SONY®

(Shown with optional table stand)

LUMA®
Sony Professional LCD Monitor

Sony unveils its impressive new lineup of elegant two-piece Professional Video LCD monitors—the LUMA™ Series. Choose from the LMD-230WS or LMD-170WS LCD monitors, both of which are driven by a separate, powerful signal-processing Multiformat Engine. Their innovative designs offer the perfect solution for a wide variety of professional applications. Thin, lightweight, and simple, the two LCD monitors provide outstanding installation flexibility. And when integrated with the optional monitor stand, it is easy to adjust both height and tilt to achieve the optimum viewing angle.

Based on the latest developments in image processing, such as the new "X Algorithm" technology, these monitors provide outstanding natural images with a high level of brightness and contrast. They accept a wide variety of signal formats such as analog RGB and HD, and computer signals from VGA to SXGA.

Building on Sony's successful PVM series, these all new 23–inch and 17.1-inch (viewable area, measured diagonally) LCD monitors are designed to meet a wide range of picture-monitoring demands in professional applications such as broadcast stations, OB vehicles, post-production studios, and digital photo studios.

Features

■ Outstanding Picture Performance

Excellent Brightness and Contrast

The LMD-230WS and LMD-170WS monitors utilize WXGA LCD panels to provide high-brightness and high-contrast images with natural color reproduction. Incorporating a color filter with broad color gamut, these monitors display outstanding natural images.

Interpolation Technology – X Algorithm

This new "X Algorithm" technology delivers impressive improvements in picture quality. Jaggy noise, which often occurs on the edge of moving objects in pictures, is effectively removed. Traditionally, standard-definition video signals are converted from interlace signals into progressive signals through the formation of a frame picture with two field pictures. This often results in jagged shape noise along the oblique direction of fast-moving objects. To overcome this, the "X Algorithm" technology detects motion and, through comparison of the oblique pixels above, below, and adjacent to the moving part, inserts a new line. This reproduces images smoothly, such as a fluttering flag with moving oblique lines. X Algorithm is especially effective for low-resolution images.

Conventional technology

X Algorithm

(image picture)

2-2 and 2-3 Pull-Down Functions

When displaying film-originated sources, the 2-2 and 2-3 Pull-Down functions help to reproduce natural and detailed pictures. If NTSC signals that have been converted from film are detected, each frame of the original film is accurately reproduced by the 2-3 Pull-Down function. Any other video signals, including PAL signals, are converted by the 2-2 Pull-Down function with natural reproduction.

2-2 Pull Down

Film

interlace

progressive

Nomal I/P conversion

interlace

progressive
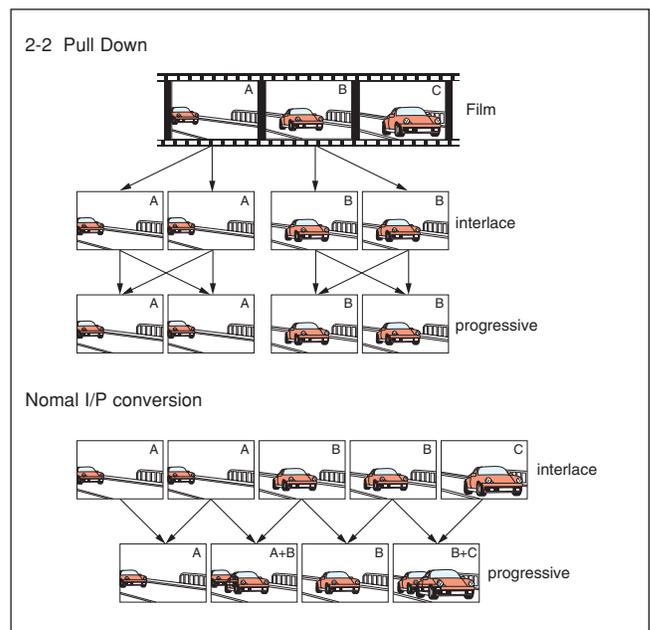
Wide Viewing Angle

The LCD panel has a wide viewing angle of 170 degrees, horizontally and vertically, enabling images to be viewed from various positions and angles.

AR-Coated Protection Panel

The LCD panel is protected from various types of damage by a highly durable protection panel. The panel has an anti-reflection (AR) coating with a high-transmission rate that reduces the effects of outside light.

