

## Technologies Explained – XA10 Professional Camcorder

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### Canon HD CMOS Pro Sensor

Canon possesses unrivalled expertise in the design and manufacture of CMOS imaging sensors. In 2006, Canon's investment in in-house R&D resulted in the introduction of its first CMOS sensor designed for HD video capture. Continual refinement of this industry-leading technology has resulted in the HD CMOS sensors being used throughout Canon's HD camcorder range.

Canon's latest CMOS sensor, HD CMOS Pro, is taken directly from its acclaimed XF-series of professional HD camcorders. Individual pixels on this sensor are approximately 2.6x larger than those of conventional CMOS chips, offering greater light-gathering capability for drastically improved performance in low light shooting conditions. In addition to increased surface area, each pixel is deeper than on previous sensors, resulting in wider dynamic range. Over and under-exposure is reduced and detail is retained, even in very dark or bright areas of an image. Wider dynamic range also means greater tonal gradation of subjects, such as skin tones.

The sensor's native 1920x1080 image capture means no resizing or interpolation is necessary for Full HD workflow and playback, helping to ensure the very best quality is maintained. A Bayer-pattern filter provides outstanding colour reproduction. Compared with traditional CCD sensors, CMOS brings numerous advantages to HD imaging. It makes multi-channel readout of pixel sites possible, enabling much faster processing of High Definition data.

With CMOS, it is also possible to integrate other circuitry onto the imaging chip itself – leading to more efficient designs. Every Canon HD CMOS image sensor incorporates on-chip noise reduction and pixel amplification. In addition, CMOS consumes less power than CCD sensors, reducing heat and noise output and extending battery life. Plus, unlike CCD devices, CMOS sensors do not suffer from vertical smearing caused by single pixel overflow – visible when bright points of light are in the frame.

## Canon HD Video Lenses

The Full HD Video Lens in the XA10 and LEGRIA HF G10 has been custom-designed to ensure the best possible HD performance, while also offering the size and weight advantages required for mobile use.

A ground-breaking design makes this lens ultra-compact, allowing for wide-angle shooting while keeping physical size to a minimum. The new design methodology features an increase in the number of moveable groups of lens elements from two to three. The middle group moves freely in a three-dimensional space, providing both effective image stabilisation and immediate response to zoom commands.

Reduction in the overall size of the lens can result in increased levels of image distortion and aberration. The addition of a third moving lens group also helps to prevent these effects, providing outstanding all-round HD image quality.

The XA10 lens utilises unique Canon lens coatings for infrared shooting. These coatings help to ensure a clean image with consistent brightness across the frame when shooting at night.

## DIGIC DV image processors

DIGIC DV III first featured in Canon camcorders in 2009. It evolved from the DIGIC DV II processor which was originally developed for the XL H1 camcorder to handle the increased data rate and requirements of HD. High speed processing of Full HD data requires about 5x more handling capacity than Standard Definition video. DIGIC DV III has been optimised to process greater amounts of data and provide more user-friendly features.

As it handles the enormous amount of data involved in Canon HD imaging, DIGIC DV III employs a unique noise reduction system. The resulting video benefits from excellent colour reproduction and a wide tonal range. DIGIC DV III also supports the expanded gamut of xvYCC Colour Space (x.v.Color) and boasts a 25% increase in dynamic range compared with DIGIC DV II.

As a core Canon technology, DIGIC DV III provides split path processing of separate video and photo signals in a single camcorder. Video and still images have different colour requirements and by processing the signals differently, each can be maximised

for output. The result is rich and vibrant colours that are faithful to the original shooting subject, whether seen on a television screen or printed as a photograph.

DIGIC DV III is also the driving force behind many Canon camcorder features such as Smart Auto and Face Detection Technology.

#### Instant AF

As HD movies are captured at very high resolution, an extremely accurate auto focus system is essential – in HD, even slight focus errors are readily apparent.

Conventional TV AF systems are slow to react to significant changes in subject distance and can often be confused by high frequency background patterns. Canon's unique Instant AF system therefore combines a high-speed External AF sensor and an accurate TV AF sensor – the former quickly detects the range of the subject; the latter then performs the necessary super-fine focus adjustments.

#### Cinema Filters

The advanced 2011 models feature nine Cinema-Look Filters designed by professional film-makers, allowing users to transform everyday scenes by applying presets for settings such as colour, contrast, sharpness and saturation. Users select and check filters before starting to shoot, with every filter offering an explanation on the LCD screen before it is activated.

The filter options include:

- **Cinema standard:** A cinematic look that can be customised by the user
- **Vivid:** Scenes have high colour saturation (mainly RGB colours) and slightly higher contrast, which accentuates primary colours for a bright, cheerful look
- **Dream:** Gives a soft focus to a scene, adding a magical look for a dream-like effect
- **Cool:** Adds higher contrast and sharpness to the scene and enhances cold colours. Gives a bluish tint for a cool, futuristic-looking effect
- **Nostalgic:** Characteristics of the scene are sharp, black and with slight high-contrast, as well as low saturation. This filter helps users to recreate the look of old '70s TV programmes
- **Sepia:** Scenes have a sepia tone, with low contrast and saturation. This tint produces an antique, faded look

- **Old Movies:** Movies get the aged look of old cinema thanks to artificial ‘shake’ and scratched, grainy effects.
- **Memory:** Gives a light fall-off at the edges of the clip which adds a faded, misty look to create flashback scenes
- **Dramatic B&W:** Scenes have a monochromatic look; they have high-contrast and are grainy. This creates a powerful black and white image with a high-contrast greyscale

### Story Creator

Story Creator gives users a built-in “shot list” to give guidance on what the user should be shooting, providing them with a ready-made story or narrative for their movies.

Story Creator offers 1 of 5 topics which can be selected as the movie theme:

- Travel
- Kids & Pets
- Party
- Ceremony
- Blog

Story Creator then guides the user on the order in which to capture clips, and recommends lengths of time for each scene. When played back, they are composited together to make one movie with a story. Clips shot using story creator are all stored under their respective theme in a “Gallery” and after shooting, or during play back, users can rate each scene by number of stars. Once the video playlist has been created, the themed story can be played back on an HD television or other HDMI-compatible devices via the integrated mini HDMI socket, music can be mixed in camera by connecting an external music player or using pre-installed music tracks. HD videos can be down-converted to standard definition in-camcorder, ready to be uploaded to the internet.

### Touch Decoration

Touch Decoration is intended to help users add effects to their movie easily. Effects are added in-camcorder, and don’t require a PC.

Touch Decoration will allow users to add the following to their movies:

- **Animation:** Animated icons and effects to add a touch of magic to scenes e.g. shooting stars
- **Handwriting and stamps:** Allows the movie to have text overlaid, e.g. 'Happy Birthday'. Text is written using a supplied stylus pen, while a selection of stamps can also be added
- **Still Image mix:** Allows users to overlay simple graphics, or still images, to their footage

#### Improved Video Snapshot

Video snapshot enables users to shoot short scenes that last for varying lengths of time (2, 4 or 8 seconds), providing a simple way to put together a professional-looking story. In 2011 users can mix both the original audio track and additional music during playback, for more creative options.

As with Story Creator, video snapshots can be rated. This makes it easy for users to narrow down their favourite scenes for playback.