

JVC ProHD GY-HM700 An In-Depth First Look by Tim Dashwood



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JVC Professional Products has finally unveiled the highly anticipated GY-HM700, its first shoulder-mounted solid-state ProHD camcorder and "big brother" to the [recently announced GY-HM100](#). This camcorder represents a first in the professional video industry by combining technology from JVC, Sony and Apple into a single product (not to mention the superb new bundled lens from Canon.) The popular features of the GY-HD200 series camcorders are carried over to the HM700 including focus assist, 180° image rotation, cinema gamma/matrix, white shading, truly progressive CCDs, 4-pin 12VDC power, 1/3" bayonet mount and a professional battery mount (Anton Bauer or IDX.)



I was recently granted some quality-time with a pre-production version of the camcorder. There wasn't enough time to warrant a full technical review, but enough to become convinced this camcorder will be the big hit when it ships in March 2009.

XDCAM EX Format Pre-Wrapped in Quicktime



An out-of-the-box GY-HM700 can record to inexpensive SDHC cards (class 6 or faster) as Quicktime .MOV using the XDCAM EX codec at selectable bitrates of 19, 25 or 35Mbps. The Mpeg-2 encoder is JVC's, the XDCAM EX codec is licensed from Sony, and the Quicktime wrapper is licensed from Apple.

All HD formats and frame rates are supported

(1080i50/60, 1080p24/25/30 & 720p24/25/30/50/60.) Two built-in SDHC card slots can accommodate continuous recording from card to card allowing the card in one slot to be changed while the other is recording. This is good news for event videographers who need to document an all-day event. A pre-record buffer of 3 seconds means documentary filmmakers will never miss unexpected or unrehearsed action.

The marketing for the HM700 suggests that the Quicktime XDCAM EX .MOV files will only be compatible with Apple's Final Cut Pro, but the truth is that by simply downloading and installing the free open-source [Perian XDCAM Quicktime component](#), the files can be read by most other Quicktime compatible applications. After installing the open-source XDCAM component I easily opened and imported the Quicktime clips I shot into Premiere Pro CS4, Media 100 Producer & Quicktime Player using an off-the-shelf Macbook that had never had FCP installed. To work with the XDCAM EX .MOV files in Windows I recommend [Calibrated Software's XD Decode](#). I was able to open the HM700 Quicktime files in the Windows XP version of Adobe Premiere Pro CS4 after XD Decode was installed.

Optional SxS module for XDCAM EX Wrapped in MP4



The optional KA-MR100 SxS module (pricing yet to be determined) can be solidly attached between the back of the HM700 and the battery plate (Anton Bauer or IDX.) This module not only allows the recording of XDCAM EX format files in the standard MP4 wrapper to SxS media (exactly like Sony's EX1 or EX3 camcorders) but it's presence also "unlocks" the ability for the camera to record .MP4 wrapped XDCAM EX to the internal SDHC card slots, although it hasn't yet been confirmed if .MP4 recording to SDHC can be done if the KA-MR100 is not powered up. MP4 wrapped media can also be recorded to the SxS card while Quicktime wrapped media is being recorded to SDHC providing a complete cross-compatibility option and an instant backup. It has also been suggested that (but not tested) an [ExpressCard SDHC adapter](#) will provide a third SDHC slot when inserted into the SxS module. This is the same adapter that would be used with a laptop and ExpressCard slot to read SDHC cards.

The advantage of the .MP4 wrapper is that all non-linear editors (on any platform) that are already compatible with Sony's PMW-EX1 or EX3 cameras will also accept .MP4 XDCAM EX media created by the the HM700 (or the HM100, [previously examined here](#)).

Ergonomic Design

Let me start by saying that the GY-HM700 is the sexiest camcorder I've ever seen, not that a professional camcorders' appearance should be of any importance to the average shooter, but good design certainly won't hurt sales. The industrial design shares the same DNA as JVC's GY-HD200 series cameras, but there isn't a single 90° angle on the HM700. The smooth curves of the HM700's body are coated with an attractive black matte finish that give it a professional looking yet rugged texture.



