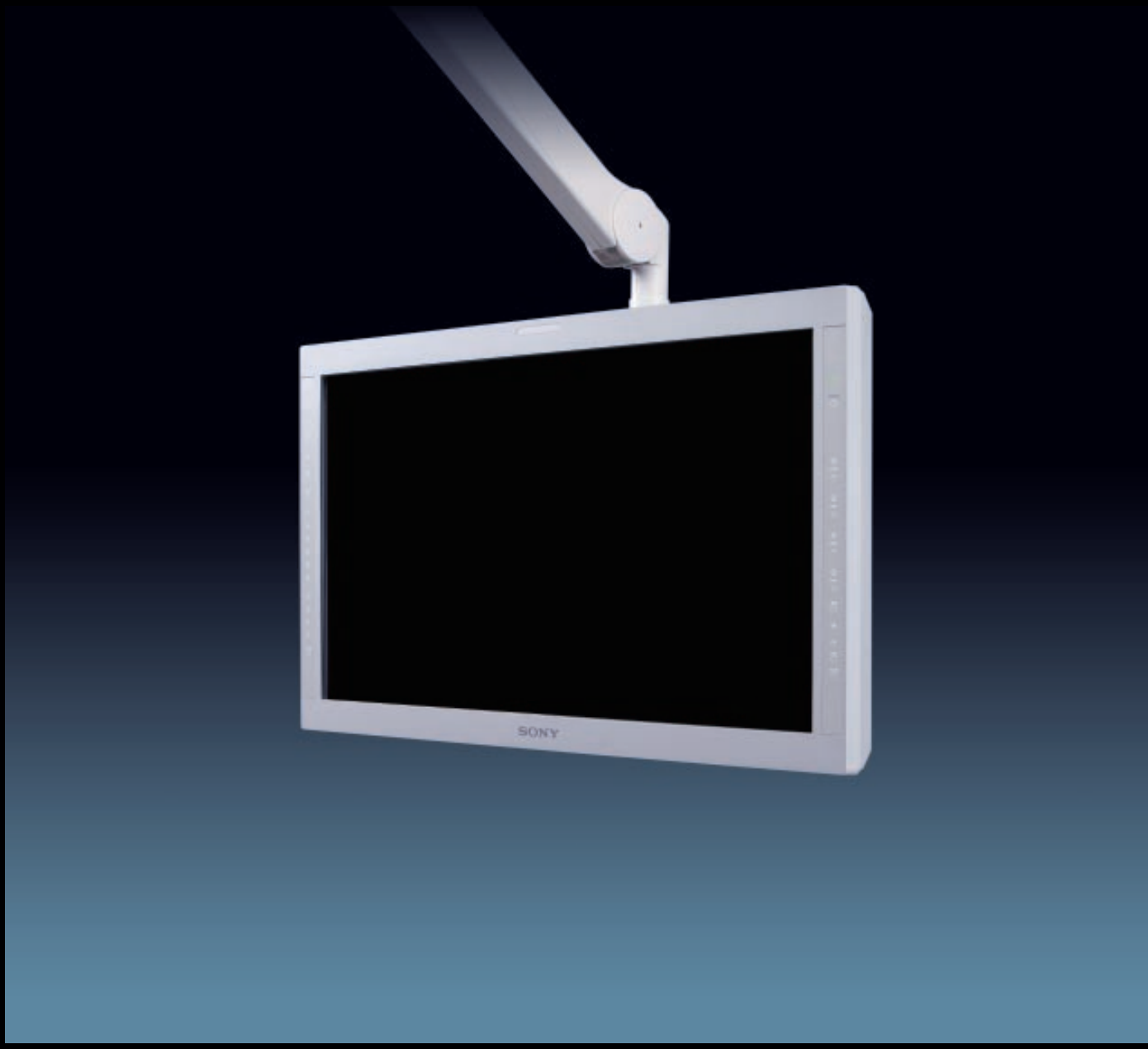
