



Canon

XH G1
XH A1

Canon
*image*ANYWARE**

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0067W571 11/06

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*Your Vision...
in High Definition.*



XH G1



XH A1

The XH G1 and XH A1 High Definition camcorders reflect decades of Canon leadership and know-how in the design and manufacture of cameras and lenses for professional video and still photography. Videographers get not only outstanding HD image quality but also the operability, flexibility, reliability, and connectivity that professionals demand of their gear. The Canon XH G1 and XH A1 deliver the technologies, performance, and features that make them serious tools for the capture of creative HD content. Put them to work. They'll help videographers get the job done with efficiency, excellence, and expression.

HDV
HDV 1080i

True HD Image Quality...

Because Professional Standard is Canon's Standard.



without Super-Range Optical Image Stabilizer

Genuine Canon 20x HD L Series Zoom Lens



HD image quality starts with optics, and the XH G1 and XH A1 deliver the many benefits of Canon's world-renowned lens technologies. The Genuine Canon 20x HD video zoom lens is a professional L Series lens, incorporating Fluorite and Ultra-Low-Dispersion elements. This state-of-the-art design ensures outstanding resolution, contrast, and color reproduction, delivering image quality throughout the entire zoom range unmatched by conventional optics. The 20x zoom covers an exceptionally wide and useful range of focal lengths—from 32.5–650mm (35mm photography equivalent), an optional 0.8x HD Wide Angle Adapter is available—assuring unmatched versatility for a wide range of shooting applications.



Three 1/3" Native 16:9 CCDs (1440 x 1080)

A sophisticated 3CCD design employs separate native 16:9 sensors for each primary color. With 1.67 million pixels (1440 x 1080) per sensor, the effective pixel count of the XH G1 and XH A1 is significantly higher than that of comparable HD camcorders. Canon's superior design thus delivers outstanding picture quality at 1080 HD resolution. It further ensures highly accurate color with wide dynamic range and virtually no color noise.

DIGIC DV II HD Image Processor



Engineered and manufactured by Canon, the DIGIC Digital Signal Processing chip (DSP) uses proprietary algorithms and architecture to deliver the highest image quality at the highest operating speeds. The latest-generation DIGIC DV II HD Processor is designed for HD video, operating at 1440 x 1080 pixels with 4:2:2 color sampling. A new hybrid noise reduction system uses dual processes to improve image clarity in monotone and shadow areas. Color reproduction has also been improved, especially in skin tone areas and with dark and light scenes. The DSP also enables high-quality still image recording in either video or digital camera color spaces.



Super-Range Optical Image Stabilization

Canon's Optical Image Stabilization (OIS) uses a gyro sensor to detect camera movement and activate the Lens Shift System to continuously compensate for shake and jitter. The 20x HD video zoom lens on the XH G1 and XH A1 incorporates Canon's Super-Range IS Technology, which further improves low-frequency vibration control by using two detection methods (gyro and vector). The image at the CCD sensor is analyzed, providing additional feedback to the lens shift element for even greater compensation and precision. The result is highly reliable camera shake correction, even at long focal lengths, without any image degradation.



Comprehensive Focus and Zoom Control

The Focus, Zoom, and Manual Iris Rings provide the "feel" of a professional broadcast lens. It allows fine, smooth adjustment in 1/8th-stop increments manually. The XH G1 and XH A1 provide superb response, enabling zoom speed control by varying the angle of rotation of the zoom ring with a High-Speed Zoom Mode. Zoom speed can be variable or constant with 16 possible speed level settings. Programmable lens presets enable repetitive focus and zoom actions to be memorized for instant recall.

True HD 1080 Capture with Choice of Frame Rates



The XH G1 and XH A1 capture true 1080 High-Definition video, providing images of stunning clarity. Moreover, the frame rate is selectable: Capture and output video in 60i, 30F, or 24F as needed to deliver spectacular clarity or evoke the look and feel of film and episodic TV. A 50i/25F option is available, requiring modification at a Canon Service Center. Modified cameras offer the option of switching to 50i or 60i capture in HD mode and PAL or NTSC compatibility in SD modes.

Built-In Neutral Density Filters

Two built-in Neutral Density (ND) filters (1/6 and 1/32) reduce exposure by two or five stops for added image control. They can be used, for example, when shooting bright, sunlit exteriors or to decrease depth of field for a more dramatic, cinematic look. A focus distance readout in the viewfinder assists in setting manual focus.

