

Canon

XLH1

OVERALL IMAGE SETUP

VERSION 1.0

4/16/2006

XLH1

XL H1 OVERALL IMAGE SETUP, V. 1.0

INTRODUCTION

The XL H1 is Canon's first high definition (HD) camcorder. It combines Canon's many years of innovative optical, integrated circuit and camera design into a camcorder designed for use by broadcasters in ENG, documentary and reality/episodic TV production and filmmakers.

The XL H1 has a similar appearance to Canon's XL1 and XL2 models, and has many of the same features, but offers a much broader range of capabilities, emulating those of cameras that are significantly more expensive.

The XL H1 camcorder offers the ability to customize the image using a number of variables. These include: three color matrixes for a wide range of color correction and two cine gammas for intricate adjustment of dynamic range; customizable knee, black stretch, horizontal detail, coring, sharpness, noise reduction, color gain, hue and master color adjustments. Each setting can be modified independently, giving the user precise control over the video's appearance.

IMAGE ADJUSTMENTS

Gamma: There are three settings, NORMAL, CINE1 and CINE2. The NORMAL setting is used when images are to be viewed on a TV monitor. If CINE1 is selected, the resulting quality and grayscale resemble those of a movie film. This is a gamma adjustment for creating images on TV that appear like movies. The CINE2 setting is a gamma adjustment for images that are to be transferred to film.

The Gamma curve can be refined by setting one of the Gammas and then using the other image adjustments to fine tune the exact look that is needed.

Knee: This adjusts the dynamic range (knee point) at the high-brightness end (highlight area), to limit overexposure when high-brightness subjects are shot. Settings are AUTO, HIGH, MIDDLE, and LOW. When HIGH is set, overexposure tends to occur more readily, but the scenes can be shot high-key. When LOW is set, the extent of the overexposure can be limited.

Black: Adjusts the dynamic range in the black area of the image. STRETCH, MIDDLE and PRESS are selectable. When STRETCH is set, the dynamic range in the black areas is expanded, emphasizing contrast in the dark area, so that the grayscale for black can be expressed. When PRESS is set, the dynamic range in the black areas is narrowed – the darkness is enhanced or deepened – so the grayscale for black is reduced. This is adjusted to suit the user's personal preference.

Master pedestal: This adjusts the bottom portion of the Gamma curve without affecting the white portion of the Gamma curve. When the cursor is moved in the [+] direction, the dark areas of the image become brighter, and the contrast is reduced. Conversely, when it is moved in the [-] direction, these areas become darker, and the contrast is increased. This is user-adjustable to suit the user's personal preference. Adjustment is possible in the -9 to +9 range, only in Camera mode.

Setup level: For adjusting the overall Gamma curve up or down. When the cursor is moved in the [+] direction, the shadow areas become brighter; conversely, when it is moved in the [-] direction, the screen darkens. Adjustment is possible in the -9 to +9 range. Depending on the value set for the master pedestal, the setup level may not be able to take a negative value. In this case, adjusting the setup value within a certain value range will have no effect.

Sharpness: Adjusts the sharpness of images. When the cursor is moved in the [+] direction, the images become sharper; when moved in the [-] direction, they become more blurred. This is adjusted to suit the user's personal preference. Adjustment is possible in the -9 to +9 range.

H detail: This adjusts the center frequency of the H detail. The center frequency in the horizontal direction can be set to HIGH (high range), MIDDLE (middle range), and LOW (low range).

H/V balance: This is for adjusting the horizontal/vertical percentage of detail correction in the -9 to +9 range, user adjustable to suit personal preferences.

Coring: Adjusts the subtle noise components on the screen. When the cursor is moved in the [+] direction, the noise becomes less noticeable. When the cursor is moved in the [-] direction, it becomes more noticeable. Adjustment is possible in the -9 to +9 range, adjusted to suit the user's personal preference.