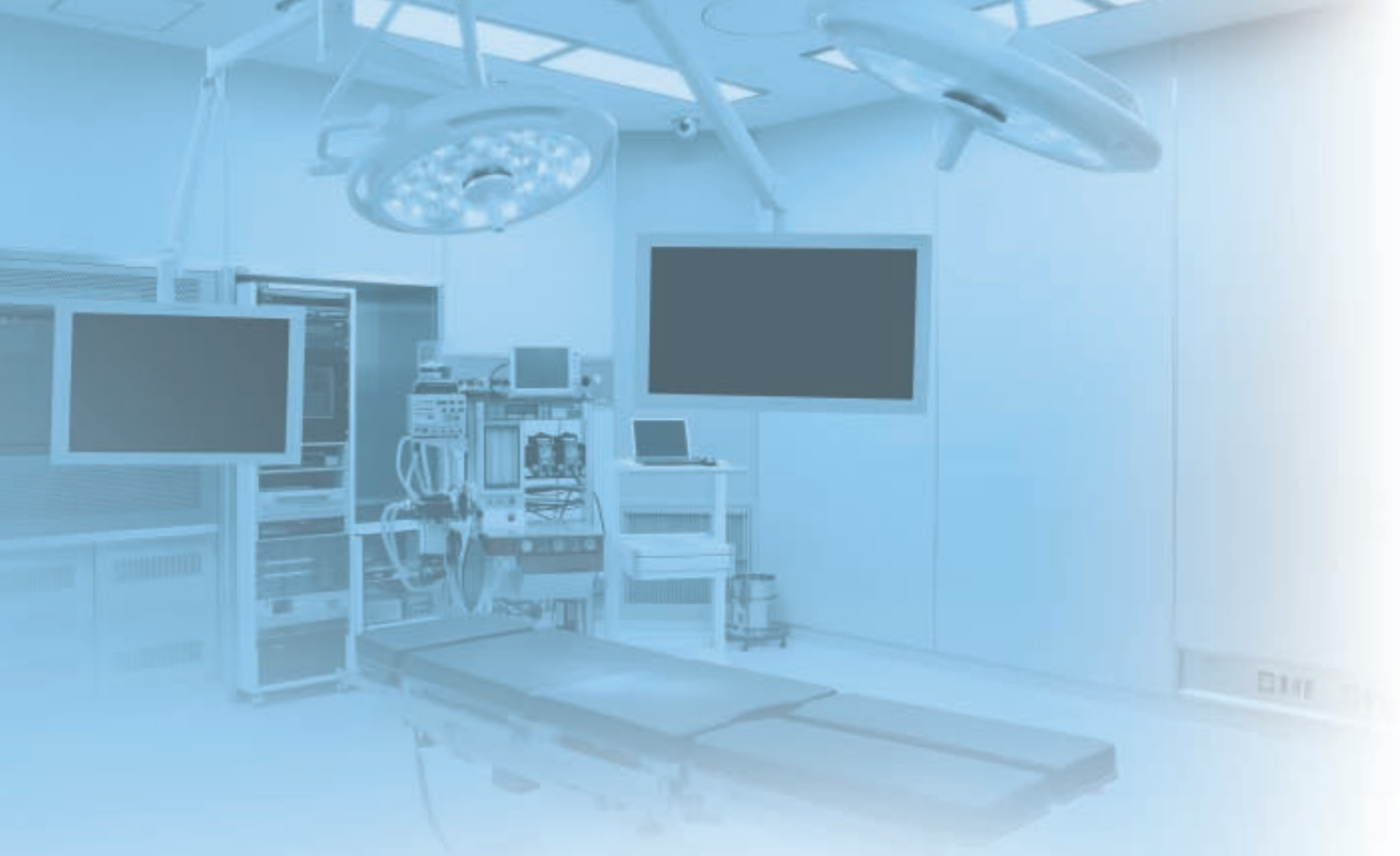
SONY



