



LMD-2451MD

Medical LCD Monitor

For over 20 years, Sony has been a trusted and reliable resource for surgeons, offering high-quality monitors with exceptional picture quality for a variety of medical applications. Now, Sony is proud to introduce the LMD-2451MD - a 24-inch (measured diagonally) full HD widescreen medical LCD monitor - to its comprehensive medical-grade display line-up.

The LMD-2451MD features two unique built-in option slots for ultimate flexibility, allowing users to easily expand, select, and change input/output signals depending on the modality application. These built-in option slots are designed to support a variety of option boards such as the BKM-250TGM, which enables the monitor to accept a 3G-SDI input signal and transfer a 1080/60p signal via a single SDI cable. Use of the optional BKM-256DD board increases the monitor's DVI input/output capability to accept up to two DVI-D inputs and one DVI loop-through output. In addition, the LMD-2451MD also provides a Picture-and-Picture function that can accept two DVI-D inputs.

Its unique built-in option slots and easy-to-install body design allow this monitor to be smoothly integrated into any environment such as an OR, conference room, and learning center, making it the ideal choice for today's demanding medical applications.

FEATURES

Flexible Input Configuration

The LMD-2451MD is equipped with two built-in option slots, which greatly expand the variety of input signals the monitor can accept. This allows users to easily select and change input/output signals for ultimate flexibility via a variety of available option boards.

BKM-256DD Optional Input Adapter

By installing the optional BKM-256DD board in the monitor's expansion slot, users can employ a maximum of two DVI inputs and one loop-through output in a standard configuration.

- **Equipped with DVI Signal Level Stable Circuit**

The BKM-256DD is equipped with an equalizer circuit that enables the transfer of input signals over a long distance without signal deterioration. For optical fiber transmission, the 5 V power required to convert a signal from electric to optical is supplied from each 14-pin input and output connector.

Multi Picture-and-Picture Capability

In accordance with the growing demand for enhanced functionality, the LMD-2451MD provides a combination of inputs and outputs for Picture-and-Picture display. With the optional BKM-256DD, the monitor can display two images of DVI input signals at the same time. It also offers Side-by-Side mode with vertical full scan, to make it easier to diagnose captured images. These flexible display modes are convenient when displaying images from an ultrasound, endoscope, X-ray, and more. Besides, the feature is convenient to check captured images by a printer.

Excellent Picture Reproduction

ChromaTRU Color Processing

For the highest level of color reproduction accuracy, every LCD panel used in the LMD-2451MD is precisely color calibrated at the factory, providing consistent characteristics. This technology is invaluable for applications such as simultaneous monitoring in operating rooms and monitoring rooms.

Excellent Brightness and Contrast (WUXGA panels)

The LMD-2451MD offers highly bright and high-contrast images with a wide viewing angle by utilizing super-wide aperture WUXGA LCD panels.

Natural Gradation and Accurate Color Reproduction (10-bit DSP)

The LMD-2451MD adopts an advanced full 10-bit digital video signal processor to produce accurate and lifelike images with smooth and natural gradation.

Operational Convenience

Gamma Curve Selection

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

Mirror Image

The LMD-2451MD can reproduce a full-screen size, reverse image. This feature is ideal for procedures where two surgeons work at opposite points of orientation to the patient in applications such as thoracoscopic surgery, laparoscopic surgery, and more.

Selectable Scan Size/ Aspect Size

The LMD-2451MD has a native display mode in which 1080/60i signals are displayed on a pixel-to-pixel basis without a scaling process. Therefore, this monitor achieves faithful image reproductions that are not influenced by signal deterioration incidental to the process. Moreover, there are various image scan modes - such as 20% Overscan mode, Full Scan mode, and Vertical Full Scan mode - of the Picture-and-Picture function, allowing users to select the most suitable scan size.

Protected Controls

The key-inhibit function helps prevent inadvertent operation on the control panel. Users can execute this function either by the OSD menu or a control button.

Mounting Flexibility (VESA)

The LMD-2451MD complies with the 100-mm hole spacing VESA mounting standard, making it ideal for use with surgical equipment arms.