NR1: This function is for activating noise reduction that cycle through the fields. The variable range of the noise reduction level can be selected. The available settings are OFF, HIGH, MIDDLE, and LOW. In settings other than OFF, noise reduction level changes according to the gain, and the variable range becomes progressively larger as the setting is changed from LOW to MIDDLE to HIGH. Although the S/N ratio is improved, afterimages may appear in some cases. This is adjusted to suit the user's personal preference. When picture noise is already low due to the gain settings, the noise reduction may not be noticeable.

NR2: This function uses an epsilon filter that activates noise reduction in field units. The available settings are OFF, HIGH, MIDDLE, and LOW. By switching from LOW to HIGH, the entire screen appears with a smooth and soft presentation. This results in an effect similar to that of applying the skin detail function over the whole picture. Unlike with the NR1 setting, a trailing afterimage will not appear.

Color matrix: This adjusts the color during shooting. The available settings are NORMAL, CINE1 and CINE2. The NORMAL setting is a matrix based on the assumption that images will be viewed on a TV monitor. If CINE1 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 CINE2 setting is a matrix that is for images being transferred to film for viewing.

Color gain: Adjusts the coloring of images. When the cursor is moved in the [+] direction, the amount of coloring is increased; when moved in the [-] direction, it is reduced. Adjustment is possible in the -9 to +9 range, adjusted to suit the user's personal preference.

Hue: For adjusting the hue of the images. When the cursor is moved in the [+] direction, the images become redder; when moved in the [-] direction, they become greener. Adjustment is possible in the -9 to +9 range.

R gain: This is for adjusting the white balance (WB) of the images. When the cursor is moved in the [+] direction, WB shifts toward red; when moved in the [-] direction, it shifts toward cyan. The coloring is adjusted to suit the user's personal preference in a range of -9 to +9.

G gain: Also for adjusting the white balance (WB) of the images, when the cursor is moved in the [+] direction, WB shifts toward green; when moved in the [-] direction, it shifts toward magenta. The coloring is adjusted to suit the user's personal preference. Adjustment is possible in the -9 to +9 range.

B gain: For adjusting the white balance (WB) of the images. When the cursor is moved in the [+] direction, WB shifts toward blue; when it is moved in the [-] direction, it shifts toward yellow. The coloring is adjusted to suit the user's personal preference, in a range of -9 to +9.

R-G matrix: This adjusts the color tint without affecting B (blue). Adjustment is possible in the -9 to +9 range, adjusted to suit the user's personal preference. **R-B matrix:** This function adjusts the color tint without affecting G (green). Adjustment is possible in the -9 to +9 range, adjusted to suit the user's personal preference.

G-R matrix: This function adjusts the color tint without affecting B (blue). Adjustment is possible in the -9 to +9 range, adjusted to suit the user's personal preference. **G-B matrix:** This adjusts the color tint without affecting R (red). Adjustment is possible in the -9 to +9 range, adjusted to suit the user's personal preference.

B-R matrix: Adjusts the color tint without affecting G (green). Adjustment is possible in the -9 to +9 range, adjusted to suit the user's personal preference.

B-G matrix: This adjusts the color tint without affecting R (red). Adjustment is possible in the –9 to +9 range, adjusted to suit the user’s personal preference.

CUSTOM PRESETS

The functions listed above can be saved as Custom Presets in the XL H1, and then saved to a memory card, for transfer via the card to another XL H1. Saving and Sharing Custom Presets: You can define preset levels for 23 recording specifications when recording on tape, 17 when recording still images on the memory card. Up to 6 custom presets can be stored in the camcorder’s memory, and up to 20 can be stored on a memory card. You can copy the camcorder’s custom presets to the memory card.

While recording to tape and simultaneously recording a still image on the memory card, the current recording specifications can be saved as a custom preset on the card. Later you can load that custom preset from the memory card to the camcorder. When saving the custom preset currently in use – embedding it in a still image – the number of custom preset files you can save is not limited to 20; you can record as many still images/CP files as there is free space available on the memory card.

