LCD Monitor Features and Functions

Features and Functions Comparison Table

*For details, see page 55 – 58.

		BT-4LH310	BT-LH2170	BT-LH1850	BT-LH910G
1	3D-LUT & 6-Axis Color Correction	✓	✓	✓	✓
2	HDR (High Dynamic Range) compatibility	✓			
3	Compatibility with BT.2020 color space	✓			
4	I/P Conversion Circuit for Motion Response Latency Less than 1 Field	✓	✓	✓	✓
5	Diagonal Line Compensation	✓	✓	✓	✓
6	Gradation & RGB Manual Control	✓	✓	✓	✓
7	High-Speed Response	✓	✓	✓	✓
8	Wide Viewing Angle	178˚	178˚	horizontal 170˚ vertical 160˚	176˚
9	VariCam Cine gamma Compensation	✓	✓	✓	✓
10	Black Mode	✓	✓	✓	✓
11	Calibration Function	✓	✓	✓	✓
12	Various Markers	✓	✓ (2D mode)	✓	✓
13	Cross Hatch Overlay	✓	✓	✓	✓
14	Waveform Monitoring	Y/R/G/B	Y/R/G/B	Y/R/G/B	Y/R/G/B
15	Vectorscope Display	✓	✓	✓	✓
16	Pixel-to-Pixel Display	✓	✓	✓	✓
17	Zoom Display	✓	–	–	–
18	Focus-in-Red Display	✓	✓	✓	✓
19	Y Map Display	✓	✓	–	–
20	Still Frame Display (Frame Grab)	✓	✓	✓	✓
21	Quad Display (2K/HD)	✓	–	–	–
22	2-Input Split-Screen	–	✓	–	–
23	Error Indication Display	✓	–	–	–
24	Audio Level Meter	✓ (color)	✓ (color)	✓ (color)	✓ (color)
25	Time Code Display	✓	✓	✓	✓
26	Closed Caption Display	8 Windows	8 Windows	8 Windows	8 Windows
27	HV Delay Display and B/W Mode	MONO Mode only	✓	✓	✓
28	Function Keys	5	5	5	3
29	Diverse 3D Camera Assist Functions	–	✓	–	✓
30	External Remote Compatibility	RS-232C/ GPI/RS-485	RS-232C/ GPI/RS-485	RS-232C/ GPI/RS-485	RS-232C/ GPI
31	Tally Lamp (s)	Front	Front	Front	Front/Rear
32	Power Save Mode	✓	✓	✓	✓
33	Key Lock	✓	✓	✓	✓
34	Rugged Frame Structure	Aluminum Frame	Aluminum Diecast Frame	–	Magnesium Diecast Frame
35	AC/DC Power Supply	AC/DC 24 V	AC/DC 12 V	AC/DC 12 V	DC 12 V
36	Wall/Rack Mounting (with Option)	–	Wall Mounting	Wall Mounting	Rack Mounting
37	Fanless	✓	✓	✓	✓
36	Mercury Free, LED Backlight	✓	✓	✓	✓
37	Speakers and Headphone Jack	✓	✓	✓	Headphone Jack only