■ Stylish Design

These innovative two-piece type Sony LCD monitors consist of a thin, lightweight LCD monitor unit and a high-input/output, highly functional signal-processing unit. Because they are separate units, the LCD monitor is not weighed down by the circuitry of the signal-processing Multiformat Engine Unit. Consequently, its design is as thin and as light as possible – resulting in outstanding installation flexibility.

When attached to the optional monitor stand SU-558, which has a biaxial joint in the neck assembly, the LMD-170WS and LMD-230WS can be positioned at various heights and tilt angles – meeting a wide range of application needs.

■ Input Versatility

Multi-Format Signal Support

The multiformat engine accepts a wide range of analog and digital signals such as NTSC, PAL, 480/60I, 575/50I, 480/60P, 576/60P, 1080/50I, 1080/60I, and 720/60P. It also accepts 1080/24PsF, converting it into 1080/48I and 1080/25PsF converted in 1080/50I.

It can accept one analog video signal from the following inputs, which is then output with loop-through:
1. Analog component (GBR) input
2. Analog component (Y/PB/PR) input
3. Composite (CVBS) and Y/C (S-Y, S-C) input *1

The multiformat engine also accepts one signal input from various types of analog computer signals. Incorporating a high-performance scan converter, it can accept input signals from VGA to SXGA*2.

*1 Y/C input signals must be input via BNC connectors that are converted from S connectors.

*2 SXGA images are displayed reduced.

Signal-Interface Options

The multiformat engine can receive HDSDI/SDI, SDI or DV signals via the following newly designed small-sized optional input adaptors:

BKM-220D
- SDI signal input (x2) • Monitor output (x1)
- Power consumption: Max. 1.5 W

HD SDI&SDI Input Adaptor

BKM-243HS
- HD SDI/SDI signal input (x2) • Monitor output (x1)
- Power consumption: Max. 2 W
  HD SDI and SDI signals are automatically detected.

i.LINK® Input Adaptor

BKM-255DV
- DV signal port* (x 2) • Transfer rate: 400 Mbps
- Power consumption: Max. 4 W
  The BKM-255DV accepts and outputs DV signals. However it does not accept the full AV/C command sets.

  *The port has a 6-pin connector; power is not supplied through this port.

Computer Signal Memory

The multiformat engine includes sufficient memory for 17 preset computer input signals. In addition, 20 user-setting memories are available for individual user input signals.

Smart APA (Auto Pixel Alignment) for Computer Input

Image size and shift can be automatically adjusted to their optimal settings with the one-touch APA key.

■ Flexibility

Seven-Language On-Screen Display

The On-Screen Display is available in English, French, Spanish, German, Italian, Japanese, and Chinese.
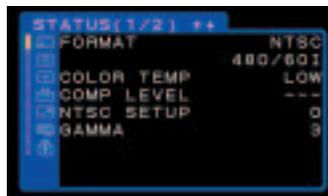
Color Temperature/Gamma Selection

High/low color temperatures or user presets can be selected.

Selectable Scan Size for Video Input and Aspect Ratio

The screen size can be selected between 5% over-scan and 0% inscan modes.
The aspect ratio can be switched between 16:9 and 4:3 according to input signals.

*i.LINK is a trademark of Sony used only to designate that a product contains an IEEE 1394 connector. All products with an i.LINK connector may not communicate with each other. Please confirm interoperability with third party manufacturers. For more information contact Sony at 1-800-686-7669.

Various Markers

The following marker functions are available: safety area marker, 4:3 marker, 2.35:1 marker, and 4:3 & 1.85:1 box marker - convenient for movie makers.

	16:9	4:3
MARKER	4:3, 15:9, 14:9, 13:9, 1.85:1, 2.35:1, 1.85:1 & 4:3	16:9
CENTER MARKER	O	O
SAFETY AREA	80%, 88%, 90%/93%	80%, 88%, 90%/93%

Three-Color Tally

The tally lamp can be lit up via a parallel remote connector, and the status of the monitor can be identified by the tally color – red, green, or amber.

Parallel Remote Control

The multiformat engine can be controlled remotely with the parallel remote connector. There are 30 functions in the Remote menu (such as the ability to switch input signals), of which seven can be allocated to the connector.