Available HD15/DVI/BKM-256DD input signal format*

About the preset signal

This unit has a preset memory for signals connected to the HD15 and DVI input connectors, and BKM-256DD. When a preset signal is input, the unit automatically detects the signal type and recalls the data for the signal from the preset memory to adjust it to an optimum picture. This unit is applicable to the following preset signals.

For the single display

■ Range of HD15 input signal (for Preset 1)

VESA DMT

Resolution	Dot clock [MHz]	fH [kHz]	fV [Hz]	Sync. polarity	
				Horizontal	Vertical
640 × 480 60 Hz	25.175	31.469	59.940	Negative	Negative
800 × 600 56 Hz	36.000	35.156	56.250	Positive	Positive
800 × 600 60 Hz	40.000	37.879	60.317	Positive	Positive
800 × 600 72 Hz	50.000	48.077	72.188	Positive	Positive
800 × 600 75 Hz	49.500	46.875	75.000	Positive	Positive
800 × 600 85 Hz	56.250	53.674	85.061	Positive	Positive
1024 × 768 60 Hz	65.000	48.363	60.004	Negative	Negative
1024 × 768 70 Hz	75.000	56.476	70.069	Negative	Negative
1024 × 768 75 Hz	78.750	60.023	75.029	Positive	Positive
1024 × 768 85 Hz	94.500	68.677	84.997	Positive	Positive
1152 × 864 75 Hz	108.000	67.500	75.000	Positive	Positive
1280 × 960 60 Hz	108.000	60.000	60.000	Positive	Positive
1280 × 1024 60 Hz	108.000	63.981	60.020	Positive	Positive

■ Range of DVI input signal (for Preset 1)

Max resolution: 1920 x 1080/60Hz
 Vertical frequency: 50.0 Hz-85.1 Hz
 Horizontal frequency: 31.5 kHz-77.0 kHz
 Dot clock: 25.175 MHz-148.000 MHz

VESA CVT

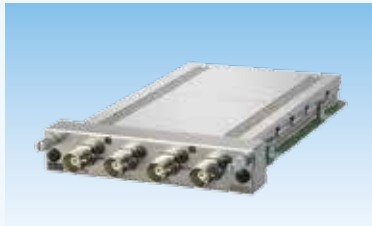
Resolution	Dot clock [MHz]	fH [kHz]	fV [Hz]	Sync. polarity	
				Horizontal	Vertical
640 × 480 60 Hz	23.625	29.531	59.780	Positive	Negative
800 × 600 60 Hz	35.500	36.979	59.837	Positive	Negative
1024 × 768 60 Hz	56.000	47.297	59.870	Positive	Negative
1280 × 960 60 Hz	85.250	59.201	59.920	Positive	Negative
1360 × 768 50 Hz	69.500	39.489	49.922	Negative	Positive
1360 × 768 60 Hz	84.625	47.649	59.936	Negative	Positive
1360 × 768 60 Hz	72.000	47.368	59.960	Positive	Negative
1920 × 1080 50 Hz	141.375	55.572	49.975	Negative	Positive
1920 × 1080 60 Hz	138.625	66.647	59.988	Positive	Negative
1280 × 1024 60 Hz	91.000	63.194	59.957	Positive	Negative
1280 × 768 50 Hz	65.125	39.518	49.959	Negative	Positive
1280 × 768 60 Hz	80.125	47.693	59.992	Negative	Positive
1280 × 768 75 Hz	102.875	60.091	74.926	Negative	Positive
1280 × 768 60 Hz	68.250	47.396	59.995	Positive	Negative

Others

Resolution	Dot clock [MHz]	fH [kHz]	fV [Hz]	Sync. polarity	
				Horizontal	Vertical
720 × 400 70 Hz	28.322	31.469	70.087	Negative	Positive
1280 × 800 60 Hz	68.900	48.935	59.969	Negative	Negative

* Available input signal format is different for picture-and-picture mode.

Flexible input configurations



BKM-250TGM
3G/HD/SD-SDI Input Adaptor



BKM-243HSM
HD/SD-SDI Input Adaptor

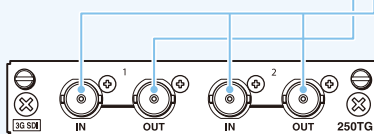


BKM-256DD
DVI-D Input Adaptor

Note: These input adaptors are optional accessories.