Instant AF

Instant AF is Canon's next-generation autofocus technology. A new external sensor works in combination with Canon's proven high-performance internal AF system to dramatically reduce focusing time and increasing accuracy, even in low-light or high brightness situations. Focusing performance is also much improved with difficult subjects. The high resolution of HD video makes focus more critical than ever, and Canon's Instant AF helps videographers capture HD images with expert precision.

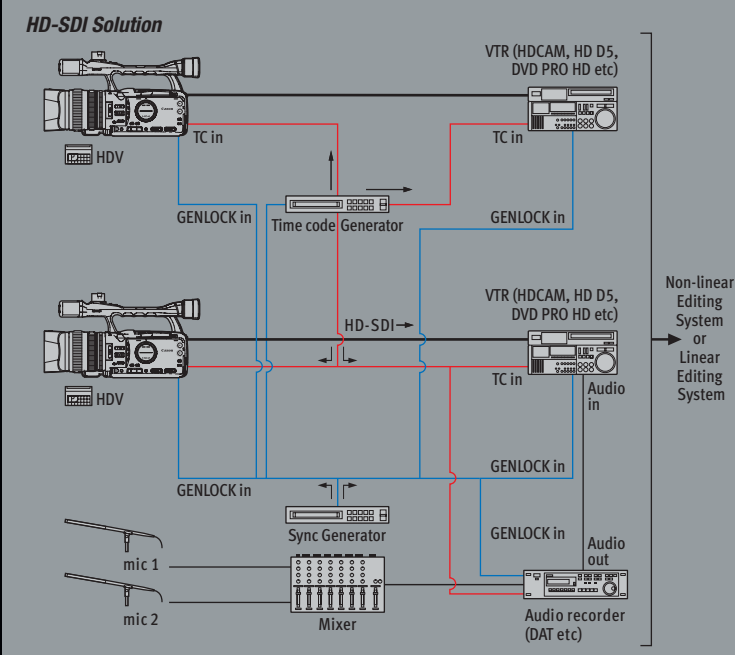
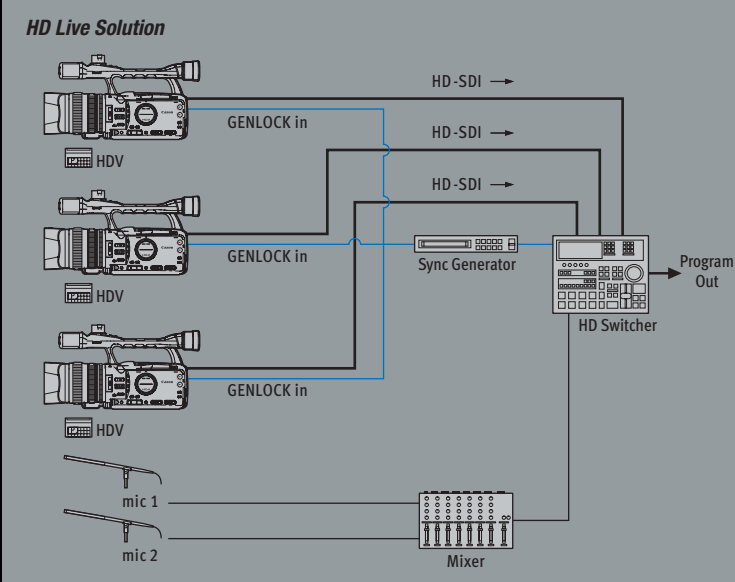
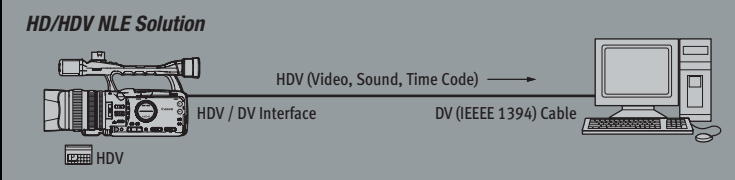


A Perfect Fit for Professional

Production Environments.