| Matrix (two dimensions) | 3D-LUT |

When the luminance levels of input signal is 100%

When the luminance levels of input signal is 10%

When the luminance levels of input signal is 10%
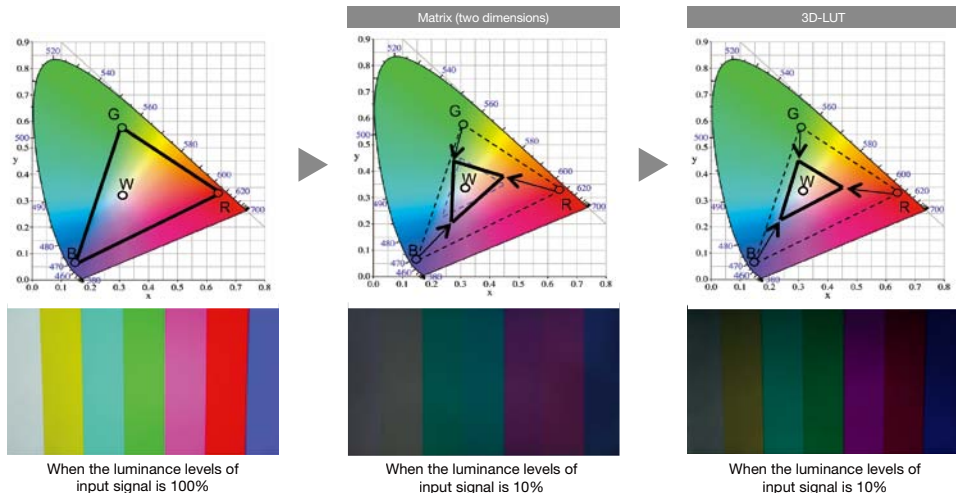
[1] 3D-LUT Color Correction and 6-Axis Color Correction

The color space on LCD displays tends to narrow when the luminance level drops, and it's often accompanied by color phase shifts that cause colors to drift. 3D-LUT (Look Up Table) Color Correction on the LH Series LCD monitors includes a look up table for each luminance level, and applies 10 bit image processing to each RGB color to balance the six coordinate axes of the three primary colors (RGB) and their complementary colors (CMY). This solves the problem of color drifting at low luminance levels, and keeps colors natural.

In addition to enhancing low luminance areas, 3D-LUT Color Correction helps to produce finely nuanced intermediate hues. Based on color measurements in the intermediate color parts of the image, this function applies smooth correction processing while balancing the six coordinates of the three primary colors (RGB) and their complementary colors (CMY), resulting in beautifully smooth gradation. It keeps the intermediate shades of extremely fine colors vibrant and lifelike.

3-Axis (RGB) Coordinate Correction

6-Axis (RGB/CMY) Coordinate Correction

[2] HDR (High Dynamic Range) compatibility

"HDR" is added to the gamma selection menu. The HDR mode provides a high dynamic range in compliance with SMPTE's FOTF standard, ST 2084. This mode provides rich gradation to render contrast, color and shadow in dark image areas that could not previously be reproduced due to blackout, thus resulting in more realistic image display.
* The peak brightness of the product is clipped at 450 cd/m2 in the HDR mode. However, the displayable range can be varied by adjusting the contrast and brightness, so that the clipped high-brightness or low-brightness image sections can be checked.

[3] Compatibility with BT.2020 color space

"ITU-2020 emu" is added to the color space selection menu. This mode enables an emulation display to support the wide color gamut and color space of the ITU-R BT.2020 standard.
* The display color space of the BT-4LH310 does not completely comply with BT.2020. The BT-4LH310 shifts the color balance of the displayed image to correspond with the BT.2020 color gamut.
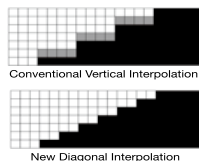
[4] I/P Conversion Circuit for Motion Response

A circuit delay time (not including panel delay) of approximately 5 msec* is achieved by incorporating an I/P converter circuit that converts SD and HD interlace signals with high precision and generates a progressive signal without causing field-length delay. Minimizing the delay between the input signal and monitor output enables the user to confirm footage without any incongruity.
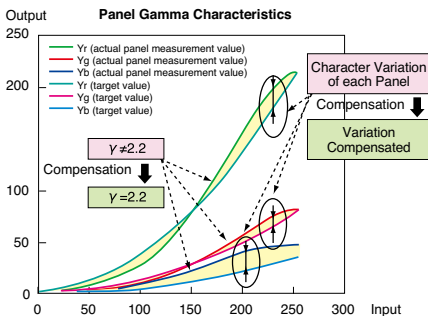* Differs slightly depending on the signal format.