BKM-250TGM, 3G/HD/SD-SDI Input Adaptor*

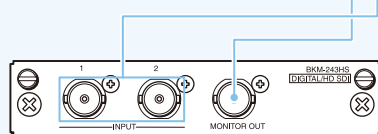
3G/HD/SD-SDI signal input (x2)
 3G/HD/SD-SDI monitor output (x2)



*3G-SDI, HD-SDI and SD-SDI signals are detected automatically

BKM-243HSM, HD-SDI/SD-SDI Input Adaptor*

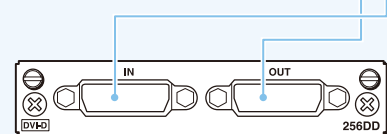
HD-SDI/SD-SDI signal input (x2)
 HD-SDI/SD-SDI monitor output (x1)



*HD-SDI and SD-SDI signals are detected automatically

BKM-256DD, DVI-D Input Adaptor

Input DVI-D signal
 Output DVI-D signal



SPECIFICATIONS

LMD-2451MD	
LCD panel type	a-Si TFT Active Matrix
Pixel efficiency	99.99%
Viewing angle (up/down/left/right, contrast > 10:1)	89°/89°/89°/89° (typical)
Scan	Normal 0%, Over scan 20%
Efficient picture size	518.4 × 324.0, 613.2 mm (w/h, dia) (201/2 × 127/8, 241/4 inches)
Resolution	H 1,920 dots, V 1,200 lines
Aspect ratio	16:10
Input/Output	
Composite	(NTSC/PAL) connector, BNC (1), 1 Vp-p ± 3 dB sync negative
Y/C	Mini-DIN 4-pin (1) Y: 1 Vp-p ± 3 dB sync negative C: 0.286 Vp-p ± 3 dB (NTSC burst signal level) 0.3 Vp-p ± 3 dB (PAL burst signal level)
Component/RGB	BNC (3) RGB input: 0.7 Vp-p ± 3 dB (Sync On Green, 0.3 Vp-p sync negative) Component input: 0.7 Vp-p ± 3 dB (75% chrominance standard color bar signal)
External synchronized input connector	BNC (1) 0.3 Vp-p to 4.0 Vp-p ± bipolarity ternary or negative polarity binary
HD15 input connector	D-sub 15-pin (1) R/G/B: 0.7 Vp-p, sync positive (Sync On Green, 0.3 Vp-p sync negative) Sync: TTL level (polarity free, H/V separate sync) Plug & Play function: corresponds to DDC2B
DVI input connector	DVI-D (1) TMDS single link
Remote	Parallel remote Serial remote
	Modular connector 8-pin (1) D-sub 9-pin (RS-232C) (1) RJ-45 modular connector (Ethernet) (1)
Optional input slot	2 slots Signal format: H: 15 kHz to 45 kHz, V: 48 Hz to 60 Hz
DC IN connector	DC 5V/24V (output impedance 0.05 ohms or less)
Output	Composite output connector
	BNC (1) Loop-through, with 75 ohms automatic terminal function
	Y/C output connector
	Mini-DIN 4-pin (1) Loop-through, with 75ohms automatic terminal function
	External synchronized output connector
	BNC (1) Loop-through, with 75 ohms automatic terminal function
General	
Power requirements	LCD Monitor (LMD-2451MD) DC IN: 24 V 5.0 A 5 V 0.030 A (Supplied from AC adaptor) AC Adaptor (Sony, AC-110MD) AC IN: 100 V-240 V, 50/60 Hz, 1.53 A-0.58 A DC OUT: 24 V 5.0 A 5 V 0.060 A
Power consumption	Maximum: Approx. 136 W (when two BKM-250TGM are installed)
Operating temperature	0 °C to 35 °C (32 °F to 95 °F)
Recommended temperature	20 °C to 30 °C (68 °F to 86 °F)
Humidity	30% to 85% (no condensation)
Pressure	700 hPa to 1060 hPa
Storage and transport temperature	-20 °C to +60 °C (-4 °F to +140 °F)
Storage and transport humidity	0% to 90% (no condensation allowed)
Storage and transport pressure	700 hPa to 1060 hPa
Supplied accessories	AC adaptor (AC-110MD) (1), AC power cord (1), AC plug holder (2), Before Using This Unit (1), CD-ROM (including the Instructions for Use) (1), Service Contact List (1)

LMD-2451MD is distributed to US and EU as a medical device and it satisfies product safety standards (e.g. IEC 60601-1*).

