SONY

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LCD Monitor

Instructions for Use

Before operating the unit, please read this manual thoroughly and retain it for future reference.

CE

LMD-2451MT

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Owner's Record

The model and serial numbers are located at the rear. Record these numbers in the spaces provided below. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. _____
Serial No. _____

WARNING

To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

No modification of this equipment is allowed.

WARNING
To avoid the risk of electric shock, this equipment must only be connected to a supply mains with protective earth.

WARNING
This unit has no power switch.
To disconnect the main power, unplug the power plug.
When installing the unit, incorporate a readily accessible disconnect device in the fixed wiring, or connect the power plug to an easily accessible socket-outlet near the unit.
Do not position the ME equipment where it is difficult to unplug the power plug.
If a fault should occur during operation of the unit, operate the disconnect device to switch the power supply off, or unplug the power plug.

CAUTION
This LCD monitor should only be used with a specified monitor stand. For information on suitable stands, refer to "Specifications." Installation of the LCD monitor on any other stand may result in instability, possibly leading to injury.

WARNING
The apparatus shall not be exposed to dripping or splashing. No objects filled with liquids, such as vases, shall be placed on the apparatus.

Do not install the appliance in a confined space, such as book case or built-in cabinet.

CAUTION
The unit is not disconnected from the AC power source (mains) as long as it is connected to the wall outlet, even if the unit itself has been turned off.

WARNING
Make sure the surface is wide enough so that this apparatus's width and depth don't exceed the surface's edges.
If not, this apparatus may lean or fall over and cause an injury.

Consult with Sony qualified personnel for mounting arm, wall or ceiling mount installation.

Indications for Use/Intended Use

The Sony LMD-2451MT LCD Monitor is intended to provide 3D and 2D color video displays of images from surgical endoscopic/laparoscopic camera systems and other compatible medical imaging systems. The LMD-2451MT is a widescreen, high-definition, medical grade monitor for real-time use during minimally invasive surgical procedures and is suitable for use in hospital operating rooms, surgical centers, clinics, doctors' offices and similar medical environments.

For the customers in the U.S.A.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

All interface cables used to connect peripherals must be shielded in order to comply with the limits for a digital device pursuant to Subpart B of part 15 of FCC Rules.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Symbols on the products

Consult the Instructions for Use
Follow the directions in the Instructions for Use for parts of the unit on which this mark appears.

This symbol is located on the rear of the unit. See page 22 of these instructions for details about how to attach the connector cover.

This symbol indicates the manufacturer, and appears next to the manufacturer's name and address.

This symbol indicates the European Community representative, and appears next to the European Community representative's name and address.

This symbol indicates the date of manufacture.

This symbol indicates the serial number.

This symbol indicates the version of the accompanying document.

This symbol indicates the equipotential terminal which brings the various parts of a system to the same potential.

Storage and transport temperature
This symbol indicates the acceptable temperature range for storage and transport environments.

Storage and transport humidity
This symbol indicates the acceptable humidity range for storage and transport environments.

Storage and transport pressure
This symbol indicates the acceptable atmospheric pressure range for storage and transport environments.

Caution

When you dispose of the unit or accessories, you must obey the laws in the relative area or country and the regulations in the relative hospital regarding environmental pollution.

WARNING on power connection

Use a proper power cord for your local power supply.

1. Use the approved Power Cord (3-core mains lead) / Appliance Connector / Plug with earthing-contacts that conforms to the safety regulations of each country if applicable.
2. Use the Power Cord (3-core mains lead) / Appliance Connector / Plug conforming to the proper ratings (Voltage, Ampere). If you have questions on the use of the above Power Cord / Appliance Connector / Plug, please consult a qualified service personnel.

WARNING on power connection for medical use

Please use the following power supply cord. With connectors (plug or female) and cord types other than those indicated in this table, use the power supply cord that is approved for use in your area.

	United States and Canada
Plug Type	HOSPITAL GRADE*
Cord Type	Min. Type SJT Min. 18 AWG
Minimum Rating for Plug and Appliance Couplers	10A/125V
Safety Approval	UL Listed and CSA

*Note: Grounding reliability can only be achieved when the equipment is connected to an equivalent receptacle marked 'Hospital Only' or 'Hospital Grade'.

For the customers in Canada

This unit has been certified according to Standard CAN/CSA-C22.2 No.60601-1.