Medical LCD Monitor

LMD-3250MD



A Full HD Monitor for Endoscopic Applications – Sony's New 32-inch Medical LCD Monitor

The LMD-3250MD is a new medical-grade 32-inch*1 LCD monitor that meets stringent medical safety and EMC standards and requirements. This professional medical monitor reproduces accurate full HD images and colors using Sony's unique ChromaTRU Color Matching Technology and a newly developed full HD (1920 x 1080 pixel) panel with a recently introduced 10-bit panel driver.
The LMD-3250MD is well suited to monitoring full HD (1920 x 1080 pixel) images received from full HD cameras and other video sources. It also accepts a wide variety of SD and HD video signal inputs, both in analog and digital. This broad input range allows users to migrate step-by-step from an SD system to a full HD system.

In addition, the LMD-3250MD is equipped with convenient features to support surgical operations such as its Multiple Display Setting, Mirror Image mode, and Key-inhibit function. This cleverly designed monitor complies with the VESA mounting standard*2 so it can be attached to a surgical mount arm for use in operating theaters. With all these benefits, along with the operational controls for which Sony's medical monitors are already acclaimed, the LMD-3250MD is ideal for surgical endoscopy applications today and tomorrow.

*1 31 5/8 inches viewable area measured diagonally. *2 200 x 400 mm pitch (4 holes).

Main Features

Safety Listing and Compliance

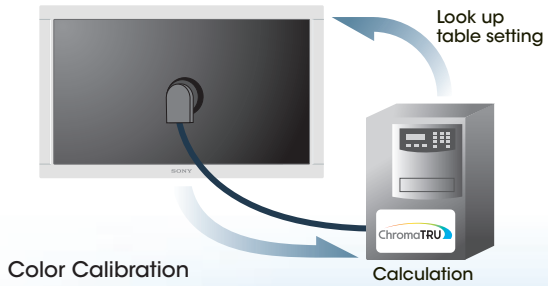
The LMD-3250MD monitor is UL60601-1 listed and complies with the CSA C 22.2 No. 60601 and EN60 601-1 safety regulations, making it suitable for use in professional medical applications.

Excellent Picture Reproduction

ChromaTRU Color Matching Technology

For an extra level of color reproduction accuracy, every LCD panel used in the LMD-3250MD is precisely color calibrated at the factory, providing faithful color reproduction. An LCD display, by the nature of its colorimetry, can exhibit inconsistent color characteristics and unique gamma curve characteristics. These can make precise color matching a challenge between multiple LCD monitors and between multiple CRT monitors. The LMD-3250MD solves this problem by calibrating each LCD panel's light output so that the R, G, B color coordinates are consistent for every monitor. Further to this, a second calibration is applied so that white balance is maintained at a consistent color temperature throughout all grayscale levels. This ChromaTRU technology enables consistent color reproduction among multiple monitors, particularly Sony's medical monitors*, and is invaluable for many applications, such as simultaneous monitoring in different rooms.

* The LMD-2450MD monitor also incorporates ChromaTRU technology.



Natural Gradation of Color Reproduction (10-Bit DSP)

The LMD-3250MD incorporates an advanced 10-bit digital video signal processor to produce accurate and lifelike images with smooth and natural gradation.

Sophisticated I/P (Interlace to Progressive) Conversion

The LMD-3250MD uses an advanced technology to perform sophisticated I/P conversion*. I/P conversion is essential, enabling an interlaced video source to display on the LCD progressive panels. Typically during this process, a second process – scaling – also occurs. Scaling adjusts the pixel counts of the video source to match the monitor panel's pixel count, but it can also degrade picture quality. With its sophisticated I/P conversion technology, the LMD-3250MD does not need a scaling process to deliver essential high-level accuracy when monitoring detailed images from full HD video sources.

* Three I/P conversion methods can be simply selected via the on-screen menu.

Excellent Brightness and Contrast

The LMD-3250MD provides high brightness and high-contrast images by utilizing super-wide aperture LCD panels.

Full HD Panel with 10-bit driver

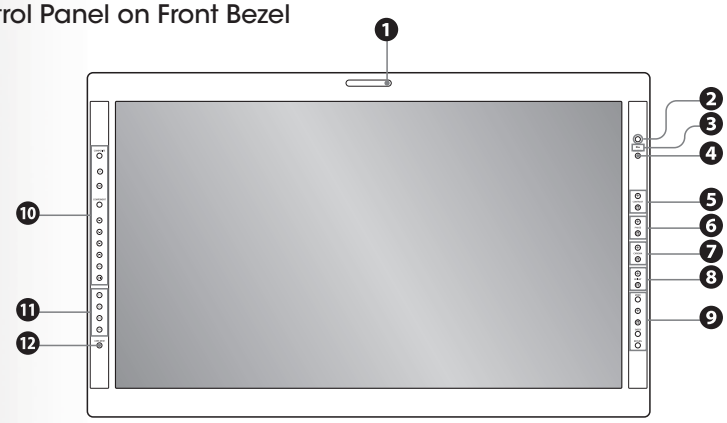
The LMD-3250MD incorporates a 1920 x 1080 pixel, full HD panel with no requirement for a scaling process when monitoring full HD video sources. At the same time, the recently introduced 10-bit panel driver can achieve full-scale image reproduction of the video data processed by the 10-bit DSP engine. These features enable the LMD-3250MD to deliver faithful image reproduction.