* For more details, please contact your nearest Sony sales office or an authorized dealer.

OPTIONAL ACCESSORIES

BKM-250TGM

3G/HD/SD-SDI Input Adaptor

BKM-243HSM

HD/SD-SDI Input Adaptor

BKM-256DD

DVI-D Input Adaptor



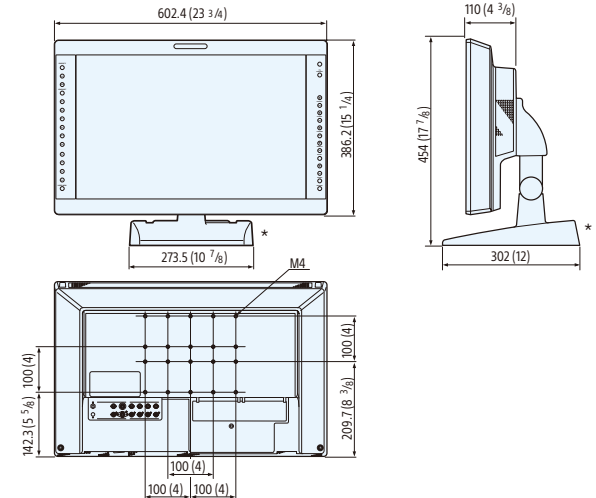
SU-560
Display Stand



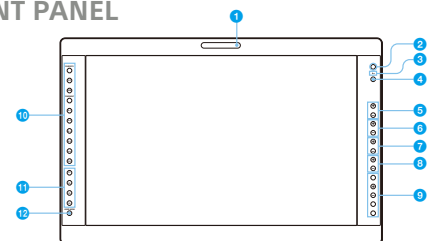
SMF-405
Signal Cable

DIMENSIONS

* With the SU-560 optional monitor stand.

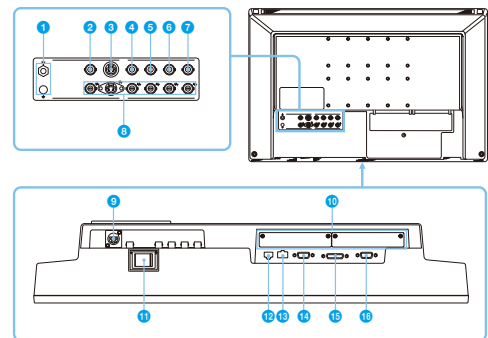


FRONT PANEL



- 1 Tally lamp
- 2 Power indicator
- 3 (key inhibit) indicator
- 4 CONTROL button
- 5 CONTRAST buttons
- 6 PHASE buttons
- 7 CHROMA buttons
- 8 BRIGHT (brightness) buttons
- 9 Menu operation buttons
- 10 Input select buttons
- 11 Function buttons
- 12 USER MEM (user memory) button

CONNECTOR PANEL



- 1 ⚡ (Equipotential/Function Earth) terminal
- 2 COMPOSITE IN connector (BNC)
- 3 Y/C IN connector (4-pin mini-DIN)
- 4 G/Y IN connector (BNC)
- 5 B/PR IN connector (BNC)
- 6 R/PR IN connector (BNC)
- 7 EXT SYNC IN (external sync input) connector (BNC)
- 8 Loop-through output connectors
- 9 DC 5V/24V IN connector
- 10 Optional input slot
- 11 ⏻ (power) switch
- 12 PARALLEL REMOTE connector (modular connector, 8-pin)
- 13 SERIAL REMOTE connector (RJ-45)
- 14 SERIAL REMOTE RS-232C connector (D-sub 9-pin, female)
- 15 DVI-D input connector (DVI-D)
- 16 HD15 input connector (D-sub 15 pin, female)

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