

## BVM-L231

23-inch Reference LCD monitor



### Overview

The BVM-L231 reference LCD monitor supersedes the market leading BVM-A series CRT models, heralding in a new era in broadcast post-production, D-Cinema production, evaluation and mastering. A premium Sony technology - TRIMASTER - is used in the BVM-L231 to produce an LCD monitor fully justifying the Reference designation. In developing TRIMASTER, the technology had to deliver accurate colour reproduction, precision imaging and absolute picture consistency. Sony has achieved this through 3 key devices: a high-grade customised LCD Panel, a precision High-Purity LED Backlight system and a sophisticated Display Engine.

The high-grade customised LCD panel incorporates a 10-bit driver for smooth greyscale and colour transitions, and possesses a high frame rate allowing black-frame insertion for reduced motion blur.

The Precision Backlight system uses High Purity LEDs - delivering wide reference-standard colour space, uniformity control and colour stability through the auto white-balance circuitry.

The display engine uses 2 state-of-the-art ICs employing accurate 12-bit output processing - one dedicated to I/P conversion, producing the lowest possible artefact count, and one focussed on the highly accurate colour management system, delivering

stability, consistency and precise standards emulation. The BVM-L231 also benefits from picture and picture and blend modes plus a pixel zoom function for greater user flexibility. The BVM-L231 accepts all video formats up to 3G SDI with the optional BKM-250TG input board. It is also equipped with HDMI interface as standard.

Finally, a new backlight scanning system is integrated to improve the black level reproduction when Black Frame insertion mode is selected. With its exceptional performance and the advantages of LCD, the BVM-L231 is a deserving successor to CRT broadcast reference monitors.

### **Suitable for a Wide Range of Reference and Mastering Applications**

Ideal for BROADCAST (studio and engineering etc.), PRODUCTION (OB, monitor wall, camera and VTR control etc.), and POST-PRODUCTION (top-end multi-format editing consoles, telecinema and digital cinema).

### **Ultimate Picture Quality Rivaling Top-Flight CRT Monitors**

The BVM-L231 is capable of displaying High Definition native 1920x1080 picture resolution on its LCD display. Taken together with its customised LCD panel and 10-bit drivers for smooth colour gradation, its precision LED backlight for wide colour gamut and picture consistency, and its new 12-bit output display engine processor for accurate colour reproduction and sophisticated I/P conversion, the BVM-L231 is truly the standard-bearer amongst reference LCD monitors.

### **Superb Colour Accuracy**

The innovative Colour Management System ensures consistent and repeatable colour to ITU-709, SMPTE-C and EBU standards and from monitor to monitor. The level of accuracy is the same as displayed by the BVM-A series of CRT monitors.

## **Outstanding Greyscale and Colour Depth Provide Lifelike Picture Quality**

Achieved through 10-bit LCD panel drivers and 12-bit output signal processing.

## **Picture Quality Decisions can be made with Confidence**

The BVM-L231 Monitor's exceptional performance in the key areas of picture quality, accuracy, consistency and stability make this product a natural choice as a measurement and reference tool.

## **Consistently Optimal Picture Performance**

Less 'drift' than CRT displays, with an absence of picture distortions such as convergence, geometry, linearity and focus variation. The BVM-L231 is also immune to magnetic field interference.

## **Faithful Reproduction of Interlaced Pictures**

Capable of reproducing interlaced video images to the same standard as CRT monitors.

## **High Quality Motion Display**

Black Frame Insertion Mode dramatically reduces motion blur.

## **Exemplary Picture Consistency**

Consistent and repeatable chroma and greyscale performance ensures efficient matching between monitors.

## **Productivity Boost**

New dual image processing including Picture Side by Side, Wipe, Butterfly, Blending modes and a new Pixel Zoom mode allow quick evaluation and comparison of two input sources.

## **Exceptionally Versatile**

Due to its broad range of inputs and multi-format signal capabilities, the BVM-L231 is equally suited to AV or IT-based

applications, allowing you the freedom to operate in whichever format you choose, even D-Cinema.

### **Future Proof**

Multi-format and HD capability plus optional decoder boards will ensure that the BVM-L231 remains current.

### **Easier to Install and Accommodate than CRT**

Space saving / lightweight / low heat output

### **Air Conditioning Requirements lower than with CRT**

LCD monitors generate less heat.

### **Easy Maintenance**

No routine convergence, focus, geometry or linearity adjustments necessary. No susceptibility to magnetic fields.

### **Lower Total Cost of Ownership than CRT**

Long operational life / high reliability.

Low energy bills.