Stereo Audio Monitoring

The multiformat engine is equipped with stereo speakers (1W+1W), which enable the user to monitor audio.

Protected Controls

The key-inhibit switch helps prevent inadvertent operation from the control panel.

- **H/V Delay Function**
- **Chroma Transient Improvement (CTI) Function**
- **ACC Off**
- **DC Operation**
- **Power-Saving Function**
- **Setup Level for Analog Component and NTSC signal**

- **Sub Control on Contrast, Chroma, Phase and Brightness**
- **Blue-Only Mode**
- **Monochrome Mode**
- **DDC-2B Plug and Play**
- **Auto Chroma/Phase Setup**

■ Other Features

Mountable in a 19-Inch EIA Standard Rack

The LMD-170WS panel can be mounted in a 7U-sized, 19-inch EIA standard rack with the optional Mounting Bracket MB-522. The multiformat engine can be mounted in a 1U-sized, 19-inch EIA standard rack with the supplied mounting bracket.

VESA Mounting Standard

Complying with VESA standards, the LMD-170WS and LMD-230WS can easily be mounted on a wall or a ceiling. Although a large-screen monitor, it remains thin and lightweight because the large-scale signal-processing circuitry is contained in the separate engine instead. In addition, the arm of the monitor unit can be adjusted with more flexibility thanks to fewer connector cables between the monitor unit and the multiformat engine.

LCD Panel Advantages

CRT
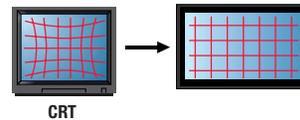
Accurate image geometry from the linear alignment of the light-emitting pixels
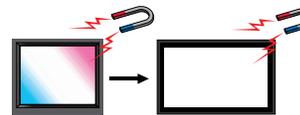
Resistance to magnetic fields for drift-free color uniformity

■ Optional Accessories

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

- **BKM-255DV**
  i.LINK® Input Adaptor*

- **BKM-243HS**
  HD SDI&SDI Input Adaptor

- **SMF-600**
  Extension Cable*

- **SU-558**
  Monitor Stand

- **MB-522**
  Rack-Mount Bracket for LMD-170WS

* BKM-255DV and SMF-600 will be available in Fall 2003.

LMD-230WS/LMD-170WS

LMD-230WS with the optional
SU-558 monitor stand

LMD-170WS with the optional
SU-558 monitor stand
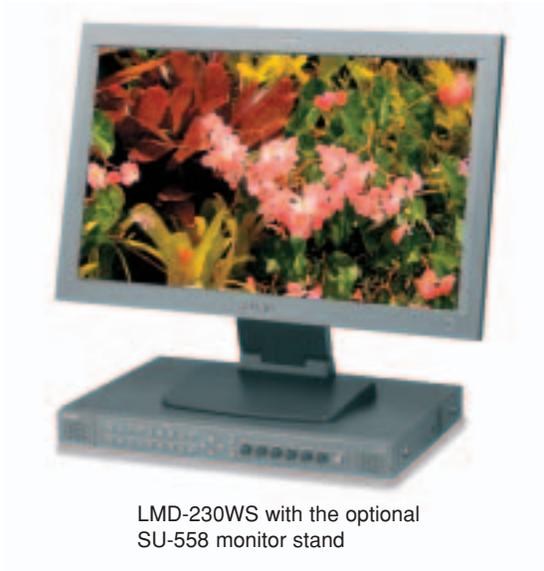
Multiformat Engine

Front Panel

Rear Panel

Dimensions

563 (22 1/4)

372 (14 3/4)

78 (3 1/8)
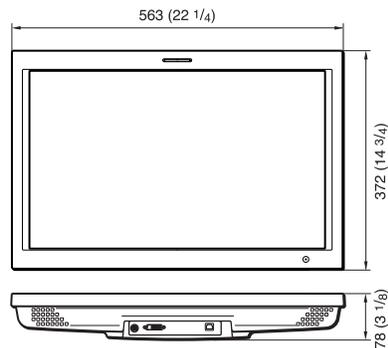
■ LMD-230WS panel dimensions

434 (17 1/8)

294 (11 5/8)