Main Features

Input Versatility (Multi-format Signal Support)

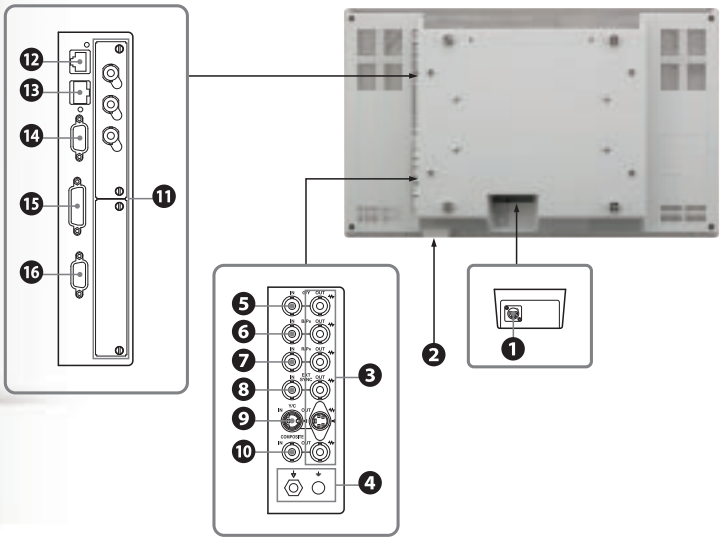
The LMD-3250MD monitor can accept almost any signal ranging from SD to HD video, as well as PC signals, via its DVI-D and HD15 connectors. In addition to standard inputs, four different optional input adaptors are offered for use in the monitor's expansion slot. This flexibility allows images to be monitored from a variety of medical equipment sources, including endoscopes. The LMD-3250MD also provides parallel and serial control (including via Ethernet) as standard.

Control Panel on Front Bezel



❶ Tally lamp
❷ Power indicator
❸ Key inhibit indicator
❹ CONTROL
❺ CONTRAST
❻ PHASE
❼ CHROMA
❽ BRIGHTNESS
❾ Menu (+/-, ENTER, RETURN)
❿ Input Select (Composite, Y/C, RGB, COMPONENT, HD15, DVI, etc.)
⓫ Function
⓬ USER Memory

Connector Panel Side and Rear



❶ DC 5V/24V IN
❷ Power switch
❸ Loop-through output
❹ Equipotential/Function Earth
❺ G/Y IN (BNC)
❻ B/P IN (BNC)
❼ P/Pr IN (BNC)
❽ EXT SYNC (BNC)
❾ Y/C IN (4-pin mini-DIN)
❿ COMPOSITE (BNC)
⓫ Optional Interface Board Slot* (x 2)
⓬ PARALLEL REMOTE (8-pin)
⓭ SERIAL REMOTE (RJ-45)
⓮ SERIAL REMOTE RS-232C (D-sub 9-pin female)
⓯ DVI-I input
⓰ HD-15 input (D-sub 15-pin, female)

* BKM-243HS (HD-SDI/SD-SHI Input Adaptor) is supplied.

Input Signals

Video Signal Formats	Interface						
	Composite Y/C	RGB Component	HD-SDI SD-SDI	HD-SDI SD-SDI	SD-SDI	RGB Component	Composite Y/C
	Standard			Option			
			BKM-243HS	BKM-243HS	BKM-220D	BKM-229X	BKM-227W
575/50i (PAL)	○	○	○	○	○	○	○
480/60i (NTSC)*1	○	○	○	○	○	○	○
576/50p	N.A.	○	N.A.	N.A.	N.A.	○	N.A.
480/60p	N.A.	○	N.A.	N.A.	N.A.	○	N.A.
1080/24PsF*1	N.A.	○*2	○	○	N.A.	○*2	N.A.
1080/25PsF	N.A.	○*2	○	○	N.A.	○*2	N.A.
1080/24p*1	N.A.	○*2	○	○	N.A.	○*2	N.A.
1080/25PsF	N.A.	○*2	○	○	N.A.	○*2	N.A.
1080/30p*1	N.A.	○*2	○	○	N.A.	○*2	N.A.
1080/50i	N.A.	○	○	○	N.A.	○	N.A.
1080/60i*1	N.A.	○	○	○	N.A.	○	N.A.
720/50p	N.A.	○*2	○	○	N.A.	○*2	N.A.
720/60p*1	N.A.	○	○	○	N.A.	○	N.A.