Low routine maintenance cost

Reduced environmental disposal costs.

## Features

### **Full HD Panel with 10-bit Driver**

The BVM-L231 achieves both high resolution and stunning colour depth using a full 1920 x 1200 HD LCD panel and precise 10-bit drivers. It delivers outstandingly crisp, high brightness and high contrast HD images in Native mode.

### **LCD Panel Calibration**

Each and every BVM-L231 monitor is carefully calibrated at the factory on an individual basis, providing a high level of accuracy and stability for characteristics such as gamma and uniformity.

### **Ultra-high Precision Uniformity Correction**

White can be reproduced uniformly at every point of the screen on the BVM-L231. This is due to the use of two advanced technologies: precise adjustment of the LCD panel characteristics and sophisticated LED backlight control.

### **High-Purity Precision LED Backlight**

Provides an exceptionally broad colour gamut for faithful colour display, as well as delivering precise picture uniformity and stability.

### **Nonlinear Cubic Conversion Colour Management System**

The nonlinear cubic conversion colour management system uses a unique 3D LUT to reproduce an extremely wide colour gamut, thus offering more accurate colour reproduction.

### **Accurate, Repeatable and Stable Colour Reproduction**

The innovative precision LED backlight and Colour Management System deliver accurate and consistent colour temperature right across the greyscale range. Consequently, the monitor can emulate ITU-709, SMPTE-C, and EBU colour spaces with ease. It can also emulate D-Cinema colour gamut

### **Auto White-Balance Function**

The BVM-L231 can perform automatic colour temperature adjustments when connected to an external colour analyzer (such as those from Minolta, DK and X-Rite).

### **High Accuracy Display Engine**

The BVM-L231 uses a 12-bit output display engine, which allows images to be reproduced with high precision for accurate evaluation and manipulation.

### **Sophisticated Interlace to Progressive Algorithm**

The BVM-L231 uses a sophisticated I/P conversion technique that keeps artefacts that are often seen in typical LCD monitors to a

minimum, such as edge jaggedness, conversion errors, and ensure a picture delay that is less than one field.

### **Interlace Display Mode**

Faithfully reproduces interlaced signals, emulating CRT monitors.

### **Input Versatility**

The BVM-L231 can accept almost any SD or HD video format, both analogue and digital, plus PC signals from VGA to WUXGA (1920 x 1200). In addition to a HDMI and DVI-D interface equipped as standard, four option board slots are offered to configure the BVM-L230 monitor according to different user needs.

### **Multi-Format Signal Support - Up to 3G SDI**

The BVM-L231 is capable of displaying an exceptionally broad range of signal formats with an extremely high degree of colour accuracy. These include: composite video formats NTSC, PAL

### **3G SDI Input**

The BVM-L231 has a 3G SDI input capability. On Sony's monitors, the 3G SDI interface is compliant with the SMPTE 425 standard, transmitting up to 4:2:2/10-bit 1080/60P video data using one SDI cable. This single-link system is known as a SD-SDI or HD-SDI system, but it can also handle both Dual-Link HD-SDI and 3G SDI video data with the use of Sony's 3G SDI interface. This 3G SDI interface enables the BVM-L231 monitor to accept 50P and 60P video data. Where an upgrade to a Dual-Link HD-SDI system is necessary, this single-link 3G SDI system is the ideal alternative.

### **Dual Image Processing**

Image Side by Side, Wipe, Butterfly and Blend modes provide users with enhanced operational flexibility.

### **New Pixel Zoom Mode**

Allows picture magnification up to 800% without scaling.

### **Black Frame Insertion Mode**

Dramatically reduces motion blur - a problem common to many LCD monitors.

### **S-Log Gamma**

S-Log is the original logarithmic gamma developed for the F35 series CineAlta camera. It enables to transmit the full Dynamic of the camera over 700%. The monitor S-Log anti Gamma function allows displaying the full dynamic range on the screen.

### **Separate Control unit with memory stick slot**

The Memory Stick socket located in the BKM-16R control unit enables users to download and save all monitor set-ups such as input channel configuration, control preset adjustments, white balance settings and maintenance parameters.

### **Centralised Monitor-Wall Control**

Multiple monitors can be easily managed by a single control unit via a serial RJ45 Ethernet connector.

