Technologies Explained – PowerShot G1 X

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A high-quality camera in its own right or the perfect complement to a professional DSLR, the PowerShot G1 X combines EOS sensor technology with DIGIC 5 processing power, a new precision Canon lens and extensive manual control – creating the finest compact camera Canon has ever produced.

Large High-Sensitivity Canon CMOS sensor

Exclusively designed for this camera, with a focus on achieving the same pixel size and sensitivity as the APS-C sensors featured in Canon's EOS DSLR models, the PowerShot G1 X is equipped with a large, 4:3 aspect, 14.3 Megapixel CMOS sensor. The sensor measures 18.7mm x 14mm – similar in height to the APS-C sensors used within Canon's EOS DSLR range. The sensor features the same pixel size and structure as the EOS 600D, and a surface area approximately 6.3 times larger than the sensor in the PowerShot G12. The light-gathering ability of the PowerShot G1 X's sensor is 4.5 times greater than the sensor featured in the PowerShot G12, offering users superb image quality in even the darkest of conditions.

The PowerShot G1 X sensor design draws on the professional expertise of Canon's DSLR sensor development team and inherits many of the same technologies featured in the EOS models. The sensor utilises on-chip noise reduction technology to deliver incredible shots with minimal noise, while the 4 channel read-out enables fast, responsive performance.

Working together with the powerful DIGIC 5 processor, the sensor forms part of Canon's most powerful HS System to date, achieving outstanding low-light performance. The PowerShot G1 X offers a maximum full-resolution ISO range of 100 to 12800, perfect for shooting in a wide range of lighting conditions.

Allowing precise control over ISO selection, an Auto ISO level adjustment feature allows users to pre-configure the maximum ISO setting (up to ISO 1600) they wish to use during shooting. Users can also specify how the camera controls ISO to obtain the best balance between image quality and shutter speed to freeze subject motion.

28mm wide-angle high quality 4x zoom lens

Developed using the same design, manufacturing and quality processes as the world-renowned EF lens range, the lens in the PowerShot G1 X is built to achieve professional levels of image quality.

The PowerShot G1 X's lens has been specifically designed for this camera and has been optimised to work with the PowerShot G1 X's new large high-sensitivity CMOS sensor. The new sensor has a 2.5 times larger diagonal length than that featured in the PowerShot G12, however the lens diameter is just 1.4 times larger. The new lens has been expertly engineered to achieve a 4x optical zoom and a 28mm wide-angle view, whilst still retracting into the PowerShot G1 X's body for complete convenience and an incredibly compact footprint. To achieve a compact size and pin-sharp clarity, the PowerShot G1 X's lens is constructed using Ultra high refractive index Aspherical (UA) lenses while glass moulding technology is used during the manufacturing process to ensure the lenses are developed to Canon's precise quality standards.

The PowerShot G1 X lens also utilises Super Spectra Coating which is an anti-reflective coating that reduces lens flare and ghosting. For more pleasant background blur, the PowerShot G1 X has a 6 blade aperture construction and allows photographers the option to shoot with apertures as small as f/16.

DIGIC 5 Image Processor

The next generation of Canon's DIGIC processor – DIGIC 5 – has been engineered to process more detailed image data, faster than ever before. The new DIGIC 5 processor analyses four times more image data to accurately produce each pixel of the image, which delivers more detail and more realistic colours. Image data is also processed six times faster compared to its predecessor DIGIC 4.

Optical Image Stabilizer (4-stops)

Canon's highly-effective optical Image Stabilizer (IS) technology prevents image blur by dramatically reducing the effects of camera shake. In situations where image blur due to camera shake is more likely – such as in darker conditions or when shooting with the zoom extended – the optical Image Stabilizer can help images remain sharp through minute vibration gyros which detect camera movement caused by hand shake. These signals are processed by a single-chip IS controller, which discriminates between hand shake and intentional camera movements. Signals are then sent to the IS unit, which moves one of the lens elements accordingly to re-align the light rays and cancel out the effects of camera shake.