Representative Block Diagram of Interconnections between Various Production Equipment



Professional JackPack (XH G1 only)

While there are many situations that call for smaller, lighter HD cameras, most such products are unsuitable for professional applications because they lack the necessary interface capability. The Canon XH G1 features a Professional JackPack with HD-SDI (SMPTE 299M) or SD-SDI (SMPTE 272M) output, Genlock input, and SMPTE Time Code in/out connectors. The HD-SDI output provides a 1.485Gbps 60i signal at 1920 x 1080 resolution and with 4:2:2 color sampling with embedded audio and time code. Because a single industry standard connection carries video, audio, SMPTE (LTC) Time Code, and digital audio, cabling complexity is significantly reduced. It enables longer cable runs, improves operator mobility, and simplifies cabling. The Genlock input enables multi-camera synchronization in live-switched environments. It can accept either an SD (black burst) or HD (tri-level) sync signal when shooting HD. A switchable SMPTE input/output port accommodates time code requirements during multi-camera shoots and post-production.

Shutter Speeds

When shooting with the shutter priority auto exposure mode, the XH G1 and XH A1 provide 14 different shutter speeds ranging from 1/3 to 1/15,000 of a second. The 24F mode includes a 1/48 second setting that perfectly matches the shutter speed of a motion picture film camera. (For NTSC 60i/30F and PAL 50i/25F, there are 13 available settings.)

Superior Connectivity

The XH G1 and XH A1 include a full complement of input and output ports to meet just about any interface requirement. Two XLR mic/line audio inputs accommodate professional balanced connections. Also provided are industry standard connectors, including component (HD/SD) and composite video outputs (BNC/RCA), an IEEE 1394 (Firewire) port, a LANC terminal, and a headphone jack.

Audio Recording Control

Individual audio level controls, switchable 20 dB mic attenuation, 12 dB mic gain boost, and various monitoring options provide full control over the sound as it is recorded. They even include switchable phantom power (+48V) to eliminate the need for any external power supply with direct mic input. An external microphone holder is provided for on-camera mounting and for an optional professional shotgun microphone.





Noise Reduction 1

Total Image Control

By giving the operator total control of more than 23 independently adjustable variables, the XH G1 and XH A1 enable the capture of the perfect look in HD.

Gain Settings—Select automatic gain control or one of 3 preset gains (low, medium, or high), which can be assigned values from -3 dB to +36 dB.

White Balance—Numerous white balance modes are provided to ensure color accuracy in a variety of shooting situations. The automatic modes use a high-precision 128-segment through-the-lens metering system.

Auto—Provides automatic adjustment of white balance.

Outdoor—Balances for bright sunlight (5600°K), can be customized.

Indoor—Balances for incandescent lighting (3200°K), can be customized.

Color Temperature—Balances to a specifically selected value between 2800–12000°K in 100°K increments.

Custom Presets A and B—Enables two manual white balance settings to be programmed for instant recall.

Black—Three settings (STRETCH, MIDDLE, PRESS) provide a choice of dynamic range adjustment affecting the dark areas of the image. STRETCH expands the range, providing greater shadow detail. PRESS narrows the range, increasing the deep black content of the image.

Knee—Four settings (AUTO, HIGH, MIDDLE, LOW) provide a choice of dynamic range (knee point) adjustment in the highlight areas to control overexposure when shooting high-brightness subjects. The HIGH setting enables high-key shooting, while the LOW setting provides maximum protection from overexposure.

Gamma—The NORMAL gamma curve provides the best results for conventional viewing on a TV monitor. CINE 1 creates images that resemble the quality and appearance of film as viewed on TV. The CINE 2 setting selects an appropriate gamma curve for images that are to be transferred to film.

Master Pedestal—Adjustments from -9 to +9 sets the video reference black. Higher values brighten the darker areas of the image, reducing overall contrast.

Setup Level—Black level can be adjusted from -9 to +9.

Sharpness—Image sharpness can be adjusted from -9 to +9.

Horizontal Detail Frequency (HIGH, MIDDLE, LOW)—Adjusts the H detail center frequency. Horizontal/Vertical Detail Balance (-9 to +9) adjusts the H/V proportion of the detail correction.

Noise Reduction 1 and Noise Reduction 2 (both with OFF, HIGH, MIDDLE, LOW settings)—Provide a variety of methods and levels of noise reduction to accommodate numerous shooting situations and desired image qualities.