SKIN TONE DETAIL

One of the more critical elements when shooting video is ensuring skin tones are “natural,” and imperfections are minimized. The XL H1 employs a unique function called Skin Tone Detail to assist with this operation. Areas in the picture that have skin-tone characteristics are detected when this function is called up in the menu, and the details in those areas will be softened to conceal skin imperfections, smoothing out skin blemishes and wrinkles. These skin areas will be identified in the viewfinder, during setup, by a zebra pattern alternating with the normal picture. On a connected TV or computer screen, a white pattern appears instead. You can adjust the hue, chroma, area and Y level as required to determine the areas that will be detected as skin areas.

SKIN TONE ADJUSTMENTS

Hue: This function is used to determine the hue of the detected skin color area. In the menu, moving the cursor in the R direction detects reddish skin colors, and moving the cursor in the G direction detects greenish skin colors. The skin area detected on the monitor is shown with a zebra pattern. This is useful for selecting skin colors under fluorescent lights, at dusk, or under other shooting conditions where there are different color temperatures.

Chroma: This is used to determine the chroma saturation of the detected skin color area. Moving the cursor in the [+] direction detects more intense colors, and moving in the [–] direction detects less intense colors, and then the skin area detected on the monitor is shown with a zebra pattern. This is useful for distinguishing between vibrant skin colors and lighter skin colors.

Area: This adjusts the width of the chroma of the detected skin color. Moving the cursor in the [+] direction detects a wider chroma range, and moving in the [-] direction detects a narrower chroma range. The skin area detected on the monitor is shown with a zebra pattern. This is useful for selecting skin colors when many similar skin colors appear.

Y level: This function adjusts the brightness level of the detected skin color. Moving the cursor in the [+] direction detects brighter levels, and moving in the [-] direction detects darker levels. This function is useful for distinguishing bright skin colors and dark skin colors.

Detail adjustment: This softens the detected skin color area. The available options are “Off,” “Low,” “Normal,” and “High.” Moving from low to high applies a softer tone to skin color areas. When off is selected, no detail adjustment is made.

PROGRAM AE (PROGRAM AUTOMATIC EXPOSURE)

Program Auto Exposure (Program AE) is a term used to encompass several shooting modes that rely on the camera’s sophisticated algorithms to analyze the light coming through the lens and deliver proper exposure, automatically, under a variety of lighting conditions. To call it point-and-shoot video is undervaluing its capabilities. The XL H1 is designed to give control over the camera’s set-up and operation. This runs the gamut from video format selection to SMPTE time code settings and white balance from gamma, knee, master pedestal, sharpness and coring, to noise reduction, color matrix and color phase, from audio levels to zebra stripe settings. And, of course, from aperture to shutter speed. The XL H1 also provides a set of automatic exposure modes that are useful tools for everyday shooting situations, as well as a sophisticated answer to some problematic situations, including those times when the videographer simply doesn’t have the time (such as in a breaking news environment) for a leisurely/lengthy set-up. These modes are: Tv, Av, Manual, Spotlight, Night, Easy Record, and Auto.

Tv Mode: Tv stands for Time Value, and is perhaps better known as shutter priority. In this mode, the XL H1 automatically sets the lens aperture for a proper exposure based on the shutter speed you have selected. The chosen shutter speed is displayed in the viewfinder. In 60i you have 13 shutter speeds to select from: 1/4, 1/8, 1/15, 1/30, 1/60, 1/100, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/8000, 1/15000 second. In 24F, the shutter speeds under 1/60 change to 1/3, 1/6, 1/24, 1/48. If you have selected a shutter speed that is too low for the light conditions, a warning to use an ND filter will appear in the viewfinder.

Av Mode: Perhaps better known as aperture priority, the Av or Aperture Value mode selects the shutter speed necessary for proper exposure when you select the aperture. This mode is particularly useful when you want to control depth of field. The chosen aperture is displayed in the viewfinder. You have 20 apertures to select from when using the 20x HD lens,

depending on zoom position: f/1.8, 2.0, 2.2, 2.4, 2.6, 2.8, 3.2, 3.4, 3.7, 4.0, 4.4, 4.8, 5.2, 5.6, 6.2, 6.7, 7.3, 8.0, 8.7, and 9.5. If you select an aperture that is too large for the lighting conditions, a warning to use an ND filter will appear in the viewfinder.