Intelligent IS

Intelligent IS is a technology that enables the camera to detect the shooting situation being captured and then select the most appropriate optical Image Stabilizer mode to

prevent blur. As the nature of camera movement can change according to the shooting situation, there are seven different IS modes that can be used:

- Normal IS – This standard Image Stabilizer mode is appropriate for still image shooting where regular camera shake is corrected. Depending on the focal length and focal distance of the subject, the camera will apply the appropriate amount of angular (rotational) and shift-shake correction to obtain the best result.
- Panning IS – When shooting a moving subject such as a cyclist or moving cars at a race circuit, Panning IS detects the panning motion. This mode applies the Image Stabilizer in the axis opposite to that of the panning motion to ensure the subject remains clear and the panning effect is smooth.
- Macro IS – Macro IS corrects both angular and the more pronounced shift-shake which often occurs when shooting close ups of subjects such as flowers.
- Tripod mode – When the camera detects it is fixed on a tripod, tripod mode automatically turns the Image Stabilizer off as it is not needed.
- Dynamic IS – During movie shooting, this mode produces steadier video footage by compensating for low frequency vibrations that occur typically when users shoot movies while on the move.
- Powered IS – When users are shooting movies of distant subjects at the fullest extent of the telephoto zoom, Powered IS is used to ensure the subject remains still and clear, counteracting the more extreme camera shake that is produced when shooting using the telephoto setting.
- Dynamic and Macro IS – This mode is engaged when shooting movies of macro subjects and corrects any areas of blur caused by the shift and angular movement typical of macro shooting.

14-bit RAW and DPP Software

The PowerShot G1 X supports 14-bit RAW shooting, allowing the capture of uncompressed image information that photographers can adjust and use to manually create their final image using Canon's supplied Digital Photo Professional (DPP) software.

Sharing the same editing environment with the Canon EOS System and tailored to the needs of professionals and high-end amateurs, DPP provides a range of processing options for the RAW files produced by the PowerShot G1 X, including Picture Style, contrast, brightness, sharpness, noise reduction, white balance and exposure. A lens

correction function is also included, allowing RAW files to be corrected for lens distortion, peripheral illumination, chromatic aberration and colour blur.

High speed functions

A range of high speed functions enable users to capture both fast moving action and scenes that would otherwise be very difficult to achieve:

- High-speed Burst mode HQ –A high-speed shooting mode that enables users to capture a continuous burst of up to 6 stills at 4.5 shots/sec. in full 14.3MP resolution when the shutter is pressed, capturing a highly-detailed sequence of images to ensure you capture fast paced action.
- Handheld Night Scene – To capture scenes in very dark conditions, the camera will take a high speed sequence of shots and then combine them into a single image with the least possible blur and the best possible exposure.

In addition, when wanting to capture fast action, the PowerShot G1 X is capable of shooting exceptionally fast shooting speeds – up to 1/4000th of a second, ideal for freezing action. In contrast, when shooting with long exposures, the PowerShot G1 X offers a maximum shutter speed of 60 seconds.

Smart Auto mode

Smart Auto mode is the ultimate automatic shooting mode, which makes use of multiple technologies to offer users hassle-free shooting when photographers wish to hand over all control to the camera. Using Scene Detection Technology, Smart Auto analyses the brightness, contrast, distance and overall hue of the frame, selecting the most appropriate settings from 32 potential scenes. A colour icon indicating the type of scene detected and the lighting conditions is shown on the LCD monitor.

When shooting in Smart Auto, the following technologies are also automatically utilised to deliver great quality photos:

- i-Contrast and Smart Flash Exposure: Ensures that brighter or darker areas are captured in sufficient detail in the final image by suppressing overexposed highlights and underexposed shadows
- Multi-area White Balance: Automatically corrects inconsistencies in light balances and the way colour is represented by detecting different light sources and compensating for the differences between tungsten, flash and daylight - ensuring more realistic and consistent shots.

- Face Detection Technology: Automatically detects up to 35 faces in a scene, and then optimises camera settings to ensure everyone looks their best. The range of Face Detection Technologies includes Face Detection AF, which automatically focuses on faces, Face Detection AE which automatically adjusts exposure, Face Detection WB and Red-Eye Correction.

Electronic Level

To aid the capture of level landscapes and horizons, the PowerShot G1 X features an Electronic Level. Using information from the camera's acceleration sensor, a level indicator will appear on the LCD monitor, which displays the camera's approximate angle of tilt, allowing users to adjust the position of the body as required before taking the shot – either in portrait or landscape orientation.