Color Matrix—NORMAL, CINE 1, and CINE 2 adjust the color during the shooting. The NORMAL setting is a matrix based on the assumption that images will be reviewed on a TV monitor. If CINE 1 is selected, the resulting quality and grayscale resemble those of a movie film. This is a matrix for creating images on TV that appear like movies. The CINE 2 setting is a matrix that is for images being transferred to film.

Color Gain/Phase—Adjustable from -50 to +50 and -9 to +9 respectively.

Master Red, Blue, and Green Gain settings—Independently adjustable from -50 to +50, provide precise control over color balance.

Six Color Matrixes—RG, RB, GR, GB, BR, and BG matrixes, each independently adjustable from -50 to +50, provide even finer color control capability by altering two of the three primaries.

Control Your Capture... Create with Precision.

Image Enhancement

The XH G1 and XH A1 provide advanced features that improve image viewability and maximize visual appeal. Skin Detail mode minimizes imperfections, such as blemishes and wrinkles, without removing detail in other areas of the image. Three intensity levels are provided, and an alternating zebra pattern in the viewfinder simplifies the process of selecting the desired area for the effect. Sky Detail can be used to enhance outdoor footage by removing unwanted detail and noise in the sky. Clear Scan eliminates the flicker and black bands that usually result when shooting a computer or other CRT screen. Frequency is adjustable from 50.2 Hz to 200.3 Hz to accommodate a wide variety of monitors.



Skin Detail



Sky Detail

Program AE Modes

Seven programmed Auto Exposure modes simplify the selection of camera settings for a variety of everyday and special shooting situations.

Easy Recording—This “point-and-shoot” mode lets the camera make all the key decisions. The camcorder automatically sets focus, shutter speed, aperture, gain, white balance, and AE program shift as required to deliver the most pleasing video images.

Auto—Similar to Easy Recording, this mode also provides point-and-shoot operating simplicity. However, it gives the operator the option of manually changing the settings.

Shutter Priority—The user selects the shutter speed, and the camera automatically selects the proper aperture for correct exposure.

Aperture Priority—The user selects the lens aperture, and the camera automatically selects the proper shutter speed for correct exposure.

Manual—The user can select any combination of aperture and shutter speed. Indicators in the viewfinder show the relation of selected combinations to the exposure as metered by the camera.



Shutter Priority

Spotlight—This mode automatically adjusts exposure for optimum results when the subject is illuminated by concentrated light source (such as a spotlight) while the background is relatively dark.

Night—The camera uses slower shutter speeds to enable capture as ambient light levels begin to fall.



Canon Console Software

Canon Console Software

Canon Console is an advanced software package developed to address the creative needs of XH G1 and XH A1 users. Incorporating many of the traditional aspects of a camera control unit, Console runs on a laptop or desktop computer and provides tools for creative expression as well as remote access to basic camera settings and operations. Functions, such as a vectorscope and waveform monitor, enable critical evaluation of the camera signal. Users can also capture the camera's video output directly to a computer's hard drive.

Console's REC PANEL includes five windows:

Rec Viewer—Live video, clip counter, audio meter and controls, color/monochrome settings, split-screen, and zebra levels.

Camera Control—Remote operation of most camera functions.

Vector and Waveform Monitors—Professional tools for checking video signal quality.

Focus Assist—Aids for achieving precise focus, such as electronic zoom and black-and-white view.

Custom Preset—Multiple settings for comprehensive image control.



Vector and Waveform Monitors

Console's PLAY PANEL features three windows that enable review of captured footage or recall of any existing clips or stills that may be stored on a hard drive or memory card:

Play Viewer—Displays selected clip with a running counter. Users can adjust playback speed and view audio monitor settings.

File Browser—Enables users to select the clip to be shown in the Play Viewer.

Vector and Waveform Monitors—Enables critical evaluation of recorded material.

Professional Operability

With Unrivaled Customization Capability.



Compact and Lightweight

The XH G1 and XH A1 share a lightweight, compact design that employs an internal battery compartment. Size, therefore, is not materially affected by the battery used. The compartment will house any BP-900 series battery or DC coupler. The reduced size and weight of these camcorders make them easily transportable and maneuverable—major advantages for location work and specialized “tight-space” shooting, often making it possible to capture footage not possible with larger cameras.