[5] Diagonal Line Compensation

Jagged noise on diagonal lines in moving images is a common problem. These LCD monitors solve this by detecting correlations in the diagonal direction, resulting in smooth, precise reproduction of moving images.

Conventional Vertical Interpolation

New Diagonal Interpolation

Applicable function varies deapending on the models. Please see page 54 for details.

[6] Ideal Gradation for Broadcast Applications, and Selectable Color Temperature

In order to optimize the LCD monitor for professional broadcasting applications, compensation is conducted for each monitor in 256 discrete RGB steps, rated gamma properties (gamma = 2.2) are reproduced, and gradation suitable for broadcasting is achieved. The BT-4LH310's color temperature of 9300 K/6500 K/6300 K/6000 K/ 5600 K can be selected with the variable setting.
The BT-LH2170/LH1850/LH910G's color temperature of 9300 K/6500 K/5600 K and 3000 K to 9300 K can also be selected with the variable setting.

Panel Gamma Characteristics

- Yr (actual panel measurement value)
- Yg (actual panel measurement value)
- Yb (actual panel measurement value)
- Yr (target value)
- Yg (target value)
- Yb (target value)

Character Variation of each Panel

Compensation

Variation Compensated

$\gamma \neq 2.2$

Compensation

$\gamma = 2.2$

Output 250 200 100 50 0 / 0 50 100 150 200 250 300 Input

[7] High-Speed Response

All models feature an overdrive circuit to improve response in intermediate gradations.

[8] Wide Viewing Angle

By using a high-intensity, high-contrast IPS LCD panel, a wide viewing angle is achieved. Easy viewing is ensured by reducing color changes due to the viewing angle.
* The BT-LH1850 is not equipped with an IPS panel.

[9] Cine Gamma Compensation

The cine-gamma (F-REC) compensation function enables compatibility as a monitor for a VariCam Camcorder. This function supports the production of movies, film-like HDTV programs, and TV commercials.

[10] Black Mode

All models are equipped with a black mode that also makes dark image areas in low-gradation scenes easier to see. It helps for producing movies as well as film-like HD programs and commercials.

Black Mode ON

Normal Mode
Black Mode

Luminance

Input Level   75%
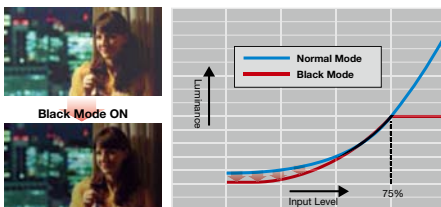
*Pictures simulated.

[11] Calibration Function

Pre-installed software allows calibration without using a PC, by simply connecting a manufacturer-designated display color analyzer and measurement probe to the monitor.
*Konica Minolta CA-310 Display Color Analyzer with CA-PU32/PU35 or CA-PSU32/PSU35 Standard Measurement Probe. For more information about the Konica Minolta calibration system, please see the following website. <http://www.konicaminolta.com/instruments/index.html>.

[12] Various Markers

Aspect Marker (17:9*, 16:9): All models have seven modes of 4:3, 13:9, 14:9, CNSCO 2.39, CNSCO 2.35, 2:1 and VISTA, with background brightness control of Black (0%), Half (50%) or Normal (100%).

Safe Area Marker： All models have five modes of 95%, 93%, 90%, 88% or 80%. In addition, the BT-4LH310 has USER, DOT, LINE, or VAR marker (selectable). In 16:9 mode, a superimposed safe area marker can display, corresponding to the aspect marker's angle of view.
Center Marker： Can be displayed together with another marker, as shown in the example at the right above.

4:3 Aspect and 80%Safe Area Marker

Safe Area and Center Marker

[13] Cross Hatch Overlay

A simple cross hatch overlay can be displayed to check the tilt of the camera.
* Intervals vary depending on the model.
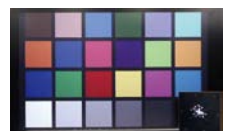
Cross Hatch ON

[14] Waveform Monitoring

The built-in waveform monitoring function displays a waveform in a sub-screen. You can select the signal to be displayed from Y, R, G or B.