High Dynamic Range mode

A High Dynamic Range shooting mode allows users to capture an increased dynamic range when shooting with a tripod – enabling the capture of detail from both highlight and shadow areas of a scene. In higher contrast situations, some conventional cameras aren't able to capture both dark shadows and bright highlights at the same time. High Dynamic Range mode captures these by taking multiple exposures of the same scene before combining them into one image in the camera. This allows the PowerShot G1 X to capture the highlights, shadows, and everything in between, closer to how the photographer sees it.

Swift manual controls

The PowerShot G1 X features a Front Dial offering DSLR-like handling and swift access to shooting settings including aperture, shutter speed and white balance, all of which can be quickly adjusted during shooting. A custom setting within the user interface also allows users to select whether to use the Front Dial or rear Multi-Control Dial as the main way of controlling these settings. Functions such as white balance, aspect ratio, i-Contrast and zoom can also be assigned to the Front Dial as the photographer wishes.

Manual pop-up flash

New to the PowerShot G1 X is a manual pop-up flash that allows photographers to add additional light to their exposure if required. The output power can be manually adjusted in the menu or automatically controlled by the camera.

Servo AF/AE

When a subject is moving towards or away from the camera and the shutter is half-pressed, Servo AF/AE will track it continuously – ensuring that the subject is in focus and well-exposed when the shutter is finally pressed.

Tracking AF

To keep focus on subjects in motion, or to help achieve a creative composition, Tracking AF mode gives photographers the ability to select objects from the centre of the frame and track them if they move, or if the frame is recomposed.

Motion Detection Technology

Motion Detection Technology automatically detects motion in the shooting scene. If movement is detected, the camera will automatically increase the ISO sensitivity (when Auto ISO is engaged) and shutter speed to minimise blur and optimise image quality.

Full HD Movie with Stereo Sound and HDMI-CEC

Full High Definition video at 1080p resolution is recorded at 24 fps with Stereo Sound, ready for playback in excellent quality on Full HD displays. When recording in Full HD, the PowerShot G1 X also offers the ability to use the 4x optical zoom to get closer to the subject. A dedicated Movie Record Button activates instant movie recording, ensuring that every moment is captured. An HDMI-CEC connection port is available for connecting directly (via an optional cable) to HD displays such as high definition TVs. If users have a HDMI-CEC compliant display, they can control playback of images on the camera via the TV remote.

PureColor II VA LCD screen

The 7.5 cm (3.0") vari-angle PureColor II VA LCD provides excellent visibility to aid the capture and playback of images and video. The screen features a 4:3 aspect ratio, 920k dot resolution and, thanks to its PureColor II design, displays images with brilliant colour rendition and high contrast. The screen can be pulled out and rotated – making it possible to shoot from awkward angles for close-up shots or behind crowds. A Quick-bright function instantly maximises the brightness of the screen, making it easier to see in conditions like bright sunlight.

Multi-aspect shooting

Multi-aspect shooting allows digital still camera users to shoot in a number of different formats without the need for post-processing. Photographers now have the ability to

choose to choose from 4:3, 1:1, 16:9, 4:5 and 3:2 allowing them to instantly select the composition that suits their subject and desired results.

Creative shooting modes

For complete creative flexibility and control, the PowerShot G1 X offers a range of creative shooting modes that lets users instantly transform the look of their shots. These modes include:

- Creative Filters – A choice of filter effects allows users to create unique shots with greater impact or a different mood:
    - Monochrome – Allows users to shoot with three types of monochromatic effects: black and white, sepia or blue.
    - Fish-eye Effect –Mimics the distortion of a fish-eye lens with one of three levels of strength (weak, medium, strong).
    - Super Vivid – Saturates the colours of an image for an intensely colourful effect.
    - Miniature Effect – Mimics the effect of a tilt-shift lens to make the scene look like a small-scale model. When shooting, designated portions of the top and bottom (or right and left side in vertical shooting) of the image are blurred, while the rest of the image remains in focus.
- iFrame Movies – The Apple®[1] iFrame video format (available when recording in 720p resolution) is an alternative, computer-friendly video format designed to dramatically simplify the process of working with video recorded using the camera. With iFrame, the video in the camera is in the same format in which users will edit, so importing video is fast. Users will be able to start editing and sharing their movies right away across multiple platforms and devices. Because it's based on standard technologies such as H.264, AAC, MP4 and QuickTime, iFrame can be used with PC and MAC applications.

[1] Apple is a trademark of Apple Inc.