An optional 0.8x HD Wide Angle Adapter is also available. Their compactness in combination with their superb HD image quality make the XH G1 and XH A1 ideal not only as support cameras in larger production environments but also as primary capture devices for smaller organizations, such as local news stations, event videographers, and independent filmmakers.

Unique Customization Features (see chart on page 14)

The unmatched customization capability built into the XH G1 and XH A1 make them exceptionally versatile and flexible. The customization features enable them to be precision-tailored for different environments, different users, and different jobs. In all, there are 23 image adjustment, 22 display option, and 21 custom function settings that define the cameras' performance and operating characteristics. Groups of these settings can be saved and exported to other XH G1 and XH A1 camcorders using an SD memory card or Canon's Console software. Organizations that use many cameras can take advantage of this feature to easily set up multiple units for uniform capture characteristics.



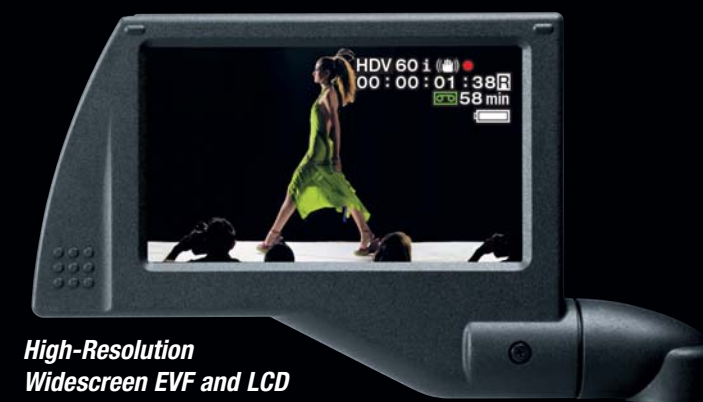
Custom Presets

Up to 9 sets of customized image adjustments can be stored in the camera's internal memory for instant recall. In addition, two Custom Keys can be programmed to provide instant access to a number of shooting functions to suit the user or the particular application.



Two Built-in Digital Still Cameras

In addition to the capture and recording of motion video, the XH G1 and XH A1 can also capture digital still images and store them on a memory card. Still images can be captured at full HD (1920 x 1080) resolution in either video color space or digital camera color space. Still images captured in video color space include time code and camera set-up metadata. Still images captured in digital still color space includes EXIF metadata. Also included are numerous advanced still camera features expected from Canon, such as auto exposure bracketing, selectable metering modes, continuous shooting and the option to use select EOS System Speedlite flashes. With many pre/post production, storyboarding, and continuity applications, still image recording is just another way the XH G1 and XH A1 deliver versatility.



High-Resolution Widescreen EVF and LCD

With both an EVF and an LCD, the XH G1 and XH A1 provide a choice of precise, informative displays for image composition and data readout. The 0.57" widescreen EVF is approximately 269,000 pixels. The separate 2.8" widescreen LCD also provides a clear, high-resolution image with approximately 207,000 pixels. Operators can choose from 22 levels of displayed shooting data, including an image-only setting that hides all information overlay. Two focusing aids are available: peaking, which highlights the edges of in-focus areas; and magnifying, which provides a 2x enlargement of the central portion of screen.

Zebra Pattern Display

High-brightness portions of the image are displayed as a black-and-white zebra pattern. The sensitivity level can be adjusted from 70 to 100 IRE in 5 IRE-unit increments.

Frame Overlays

The 16:9 color viewfinders include aspect guides for industry-standard picture formats, including 4:3, 13:9, 14:9, 1.66:1, 1.75:1, 1.85:1, and 2.35:1. Also, 80 and 90 percent picture and title safe areas can be superimposed. Other available overlays include a center crosshair mark, horizontal level marker, and a grid.



4:3 Output

The XH G1 and XH A1 include 4:3 output capability, which is highly useful in field situations where a widescreen monitor is not available for viewing 16:9 footage. The “letterboxed” 16:9 image output enables the entire frame to be viewed on a standard-definition 4:3 set.

Memory Card Slot

The memory card slot on the XH G1 and XH A1 accepts SDHC, SD, and MultiMediaCards (MMC). In addition to enabling camera-to-camera transfer of custom settings, memory cards can be used to store digital still images taken with the camcorder.