The camera is incredibly balanced on the shoulder when combined with the new bundled 14x lens from Canon (KT14x4.4B KRS). In addition to the ¼"-20 screw on the top handle JVC has also added an additional ¼"-20 screw hole next to the hot-shoe which is ideal for accessories like external lights, monitors, or just safer under-slung mounting on a jib. Shoulder strap connectors are also included, and the area between the handle and the camera has been expanded to accommodate cold-weather usage while wearing gloves.



LCD Screen and LCOS Viewfinder

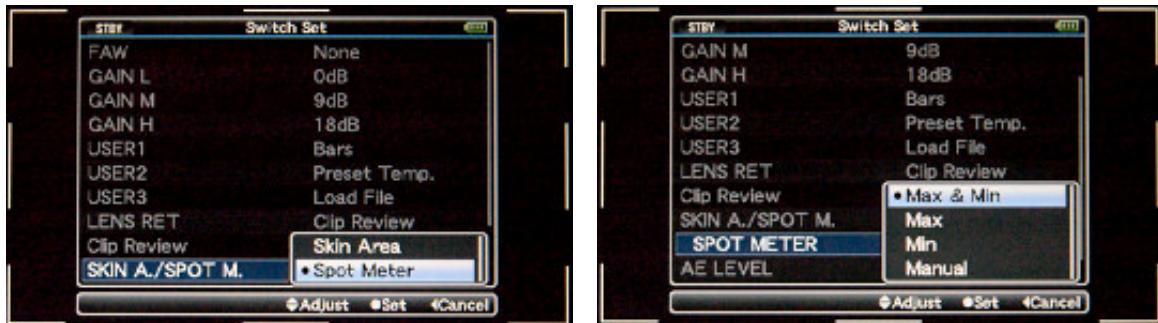
The large 4.3 inch 16x9 LCD flip out screen is a big improvement over small 4x3 LCD screens of JVC last generation of camcorders. The new LCD screen has a resolution of 800x480 (and is capable of accurately determining focus. The real story here though is the LCOS viewfinder boasting a resolution of 1,226,880 pixels 852 by (480 x RGB). The new viewfinder has a multi-pin digital interface with the camera rendering pristine clear colour images. It also has no problems refreshing at 60fps giving you an accurate representation of the final image. Unfortunately the LCOS viewfinder is not backwards compatible with the GY-HD series of JVC ProHD cameras.

Spot Meter



A new advanced feature for JVC is the Spot Meter. It can work simultaneously with Zebra patterns but not the Skin Detect feature. The Spot Meter can draw a small box around the brightest and darkest parts of the image or you can specify a target value.

I had this feature turned on while I was shooting some handheld test shots and it became very distracting to watch the boxes bounce all over the screen while panning and zooming. I would suggest that this is a tool best suited for digital cinematography applications for determining usable dynamic range with controlled lighting.



External Controls & Connectors

The majority of the external controls and connectors on the HM700 are in the same places they were on JVC's GY-HD200 series camcorders, but there are some significant improvements.

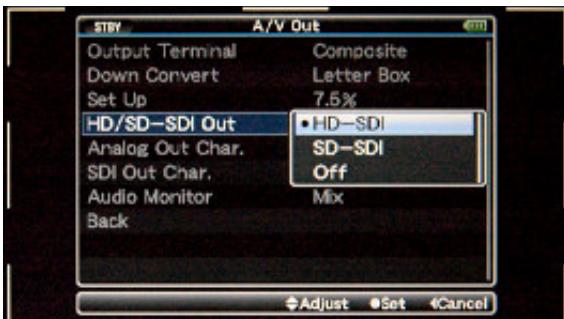


On the right side of the camera a simple push-button can switch recording from one SDHC slot to the other, presumably with uninterrupted results.