*1 Compatible with 1/1.001 *2 For component input only

HD15 Input Signal Format*

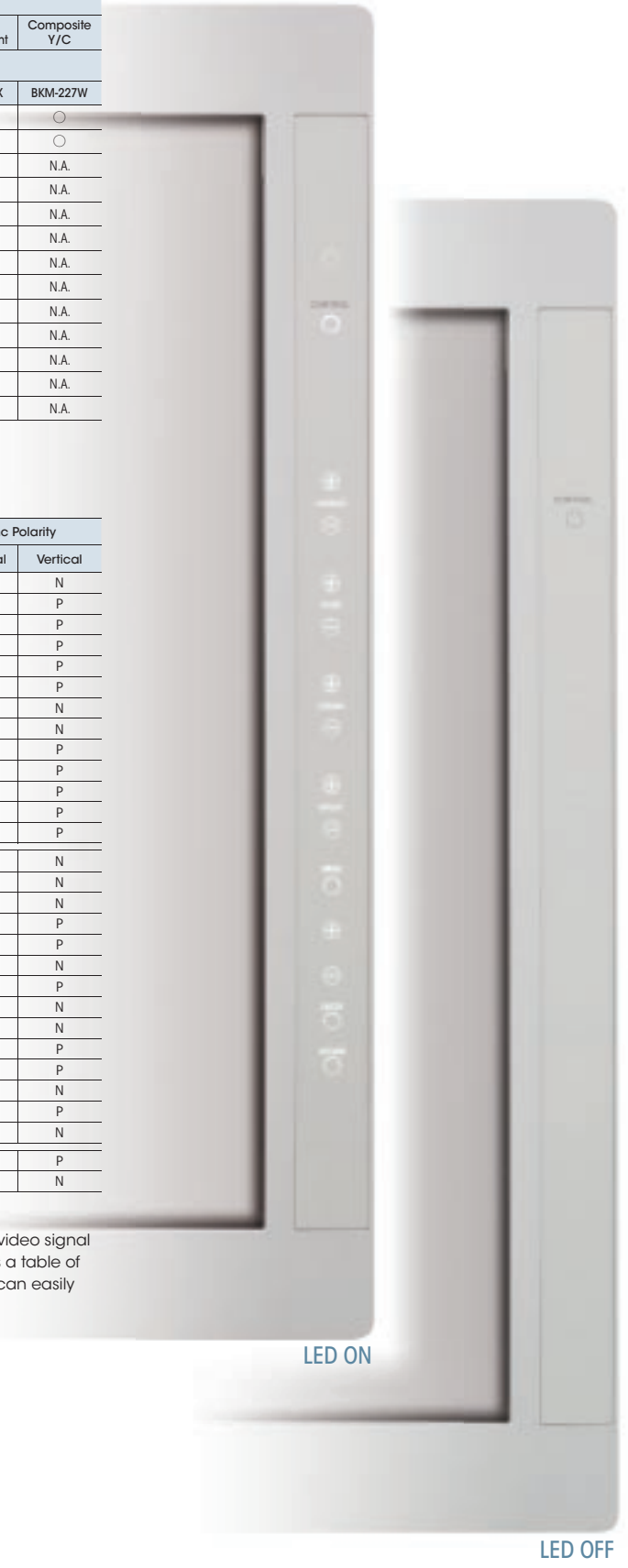
	Resolution	Dot Clock [MHz]	fH [kHz]	fV [Hz]	Sync Polarity	
					Horizontal	Vertical
DMT	640x480 @60Hz	25.175	31.469	59.940	N	N
	800x600 @56Hz	36.000	35.156	56.250	P	P
	800x600 @60Hz	40.000	37.879	60.317	P	P
	800x600 @72Hz	50.000	48.077	72.188	P	P
	800x600 @75Hz	49.500	46.875	75.000	P	P
	800x600 @85Hz	56.250	53.674	85.061	P	P
	1024x768 @60Hz	65.000	48.363	60.004	N	N
	1024x768 @70Hz	75.000	56.476	70.069	N	N
	1024x768 @75Hz	78.750	60.023	75.029	P	P
	1024x768 @85Hz	94.500	68.677	84.997	P	P
	1152x864 @75Hz	108.000	67.500	75.000	P	P
	1280x960 @60Hz	108.000	60.000	60.000	P	P
	1280x1024 @60Hz	108.000	63.981	60.020	P	P
CVT	640x480 @60Hz	23.625	29.531	59.780	P	N
	800x600 @60Hz	35.500	36.979	59.837	P	N
	1024x768 @60Hz	56.000	47.297	59.870	P	N
	1280x768 @50Hz	65.125	39.518	49.959	N	P
	1280x768 @60Hz	80.125	47.693	59.992	N	P
	1280x768 @60Hz	68.250	47.396	59.995	P	N
	1280x768 @75Hz	102.875	60.091	74.926	N	P
	1280x960 @60Hz	85.250	59.201	59.920	P	N
	1280x1024 @60Hz	91.000	63.194	59.957	P	N
	1360x768 @50Hz	69.500	39.489	49.922	N	P
	1360x768 @60Hz	84.625	47.649	59.936	N	P
	1360x768 @60Hz	72.000	47.368	59.960	P	N
	1920x1080 @50Hz	141.375	55.572	49.975	N	P
	1920x1080 @60Hz	138.625	66.647	59.988	P	N
Others	720x400 @70Hz	28.322	31.469	70.087	N	P
	1280x800 @60Hz	68.900	48.935	59.969	N	N