Flash Accessory Shoe

The accessory shoe on the XH G1 and XH A1 can be used to mount optional accessories. It can also be used with an optional flash unit for still photography. The shoe is compatible with E-TTL II Canon Speedlite flashes, designed for use with the Canon EOS SLR camera system, such as the EX-series models.

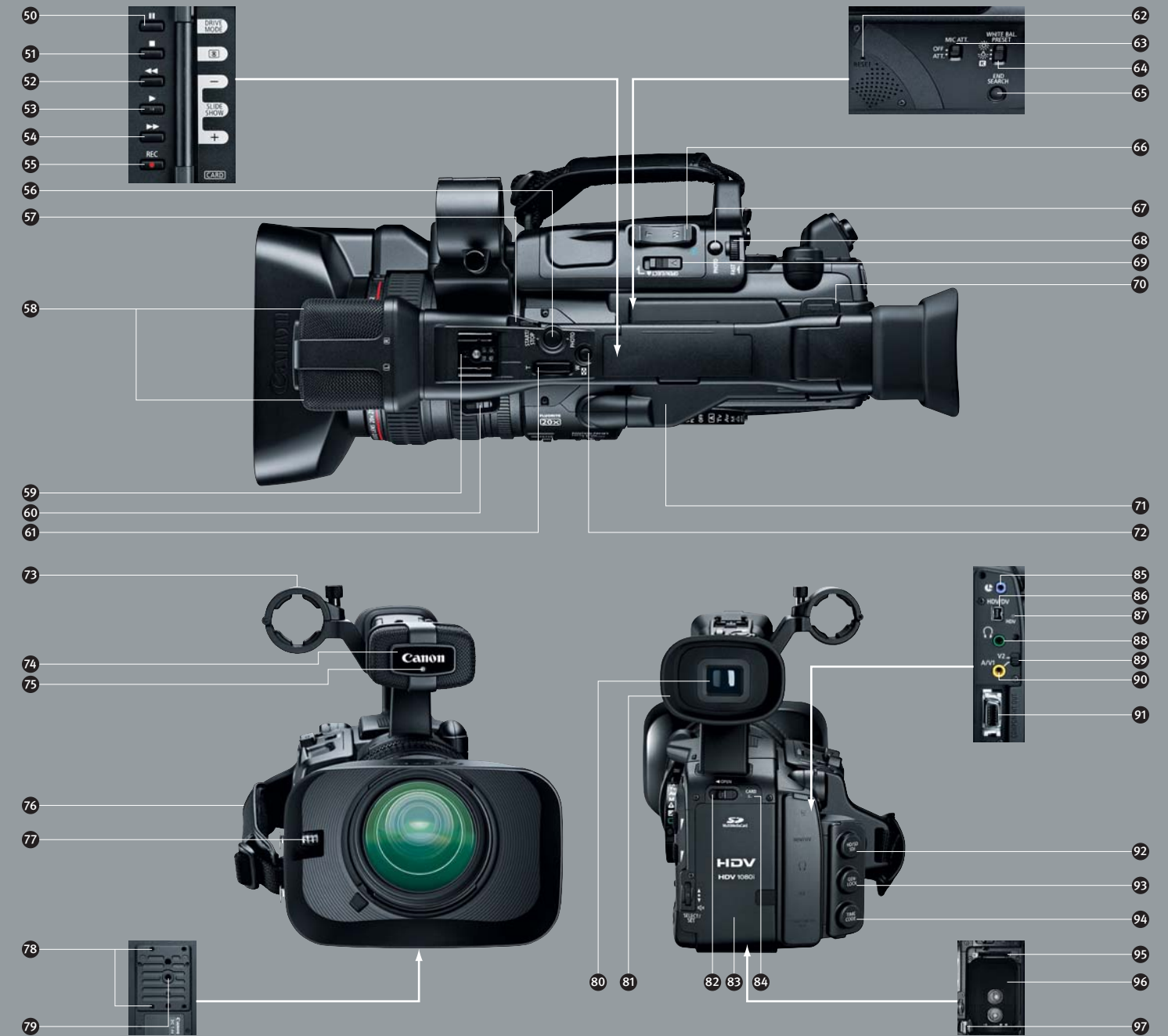


Nomenclature



- POWER Dial**
- External Control Mode
 - VCR/PLAY Mode
 - Power Off
 - Auto
 - Shutter-Priority
 - Aperture-Priority
 - Manual
 - Spotlight
 - Night
 - Easy Recording