The XLR connectors are now pointed down about 30° which should prevent damage and tangling of XLR cables. It also makes it safer for the boom mic cable to stow the camera in a padded bag while it is still attached.

The left side of the camera sports a brand new menu navigation control that will be immediately familiar to anyone who has ever used a DVD remote. Up/Down/Left/Right and centre button select make navigating the new menu system a cinch. The LED ring around the controller changes colour (red/green/blue) to indicate what mode the camera is in or to alert you to a problem. When not in menu mode the control functions as shutter control (up/down push in on/off) and AE level controller (left-right).

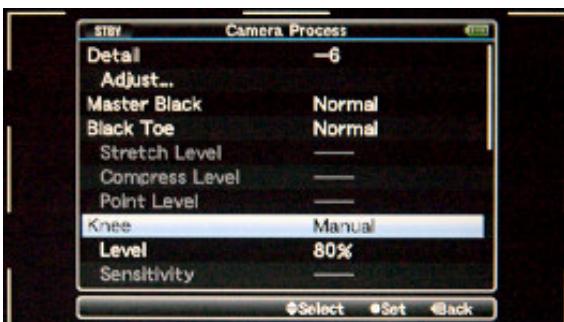
On the right side of the camera a simple push-



An HD/DV switch near the 4-pin firewire port selects whether the camera will downconvert to NTSC/PAL DV (all bitrates) or HDV (19 & 25mbps bitrates only) providing backwards compatibility with DV/HDV hard drive recorders or NLEs that may not support XDCAM EX yet. A USB 2.0 miniB connector is provided if you don't have a SDHC card reader for your computer. The RET button on the lens functions exactly like on a tape-based camcorder by playing back the last 5 seconds of the last clip recorded, but can also be set in the menu to play back the first 5 seconds or the whole clip.

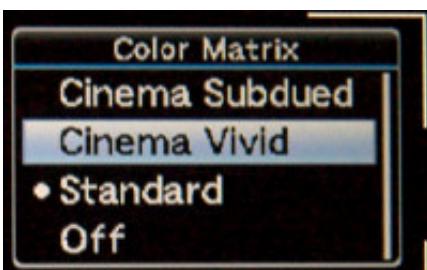
All of the external connectors are BNC including the YRB component and HD/SD-SDI outputs. The SDI output with embedded audio & TC can be switched in the menu from HD to downconverted NTSC or PAL for uncompressed 4:2:2 viewing or ingest. The on-screen displays and menus can also be output externally if required.

The Menu System



now used instead of "Black Stretch."

The new menu system is organized on the top-level much the way the GY-HD200 series was, but now continuously scrolling menus and floating windows are used instead of the annoying page flips in the old GY-HDXXX systems. Upper/Lower case fonts make readability much easier. I was impressed to see that professional terminology has been used where possible. For example the term "Black Toe" is



When making changes that affect the image processing most of the menu clears away so you can see your image and just a small floating window is left while the adjustment is made.

The Cinema matrix has been split into "subdued" and "vivid" providing another alternative for emulating different film stocks.

Timecode and Continuous Clip Recording Option

Timecode functions much the same way as a tape based system with Free Run, Record Run or Regen modes and it can be preset. I believe Record Run mode must be used to continue TC from clip to clip (so that each clip doesn't start at 00:00:00:00) but it is also possible to put the HM700 into a mode that will continuously append each clip to the end of the last so that you end up with just one clip on card, regardless of how many times the start/stop button had been pressed. There will be 4GB limits to file sizes on the SDHC cards since they are formatted as Fat-32.

Overcrank/Undercrank Capability with "Variable Frame Rate" Function



Overcranking (slow-motion) and undercranking (fast-motion) was possible to a limited degree in JVC's HD200 series cameras but quite a bit of manipulation in post-production was required to make it effective and the limited bitrate of 19.2Mbps meant that macroblocking in 60fps motion were sometimes revealed when played back at 24fps.