For the customers in the U.S.A and Canada

When you use this product connected to 240 V single phase, be sure to connect this product to a center tapped circuit.

Important safeguards/notices for use in the medical environments

1. All the equipments connected to this unit shall be certified according to Standard IEC 60601-1, IEC 60950-1, IEC 60065 or other IEC/ISO Standards applicable to the equipments.
2. Furthermore all configurations shall comply with the system standard IEC 60601-1.
   Everybody who connects additional equipment to the signal input part or signal output part configures a medical system, and is therefore, responsible that the system complies with the requirements of the system standard IEC 60601-1.
   If in doubt, consult the qualified service personnel.
3. The leakage current could increase when connected to other equipment.

4. For this particular equipment, all accessory equipment connected as noted above, must be connected to mains via an additional isolation transformer conforming with the construction requirements of IEC 60601-1 and providing at least Basic Insulation.
5. This equipment generates, uses, and can radiate radio frequency energy. If it is not installed and used in accordance with the instruction manual, it may cause interference to other equipment. If this unit causes interference (which can be determined by unplugging the power cord from the unit), try these measures: Relocate the unit with respect to the susceptible equipment. Plug this unit and the susceptible equipment into different branch circuit.

Consult your dealer. (According to standard IEC 60601-1-2 and CISPR11, Class B, Group 1)

Important EMC notices for use in the medical environments

- The LMD-2451MT needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in the instructions for use.
- The portable and mobile RF communications equipment such as cellular phones can affect the LMD-2451MT.

Warning

The use of accessories and cables other than those specified, with the exception of replacement parts sold by Sony Corporation, may result in increased emissions or decreased immunity of the LMD-2451MT.

Guidance and manufacturer's declaration-electromagnetic emissions		
The LMD-2451MT is intended for use in the electromagnetic environment specified below. The customer or the user of the LMD-2451MT should assure that it is used in such an environment.		
Emission test	Compliance	Electromagnetic environment-guidance
RF emissions CISPR 11	Group 1	The LMD-2451MT uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The LMD-2451MT is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class D	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

Warning

If the LMD-2451MT should be used adjacent to or stacked with other equipment, it should be observed to verify normal operation in the configuration in which it will be used.

Guidance and manufacturer's declaration - electromagnetic immunity			
The LMD-2451MT is intended for use in the electromagnetic environment specified below. The customer or the user of the LMD-2451MT should assure that it is used in such as environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment-guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/ output lines	±2 kV for power supply lines ±1 kV for input/ output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line(s) to line(s) ±2 kV line(s) to earth	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	< 5% U_T (> 95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles < 5% U_T (> 95% dip in U_T) for 5 sec	< 5% U_T (> 95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles < 5% U_T (> 95% dip in U_T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the LMD-2451MT requires continued operation during power mains interruptions, it is recommended that the LMD-2451MT be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE: U_T is the a.c. mains voltage prior to application of the test level.			

Guidance and manufacturer's declaration - electromagnetic immunity			
The LMD-2451MT is intended for use in the electromagnetic environment specified below. The customer or the user of the LMD-2451MT should assure that it is used in such as environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment-guidance
			Portable and mobile RF communications equipment should be used no closer to any part of the LMD-2451MT, including cables, than the recommended separation distance calculated from the equation appliance to the frequency of the transmitter. **Recommended separation distance**
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	$d = 1.2\sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	$d = 1.2\sqrt{P}$ 80 MHz to 800 MHz $d = 2.3\sqrt{P}$ 800 MHz to 2.5 GHz Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, [a] should be less than the compliance level in each frequency range. [b] Interference may occur in the vicinity of equipment marked with following symbol:
NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies. NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the LMD-2451MT is used exceeds the applicable RF compliance level above, the LMD-2451MT should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the LMD-2451MT. b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.			

Recommended separation distances between portable and mobile RF communications equipment and the LMD-2451MT

The LMD-2451MT is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled.
The customer or the user of the LMD-2451MT can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the LMD-2451MT as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d = 1.2 \sqrt{P}$	80 MHz to 800 MHz $d = 1.2 \sqrt{P}$	800 MHz to 2.5 GHz $d = 2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated a maximum output power not listed above, the recommended separation distance *d* in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

For the customers in the U.S.A.
SONY LIMITED WARRANTY - Please visit http://www.sony.com/psa/warranty for important information and complete terms and conditions of Sony's limited warranty applicable to this product.