N = Negative P = Positive

* In addition to typical signal formats, the LMD-3250MD supports a variety of video signal formats qualified by endoscopic manufacturers. The LMD-3250MD includes a table of seven types of presets to accommodate these video signal formats. Users can easily select from the OSD menu their preferred monitor setting for each format.

DVI Input Signal Format

Range of DVI Input Signal (available to 1920 x 1080 / 60 Hz)
Vertical frequency: 50.0 to 85.1 Hz
Horizontal frequency: 31.5 to 77.0 kHz
Dot clock: 25.175 to 148.000 MHz



Operational Convenience

Seven-language On-screen Display

The on-screen display is available in English, French, Spanish, German, Italian, Japanese, and Chinese.

OSD Display Position

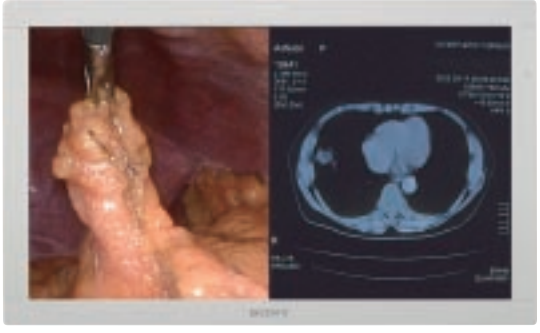
Gamma Curve Selection

Users can choose from two gamma curves, DICOM or CRT 2.2, depending on their needs.

Variety of Display Modes for Medical Applications

- **Multi-display Setting**
  The LMD-3250MD incorporates multiple display modes (also known as "Picture-and-Picture") including picture-out-picture, and side-by-side split screen. They enable zooming so that displayed images fill the viewing area. These flexible display modes are convenient when viewing both live video and captured images simultaneously – this allows, for example, more comprehensive coverage of a surgical procedure.

Picture-out-Picture



Side-by-side

- **Mirror Image**
  The LMD-3250MD can reproduce a full-screen sized, reverse image. This Mirror Image function is convenient when, for example, two display monitors are used in an operating room with one assigned to the surgeon and the other assigned to the surgeon's assistant, ensuring effective camera operation by the assistant. This capability plays an invaluable role in unique applications such as thoracoscopic surgery, endoscopic surgery of esophageal cancer, and laparoscopic surgery applications. Mirror Image mode can be selected with just a press of the F2 button on the bezel.

- **Selectable SCAN Size**
  The LMD-3250MD offers a variety of scan size display modes by utilizing the 1920 x 1080 full HD panel resolutions. Depending on the input signal, users can select the desired scan size at the press of the "F2" button.