The HM700 includes the new "Variable Frame Rate" recording of 720p at 35Mbps for 10, 12, 15, 20, 30, 40, 48, or 60 frames per second. When using the shutter angle mode (180° / 144° / 90° / etc.), the camera will automatically calculate the exposure time as if it were a film camera and therefore render accurate film-like motion blur. The final files play back at 24fps (23.98fps) so the motion effect can be instantly reviewed on the camera.

Undercrank and Overcrank Samples

Above: 60fps overcrank sample.

Image Quality and the new Canon 14x4.4 lens

I am told by JVC that the image processing and encoder are newly designed for the HM700. The native resolution of each of the three $1/3$ rd-inch CCDs is 1280x720, and an additional boost in resolution is provided by a newly developed type of spatial offset (not the traditional horizontal / vertical one-half pixel shift process, but a new form of spatial offset exclusive to JVC and designated as their Adaptive Pixel Correlation Technique). This allows the HM700 to acquire full 1080p as well as 720p.



The new 14x4.4 lens from Canon is a thing of beauty and I can't believe it is a bundled lens. Wow this lens is sharp. I turned down the detail in the camera (artificial edge enhancement/sharpening) and was surprised at the resolution capabilities of this lens. There is minimal breathing when focusing due to the internal focus system. It also has a wide diameter locking screw which will make backfocusing easier in cold weather and a nifty push button macro button. A full-open aperture will hold F/1.6 throughout the 14x zoom range (f=4.4-61.6mm).

Lateral chromatic aberration has been significantly reduced when compared to JVC's previous bundled lenses. I still observed some later-

al CA near the edges at the wide end of the lens at F/5.6, but this is definitely a huge step forward from the "stock" 16x5.5 Fujinon lens bundled with JVC's HDXXX line. I would guess that the 3 colour separation prism has also been improved in the HM700 so I'm curious to compare the lateral CA of the variety of other $1/3$ " lenses when the camera ships next month.

I haven't had a chance to perform any of my own empirical tests for noise, vignetting, sensitivity or resolution, but I've been told that with the new Canon 14x4.4 lens more than 900 horizontal TV lines are achievable at 1080p.

My Wishlist for Future Versions...



There are a few things I wish had been included in the JVC ProHD GY-HM700.

- 1. More ND.** I would have liked to see an additional stronger internal ND filter. The ND filters included are 1/4 (2 stops/N.6) and 1/16 (4 stops/N1.2). This is usually not enough reduction for bright days in the desert or snow at 1/48th or 1/60th shutter speed and closing the aperture more than F/8 is undesirable for most shooters.
- 2. Genlock & TC.** I'd like to see a version with Genlock and TC in/out capabilities for multi-cam shooting.
- 3. 1:1 blow-up on LCD.** I've come to love this feature on the Red One camera. The ability to accurately confirm focus on a wide lens by simply pushing a 1:1 button would make a great addition to the Focus Assist function.
- 4. AWB button to function as a toggle in White Balance Preset Mode.** I love the ability to assign any number of functions to the 3 user buttons the side of the camera but I inevitably always assign Preset Temperature to one of them. The AWB button however serves no purpose when the WB switch is in the PRESET position. It makes sense to me that it should function as a preset temp toggle (this goes for the HM100 as well.)
- 5. 2800K and 8000K white balance presets.** 2800K (incandescent) and 8000K (cloudy day) presets should be included with the 3200K (tungsten) and 5600K (sunny daylight) presets. This goes for all of JVC's cameras!

The Bottom Line

I love this camera and the lens. Even if the HM700 ships in a body-only configuration I would still recommend purchasing the bundle with the Canon 14x lens. At \$7999 USD that's a deal-and-a-half! (Don't forget to add the KA-MR100 SxS module if you need full XDCAM EX recording).



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