Manual Mode: This mode provides control of both the shutter speed and aperture, giving you a viewfinder display of both selections, as well as a bar and pointer display of how the chosen combination handles the light levels as metered by the XL H1.

Spotlight Mode: Based on a scenario where the subject in the center of the frame is brightly lit, while the background is dark (such as a person giving a speech), Spotlight mode delivers proper exposure for the bright subject to prevent overexposure or blooming.

Night Mode: In Night mode, the XL H1 continues to record even when light levels fall. The camera selects lower shutter speeds to deliver proper exposure – down to 1/4 or 1/3 second, depending on video format. This can deliver moving subject afterimage and comet-tailing, lower picture quality and noise, and the autofocus system may not function properly.

Easy Record (Green Mode): This is the equivalent of a simple camera's point-and-shoot operation. When this mode is selected, the XL H1 automatically controls shutter and aperture, focus, gain, and white balance. This mode is great for when action is happening and you need to catch it.

Auto Mode: Auto mode is similar to the Easy Record mode, except while the camera selects shutter, aperture, focus, gain, and white balance, you have the option of manually changing the selections.

AE Shift: When in Auto, Tv or Av modes, you can engage AE Shift in the camera menu to make slight adjustments to the image brightness – to compensate, for example, for backlighting or for scenes that are being rendered slightly overexposed. There are 13 steps available, from -2 to +2, in 0.25 increments.

AE Lock: Engaging the AE Lock on the XL H1 holds the exposure at a particular setting, preventing unplanned exposure changes with a moving subject, for instance. Auto exposure lock can be engaged in Auto, Tv and Av modes.

GAIN

The Gain control adjusts the level of the video signal. You can select from Automatic or Preset levels in a range from -3 dB to +18 dB. The gain controls are switchable between automatic and manual control. The XL H1 automatically controls the camera gain in the

Easy Record mode or Spotlight recording programs. Automatic Gain Control (AGC) also can be selected via the gain control knob. AGC is typically used to maintain a constant video luminance level by boosting weak (low light) picture signals electronically. You also can manually adjust the Gain control to other preset levels that range from -3 to +18 dB. The gain level you select appears in the viewfinder. Use lowest gain levels for lowest noise recording for indoor, low light or low contrast scenes. Zero or balanced gain (0 dB) is used for low noise, color reproduction of illuminated scenes. Higher gain settings are used to increase light capture to brighten indoor or low-light scenes when an open iris does not supply sufficient signal. Higher gain settings also enable you to increase the depth of field using a smaller iris aperture. There are times when you may have to shoot in dark locations but cannot add lighting to the scene. Using the gain control will increase the brightness of a recorded scene, although at the expense of some image noise.

WHITE BALANCE

The XL H1 uses an electronic white balance process to calibrate the picture for accurate color display in different lighting conditions (i.e. sunlight versus indoor incandescent). Automated white balance settings include a fully automated mode, an indoor mode, an outdoor mode, and a color temperature mode. This latter mode lets you set the white balance to a known color temperature, adjustable in 100°K levels from 2,800°K to 12,000°K. (When the XL H1 is set to Easy Record mode, white balance is fully automated and cannot be adjusted.) The XL H1 also lets you set the white balance manually by selecting manual select, then pointing the camera at a white object (such as a sheet of paper) that fills the field of view. The XL H1 gives you the option of setting and saving up to two white balance presets.

CLEAR SCAN

A flickering computer or TV screen in the background of a shot can be very distracting. The Clear Scan feature records a computer CRT screen or similar equipment without displaying a black band or flicker on the screen; the shutter speed is adjusted to a frequency that perfectly matches the CRT's scan rate.

CONCLUSION

The XL H1's image settings allow complete control over the image, whether you're looking for that unique look or matching another camera. This type of versatility is unmatched in this product class.

Combined with other XL H1 features such as: three 1440x1080 CCDs, HD-SDI output, Time Code in/out, Gen Lock in and 20x HD lens with built-in Optical Image Stabilization, the XL H1 is the price/performance leader in the industry.