67 (2 3/4)
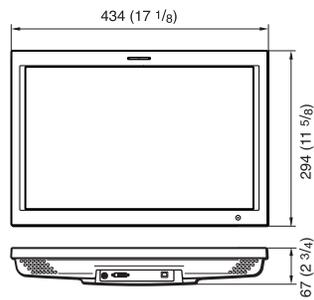
■ LMD-170WS panel dimensions

434 (17 1/8)

44 (1 3/4)
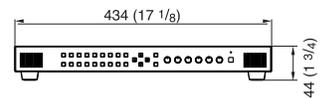
■ Multiformat engine dimensions

Unit: mm (inches)

Specifications

Model Name	LMD-230WS	LMD-170WS		
Picture Performance				
Type	a-Si TFT Active Matrix LCD with an AR-coated protection panel			
Resolution	1280 x 768 dots	1280 x 768 dots		
Pixel efficiency	99.99%			
Dot pitch	0.3915 x 0.3915 mm	0.291 x 0.291 mm		
Picture Size (H x W)	Approx. 501 x 301 mm (19 3/4 x 11 7/8 inches)	Approx. 372 x 223 mm (14 3/4 x 8 7/8 inches)		
(Diagonal)	23.0-inch (584.40 mm)	17.1-inch (434.38 mm)		
Aspect	15:9			
Colors	16,770,000 colors			
Viewing Angle	85º/85º/85º/85º (typical) (up/down/left/right contrast>10:1)			
Input				
Display Input connector				
Digital input	DVI-D			
Dot clock	25.175 MHz	68.250 MHz	25.175 MHz	68.250 MHz
Scanning Frequency (horizontal)	31.469 kHz	47.396 kHz	31.469 kHz	47.396 kHz
(vertical)	59.941 Hz	59.995 Hz	59.941 Hz	59.995 Hz
General				
Power Consumption	Approx. 70 W	Approx. 40 W		
Power requirement	DC16.5 V			
Operating Temperature	0 to 35 ºC (32 to 95 ºF)			
Operating Humidity	30 to 85% (no condensation)			
Operating Pressure	700 to 1060 hPa			
Storage & Transport Temperature	-10 to 40 ºC (14 to 104 ºF)			
Storage & Transport Humidity	0 to 90%			
Storage & Transport Pressure	700 to 1060 hPa			
Dimensions (W x H x D)	563 x 372 x 78 mm * (22 1/4 x 14 3/4 x 3 1/8 inches) *	434 x 294 x 67 mm * (17 1/8 x 11 5/8 x 2 3/4 inches) *		
Weight	Approx. 14 lb 9 oz (6.6 Kg)* Approx. 23 lb 6 oz (10.6 Kg)**	Approx. 10 lb 13 oz (4.9 Kg)* Approx. 19 lb 10 oz (8.9 Kg)**		

*without the optional SU-558 monitor stand
**with the optional SU-558 monitor stand

	Multiformat Engine		
Input/Output			
Input	Connector/Slot		
	Composite/Y/G	S-Y/YB/B	S-C/YR/R
	Loop through BNC (x1) Automatic 75 Ω termination	Loop through BNC (x1) Automatic 75 Ω termination	Loop through BNC (x1) Automatic 75 Ω termination
Composite	1.0 Vp-p sync negative		
Y/C		1.0 Vp-p sync negative	0.286 Vp-p (NTSC) 0.3 Vp-p (PAL)
Component	0.7 Vp-p		
RGB	0.7 Vp-p Sync on G 0.3Vp-p	0.7 Vp-p	0.7 Vp-p
Audio in (for Video signals)	Stereo mini jack (x1), -5 dBu, more than 47 kΩ		
OPTION A-1	Option Slot (x1)		
OPTION A-2			
OPTION B-1	Option Slot (x1)		
OPTION B-2			
Ext. sync	Loop through BNC (x1) automatic 75 Ω termination 0.3 ~ 8 Vp-p +/-6dB, sync negative usable tri-level sync signal 0.6 Vp-p +/-6dB		
Computer	HD D-sub 15-pin (female) (x1) 0.7 Vp-p, 75 Ω, positive (R,G,B)		
Audio in (for computer signals)	Stereo mini jack (x1), -5dBu, more than 47 kΩ		
DC IN*	XLR 4-pin (male) (x1), 12 V		
Output			
Audio monitor out	Stereo mini jack (x1), -5 dBu, more than 47 kΩ		
Speaker Out	Stereo (1W+1W)		
PARALLEL Remote	Modular 8-pin (Assignable)		
Display Signal Out	Exclusive connector(x1)		
Display DC Out*	XLR 4-pin (female) (x1), 16.5 V		
Video			
Horizontal Scanning Frequency	15 to 45 kHz		
Frame Scanning Frequency	48 to 60 Hz		
Computer			
Dot clock	100 MHz		
Horizontal Scanning Frequency	28 to 69 kHz		
Vertical Scanning Frequency (frame)	60 to 85 Hz		
Plug & Play	DDC-2B		