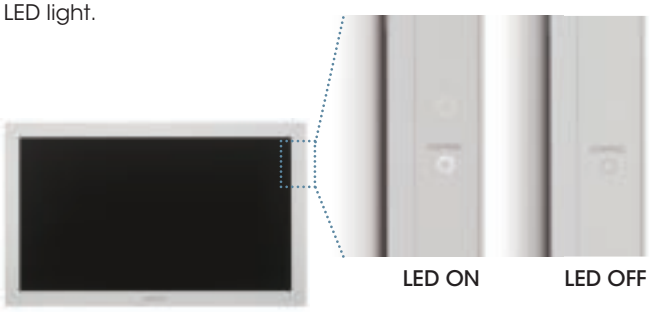
User Memory Function

Utilizing the User Memory Function, up to 20 different custom picture settings* can be created depending on each user's personal preferences. This helps users to save time as they do not have to adjust the picture setting every time. Users can simply load their desired setting when they start to use the LMD-3250MD.

* Contrast, brightness, chroma, phase, color temp, adjust gain, adjust bias color space, aperture, scan, gamma, etc.

Protected Controls

The Key-inhibit function helps prevent inadvertent operation from the control panel. In addition, the buttons on the control panel become inoperative when the LED light is turned off. The "CONTROL" button enables Turn-on/Turn off control of the LED light.



LED ON LED OFF

Front Panel

Smooth Surface Design and Fluid-resistant Structure

The LMD-3250MD is specially designed for the medical environments. Thin tactile buttons on the bezel and an AR (anti-reflection) layered protection panel over the LCD panel have together achieved a seamless surface design architecture, making the unit easy and convenient to clean. Also, the newly designed ventilation holes make the LMD-3250MD more resistant to liquid and chemical spills and splashes. As a result, the LMD-3250MD monitor provides a high level of hygiene and safety.

Seamless Surface

Ventilation holes (Rear view)

Ventilation holes (Side view)

Mounting Flexibility (VESA)

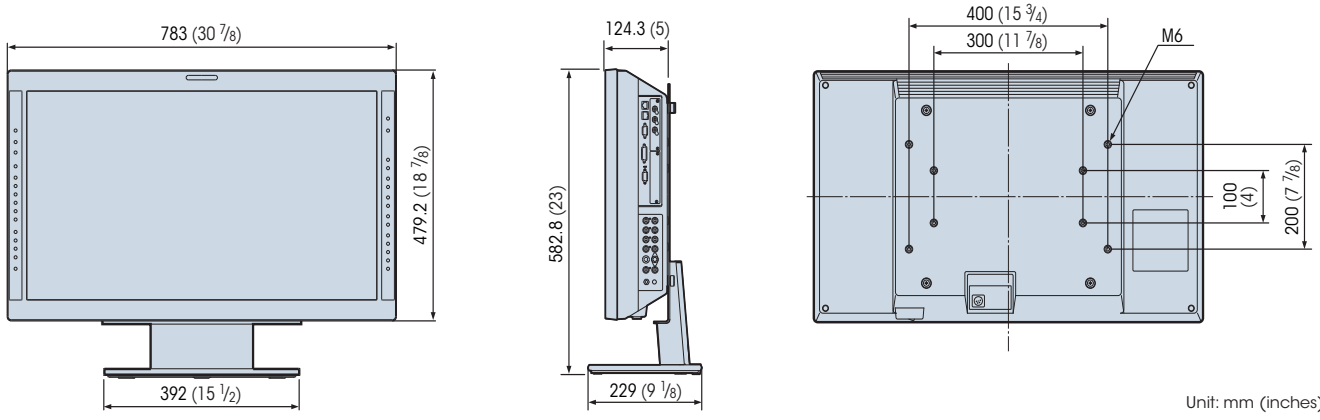
The LMD-3250MD complies with the 200 x 400 mm* hole spacing VESA mounting standard, making it ideal for use with surgical equipment arms and tabletop stands.

* 200 x 400 mm pitch (4 holes)

AC Adaptor

A small-sized AC adaptor enables easier installation where space is limited.