## Specifications

### Picture Performance

Panel	a-Si TFT Active Matrix LCD
Picture Size (Diagonal)	570.6 mm 22 1/2 inches
Effective Picture Size (H x V)	483.8 x 302.4 mm 21 1/2 x 12 1/8 inches
Resolution (H x V)	1920 x 1200 pixels (WUXGA)
Aspect	16:10

Pixel Efficiency	0.9999
Backlight	High-purity LEDs
Panel Drive	RGB 10-bit
Panel Frame Rate	96 Hz, 100 Hz, 120 Hz
Viewing Angle (Panel Specification)	89°/89°/89°/89° (typical) (up/down/left/right contrast > 10:1)
Normal Scan	0% scan
Native Scan	Mapping the pixels of the signal to the panel to one-to-one mode, or displaying an SD signal of nonsquare pixels (the number of H pixels of the signal system is 720 or 1440) or a 640 × 480 SD signal of HDMI video by scaling processing of doubling for the V direction and correct aspect ratio for the H direction and also optimizing and displaying a picture by modifying the aperture coefficient value, filter coefficient value, etc.
Under Scan	3% under scan
Over Scan	Mask of 5% over scan portion in the normal scan



Color Temperature	D55, D61, D65, D93, D-Cine *1 , User
Standard Luminance	100 cd/m2 (Preset1 to Preset5) 48 cd/m2 (Preset (D-Cine)) (100% white signal input)
Color Space (Color Gamut)	ITU-R BT.709, EBU, SMPTE-C, D-Cine *2 , L23 Nativ *3 , S-GAMUT *4
Warm-up Time	Approx. 30 minutes

## Input

HDMI Input	HDMI (x1) (HDCP correspondence, Deep Color correspondence)
DVI-D Input	DVI-D (x1) (HDCP correspondence)
Option Port	Four (4) ports
Parallel Remote	D-sub 9-pin (female) (x1)
Serial Remote (LAN)	RJ-45 (x1) (Ethernet, 10BASE-T/100BASE-TX)
Option A Input	Mini-DIN 8-pin (female) (x1)
Option B Input	USB (Type A) (x1) (used for future expansion)

## Output

DC 5 V Output

Circle 4-pin (female) (x1)

## General

Power Requirements

100 V to 240 V AC, 2.0 A to 0.9 A, 50/60 Hz

Power Consumption

Approx. 180 W (max.)  
Approx. 130 W (with BKM-243HS, average power consumption in the default status)

Inrush Current

(1) Power ON, current probe method:  
20 A (100 V), 52 A (240V)  
(2) Hot switching inrush current, measured in accordance with European standard EN55103-1:  
25 A (230 V)

Operating Temperature

0°C to 35°C  
(Recommended: 20°C to 30°C)  
32°F to 95°F  
(Recommended: 68°F to 86°F)

Operating Humidity	0% to 90% (no condensation)
Storage/Transport Temperature	-20°C to +60°C -4°F to +140°F
Storage/Transport Humidity	0% to 90%
Operating/Storage/Transport Pressure	700 hPa to 1060 hPa
Dimensions (W x H x D) *5	565.5 x 436.4 x 243.1 mm 22 3/8 x 17 1/4 x 9 5/8 inches
Mass	Approx. 21.0 kg Approx. 46 lb 5 oz
Supplied Accessories	AC power cord (1) AC plug holder (1) Cable holder (1) Bracket (1) Connection Cable for Color Temperature Probe (1) Operation Manual (Japanese, English, each 1) CD-ROM (1) Using the CD-ROM Manual (1)
	BKM-16R Monitor Control

	Unit
	BKM-37H Controller
	Attachment Stand
	SMF-700 Monitor Interface Cable
	BKM-220D SDI 4:2:2 Input Adaptor (with serial number 2100001 or higher)
	BKM-227W NTSC/PAL Input Adaptor
Optional Accessories	BKM-229X Analog Component Input Adaptor (with serial number 2200001 or higher)
	BKM-243HS HD/D1-SDI Input Adaptor (with serial number 2108355 or higher)
	BKM-244CC HD/SD-SDI Closed Caption Adaptor
	BKM-250TG 3G/HD/SD-SDI Input Adaptor (with serial number 7100001 or higher)

## Notes

[\*1] D-Cine:  $x = 0.314, y = 0.351$

[\*2] Chromaticity point of SMPTE RP 431-2 is not covered in full.

[\*3] The BVM-L231 individual

Note

chromaticity points. The widest color space setting of the signal is reproduced by the BVM-L231. R ( $x=0.661, y=0.313$ )/G ( $x=0.233, y=0.664$ )/B ( $x=0.150, y=0.060$ ) (typical)

[\*4] For displaying the color gamut of the wide color space mode S-GAMUT, which is available for the F23 or F35 Digital Cinematography Camera.

[\*5] The values for dimensions are approximate.

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## Gallery