*When operating this system with DC power, the multiformat engine supplies power to the LMD-170WS; however, the LMD-230WS requires 16.5 V DC to be applied directly to the monitor.

■ General

	Multiformat Engine
Power consumption	Maximum: Approx. 27 W (with 2 x BKM-243HS) Standard: Approx. 23 W (without optional input adaptor)
Power requirement	AC 100 to 240 V+/-10%, 50/60 Hz
Operating Temperature	0 to 35 ºC (32 to 95 ºF)
Storage and Trans. Temperature	-10 to 40 ºC (14 to 104 ºF)
Operating/Storage/Trans. Humidity	30 to 85%
Operating/Storage/Trans. Pressure	700 to 1060 hPa
Dimensions (W x H x D) excluding protrusions	434 x 44 x 305 mm (17 1/8 x 1 3/4 x 12 1/8 inches)
Weight	Approx. 9 lb 15 oz (4.5 Kg)*

*Excluding supplied accessories

■ Supplied Accessories

Display interface cable, AC plug holders, AC cord, Operating manuals, Warranty card, Mounting bracket (for multiformat engine)

■ Regulation Compliance

UL-1950, FCC Class-A, CSA C22.2 No.950 (c-UL), IC Class-A, EN60950, CE (LVD, ProAV), VCCI Class-A, C-tick, CCC, KTL, RPC

■ Video format comparison chart

System	Horizontal Scanning frequency (kHz)	Total lines per frame	Active lines per frame	Vertical scanning frequency (Hz)	Aspect	Composite Y/C	RGB Component	Input adaptor		
								BKM-220D	BKM-243HS	BKM-255DV
575/50I (PAL)	15.625	625	575	50	16:9/4:3	O	O	O	O	O
480/60I (NTSC)	15.734	525	483	60	16:9/4:3	O	O	O	O	O
1080/48I	27.000	1125	1080	48	16:9	–	O	–	O	–
1080/50I	28.125	1125	1080	50	16:9	–	O	–	O	–
576/50P	31.250	625	576	50	16:9/4:3	–	O	–	–	–
480/60P	31.469	525	483	60	16:9/4:3	–	O	–	–	–
1080/60I	33.750	1125	1080	60	16:9	–	O	–	O	–
720/60P	45.000	750	720	60	16:9	–	O	–	O	–

■ Formats of Preset Data

No.		Preset Signal	fH [kHz]	fV [Hz]	H/V
1	640 x 480	VGA mode 3	31.469	59.940	N/N
2		VGA VESA 75 Hz	37.500	75.000	N/N
3		VGA VESA 85 Hz	43.269	85.008	N/N
4		VGA (non-CRT)	29.531	59.780	P/N
5	800 x 600	SVGA VESA 85 Hz	53.674	85.061	P/P
6		SVGA VESA 75 Hz	46.875	75.000	P/P
7		SVGA VESA 85 Hz	53.674	85.061	P/P
8		SVGA (non-CRT)	36.979	59.837	P/N
9	1024 x 768	XGA VESA 60 Hz	48.363	60.004	N/N
10		XGA VESA 75 Hz	60.023	75.029	P/P
11		XGA VESA 85 Hz	68.677	84.997	P/P
12	1280 x 768	WXGA (CRT 60 Hz)	47.693	59.992	P/P
13		WXGA (non-CRT)	47.396	59.995	P/N
14	1280 x 1024	SXGA VESA 60 Hz	63.970	60.013	P/P
15		SXGA (non-CRT)	63.194	59.957	P/N

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