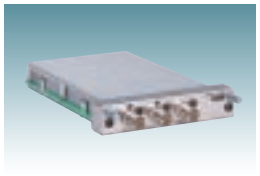
Dimensions



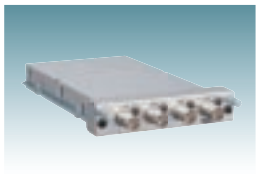
Unit: mm (inches)

Optional Accessories

BKM-243HS
HD-SDI/SD-SDI Input Adaptor

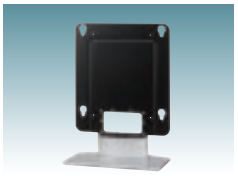


BKM-220D
SD-SDI 4:2:2 Input Adaptor



BKM-229X
Analog Component Adaptor

BKM-227W
NTSC/PAL Input Adaptor



SU-32FW
Monitor Stand

Specification

LMD-3250MD		
Picture Performance		
Type		A-Si TFT Active Matrix LCD
Resolution		1920 x 1080 pixels (Full HD)
Picture Size (H x W) (Viewable area) (Diagonal)		Approx. 698 x 393 mm (Approx. 27 1/2 x 15 1/2 inches) Approx. 802 mm (Approx. 31 5/8 inches)
Aspect		16:9
Colors		Approx 1,073,700,000 colors (10 bits)
Viewing Angle		89°/89°/89°/89° (typical) (up/down/left/right contrast >10:1)
Input		
Standard	Composite (PAL/NTSC)	BNC x 1, 1.0 VP-p ±3dB sync negative
	Y/C	4pin Mini DIN x 1 Y: 1.0 Vp-p ± 3dB sync negative, C: 0.286 Vp-p ± 3dB (NTSC burst signal level), 0.3 Vp-p ± 3dB (PAL burst signal level)
	RGB, Component	BNC x 3 RGB : 0.7 Vp-p ± 3dB (Sync On Green, 0.3 Vp-p sync negative) Component : 0.7 Vp-p ± 3dB (75% chrominance standard color bar signal)
	External Sync	BNC x 1 0.3 to 4.0 Vp-p ± bipolarity ternary or negative polarity binary
	HD15	D-sub 15 pin x 1, R/G/B: 0.7 Vp-p sync positive (Sync On Green, 0.3 Vp-p sync negative) Sync : Total level (polarity free, H/V separate sync) Plug & Play function : corresponds to DDC2B
	DVI-D	TMDS signal link
	Parallel remote	Modular connector 8 pin x 1
	Serial remote (LAN)	D-sub 9-pin (RS232C) x 1, RJ-45 modular connector (ETHERNET) x 1
Optional	Input slot	2 slots (Signal format: H: 15 to 45 kHz, V: 48 to 60 Hz) A BKM-423HS board is supplied.
DC IN		DC 5 V / 24 V (output impedance 0.05 ohms or less)
Output		
Standard	Composite	BNC x 1, Loop-though, with 75 Ω automatic termination
	Y/C	4pin mini DIN x 1 Loop-though, with 75 Ω automatic termination
	RGB, Component	BNC x 3, Loop-though, with with 75 Ω automatic termination
General		
Power Requirement		DC IN: 24 V 5.0 A, 5 V 0.060 A (Supplied from AC adaptor) AC Adaptor (Sony, AC-3250MD) AC IN: 100 V to 240 V, 50/60Hz 1.53 A to 0.58 A
Operating Conditions	Power Consumption	Maximum Approx. 136 W (with 2 x BKM-229X)
	Temperature	0 to 35 °C (32 °F to 95 °F)
	Recommended temperature	20 to 30 °C (68 °F to 86 °F)
	Humidity	30 to 85% (No condensation)
	Pressure	700 hPa to 1060 hPa
	Storage & Transport Temperature	-20 to 60 °C (-4 °F to 140 °F)
	Storage & Transport Humidity	0 to 90 % (no condensation allowed)
	Storage and transport pressure	700 to 1060 hPa
Dimensions (W x H x D)	Dimension	783 x 480 x 125 mm (30 7/8 x 18 7/8 x 5 inch) (including the projection parts)
Mass	With the supplied board	Approx. 13.3 kg (29 lb 5 oz) with BKM-243HS x 1
	With two option boards	Approx. 13.5 kg (34 lb 2 oz) with BKM-229X x 2
Supplied Accessories		AC adaptor AC-3250MD, AC power cord, AC plug holder, Instructions for Use, CD-ROM, Using the CD-ROM Manual, Quick Reference, When You First Use the Monitor, Sales Companies Guide, Warranty book

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