Waveform Monitoring

[15] Vectorscope Display

All lines of the input signal via SDI are displayed as a vectorscope, and can be positioned in any of the four corners of the screen.

Vectorscope Display

Applicable function varies deapending on the models. Please see page 54 for details.

LCD Monitor Features and Functions

[16] Pixel-to-Pixel Display

This function displays video pixels without any resizing.
• **BT-4LH310/LH2170:** Displays images with the same number of pixels as the source images.

Pixel-to-Pixel Display Image
BT-LH1850 1080 center mode

• **BT-LH1850:** When displaying 1080i/p, you can check the zoom-in image and choose from five display areas: center, right-top, right-bottom, left-top or left-bottom.
• **BT-LH910G:** With 1080/60i input signals, you can check the zoom-in image with a screen width equivalent to 342.9 mm (13.5 inches).

[17] Zoom

The BT-4LH310 is equipped with a Zoom function. Enlarges (4x normal size) the center section of the image or one of the quarter sections and displays it on the full screen for accurate, easy focusing.

Enlarges the center section of the image or one of the quarter sections

Zoom Display (Center)

[18] Focus-in-Red

This function emphasizes the sharply focused area of the image by showing it in an easily visible red.
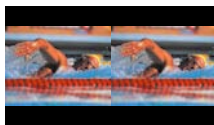

Focus-in-Red ON

[19] Y Map Display

This function allows quick visual confirmation of scene luminance levels via means of assigning a simple color code for each luminance step.

Y MAP

[20] Still Frame Display (Frame Grab)

A frame of video can easily be frozen and displayed as a still image. The BT-4LH310 displays on the full-screen, for comparing camera angles or colors between takes or scenes. The BT-LH2170/1850/910G display on the left side of the screen to match a live camera with a frame of video shot at an earlier time or with a different camera. There are two display modes: FULL and PART (center).

Still   Video Monitor
FULL mode (4:3)

[21] Quad Display (2K/HD)

The BT-4LH310 Quad Display function displays a waveform monitor (WFM) and a vector scope (VSC) as well as one of the Focus-in-Red, Y Map and Zebra assist functions simultaneously with a full-pixel image from a 2K (2048 x 1080) or HD input source. This function also allows a single BT-4LH310 to be used as four 2K/HD monitors. It displays full-pixel images without resizing.

Input source image (upper left), Focus-in-Red (lower left), WFM (upper right) and VSC (lower right)

Four-Window Display

[22] 2-Input Split-Screen

The BT-LH2170 simultaneously displays two images side-by-side from two video inputs. This is especially useful for combining CGs and actual images. Because a single monitor can temporarily serve as two monitors, it helps to save space. It is also possible to set the size, color space, and gamma and RGB gains individually for each input.

2-Input Split-Screen Function

*It may not be possible to display both images simultaneously with certain input signal combinations.

[23] Error Indication

The BT-4LH310 is equipped with an Error Indicate function. Transmission and other errors are detected during SDI input, and the error status is displayed and logged.

[24] Audio Level Meter

All models are equipped with a color audio level meter. This meter displays the level of embedded audio (3G SDI, SDI, HDMI*1, Display Port*2) input. Reference point setting, peak hold and overrange display are also possible. The display mode can be selected from 2-channel, 4-channel, 8-channel or OFF.

BT-LH910G Color Audio Level Meter

8ch Audio Level Meter

*1: 2-channel display for HDMI input.
*2: BT-4LH310 only. 2-channel display for Display Port input.

[25] Time Code Display

With HD SDI input, this function displays the value of the VITC, LTC or UB time code.

* In the BT-4LH310, this function is supported only in the 2K/HD mode.

Time Code Display

Applicable function varies deapending on the models. Please see page 54 for details.