- 1 DISP. (Display) Button
- 2 PEAKING Button
- 3 MAGN. (Magnification) Button
- 4 (Record Review) Button
- 5 POSITION PRESET Button
- 6 POSITION PRESET ON/SET Switch
- 7 PUSH AF Button
- 8 Focus Ring
- 9 Zoom Ring
- 10 Iris Ring
- 11 Side Panel
- 12 POWER Indicator
- 13 Open (Open The LCD Display) Switch
- 14 AUDIO CH1/CH2 Dials
- 15 SELECT/SET Dial
- 16 AUDIO LEVEL Switch
- 17 MENU Button
- 18 ND FILTER Switch
- 19 SHUTTER Dial/ K Dial
- 20 Focus Mode Switch
- 21 EXP. LOCK Button
- 22 GAIN Switch
- 23 AGC (Automatic Gain Control) Switch
- 24 OUTPUT Switch
- 25 AWB (Automatic White Balance) Switch
- 26 WHITE BAL. (White Balance) Switch
- 27 WHITE BAL. Button
- 28 CUSTOM KEYS
- 29 CUSTOM PRESET ON/OFF Button
- 30 CUSTOM PRESET SELECT Button
- 31 Grip Zoom Lever
- 32 PHOTO Button
- 33 Zoom Speed Adjustment Dial
- 34 VIDEO2 Terminal
- 35 Card/Tape Switch
- 36 ZOOM SPEED Switch
- 37 Cassette Compartment
- 38 Start/Stop Button
- 39 STANDBY Lever
- 40 TIME CODE Switch
- 41 LOCK Switch
- 42 MIC (External Microphone) Terminal
- 43 XLR MIC ATT. Switches
- 44 Lens Hood
- 45 LINE/MIC Switch
- 46 Input Channel Selection Switch
- 47 Lens Hood Locking Screw
- 48 +48V Switches
- 49 CH1/CH2 Input Terminals



- 50 (Pause) Button/DRIVE MODE Button
- 51 (Stop) Button/ (Metering Mode) Button
- 52 (Rewind) Button/ CARD - Button
- 53 (Play) Button/SLIDESHOW Button
- 54 (Fast Forward) Button/ CARD + Button
- 55 REC (Record) Button
- 56 Start/Stop Button
- 57 LOCK Switch
- 58 Microphone
- 59 Hot Shoe
- 60 Strap Mount
- 61 Handle Zoom Lever
- 62 RESET Button
- 63 MIC ATT. Switch
- 64 WHITE BAL. PRESET Switch
- 65 END SEARCH Button
- 66 Grip Zoom Lever
- 67 PHOTO Button
- 68 Zoom Speed Adjustment Dial
- 69 OPEN/EJECT Switch
- 70 Strap Mount
- 71 LCD Display
- 72 PHOTO Button
- 73 External Microphone Holder
- 74 Remote Sensor
- 75 Tally Lamp
- 76 Grip Belt
- 77 External Sensor for the Instant AF
- 78 Attachment Sockets for the Optional TA-100 Tripod Adapter
- 79 Tripod Socket*
- 80 Viewfinder
- 81 Dioptic Adjustment Lever
- 82 OPEN (Open The Battery Compartment) Switch
- 83 Battery/Memory Card Compartment
- 84 CARD Access Indicator
- 85 Terminal
- 86 HDV/DV Terminal
- 87 HDV Indicator
- 88 (Headphones) Terminal
- 89 Video Output Selection Switch
- 90 A/V1 Terminal
- 91 COMPONENT OUT Terminal Professional JackPack (G1 Only)
- 92 HD/SD SDI Terminal
- 93 GENLOCK Terminal
- 94 TIME CODE Terminal
- 95 Memory Card Slot
- 96 Battery Attachment Unit
- 97 BATT. RELEASE Latch

* Do not use tripods with fastening screws longer than 5.5mm as it may damage the camcorder.
 About the Terminal (LANC) stands for Local Application Control Bus System. The terminal allows you to connect and control connected devices. Connect only devices with the mark to the terminal.
 • Operation cannot be guaranteed for connections with devices not bearing the mark.
 • Some buttons of connected devices may not operate or may operate differently than the buttons on the camcorder.

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