For the customers in Canada
SONY LIMITED WARRANTY - Please visit http://www.sonybiz.ca/pro/lang/en/ca/article/resources-warranty-product-registration for important information and complete terms and conditions of Sony's limited warranty applicable to this product.

For the customers in Europe
Sony Professional Solutions Europe - Standard Warranty and Exceptions on Standard Warranty. Please visit http://www.pro.sony.eu/warranty for important information and complete terms and conditions.

For the customers in Korea
SONY LIMITED WARRANTY - Please visit http://bpeng.sony.co.kr/handler/BPAS-Start for important information and complete terms and conditions of Sony's limited warranty applicable to this product.

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Precaution

On Safety

- Operate the unit on 100-240 V AC only.
- The nameplate indicating operating voltage, etc. is located on the AC adaptor.
- Should any solid object or liquid fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Unplug the unit from the wall outlet if it is not to be used for several days or more.
- To disconnect the AC power cord, pull it out by grasping the plug. Never pull the cord itself.
- The socket-outlet shall be installed near the equipment and shall be easily accessible.
- Do not use the 3D glasses as sunglasses.
- Do not use the 3D glasses as eye protection.
- Do not use the 3D glasses as welding glasses.
- Do not drive while wearing the 3D glasses.
- Take regular breaks between watching 3D video images.
- Be careful not to pinch your fingers in the hinges of the 3D glasses when moving the temple frames.

On Installation

- Prevent internal heat build-up allowing adequate air circulation.
  Do not place the unit on surfaces (rugs, blankets, etc.) or near materials (curtains, draperies) that may block the ventilation holes.
- Do not install the unit near heat sources such as radiators or air ducts, or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
- Do not place the monitor near equipment which generates magnetism, such as a transformer or high voltage power lines.

LCD image display

Due the physical characteristics of LCD panels, there may be a decrease in brightness or change in color temperature over a long period of use. These problems are not a malfunction.
In addition, these occurrences will not affect recorded data.

About the LCD Display Panel

- The LCD panel fitted to this unit is manufactured with high precision technology, giving a functioning pixel ratio of at least 99.99%. Thus a very small proportion of pixels may be “stuck”, either always off (black), always on (red, green, or blue), or flashing. In addition, over a long period of use, because of the physical characteristics of the liquid crystal display, such “stuck” pixels may appear spontaneously. These problems are not a malfunction.
- Do not leave the LCD screen facing the sun as it can damage the LCD screen. Take care when you place the unit by a window.
- Do not push or scratch the LCD monitor’s screen. Do not place a heavy object on the LCD monitor’s screen. This may cause the screen to lose uniformity.
- If the unit is used in a cold place, a residual image may appear on the screen. This is not a malfunction. When the monitor becomes warm, the screen returns to normal.
- The screen and the cabinet become warm during operation. This is not a malfunction.

On Burn-in

For LCD panel, permanent burn-in may occur if still images are displayed in the same position on the screen continuously, or repeatedly over extended periods.

Images that may cause burn-in
- Masked images with aspect ratios other than 16:10
- Color bars or images that remain static for a long time
- Character or message displays that indicate settings or the operating state

To reduce the risk of burn-in

- Turn off the character displays
  Press the MENU button to turn off the character displays. To turn off the character displays of the connected equipment, operate the connected equipment accordingly. For details, refer to the operation manual of the connected equipment.
- Turn off the power when not in use
  Turn off the power if the monitor is not to be used for a prolonged period of time.

On a Long Period of Use

Due to the characteristics of LCD panel, displaying static images for extended periods, or using the unit repeatedly in a high temperature/high humidity environments may cause image smearing, burn-in, areas of which brightness is permanently changed, lines, or a decrease in overall brightness.

In particular, continued display of an image smaller than the monitor screen, such as in a different aspect ratio, may shorten the life of the unit.

Avoid displaying a still image for an extended period, or using the unit repeatedly in a high temperature/high humidity environment such an airtight room, or around the outlet of an air conditioner.

To prevent any of the above issues, we recommend reducing brightness slightly, and to turn off the power whenever the unit is not in use.

Handling the 3D Glasses

- Do not touch the lens surface of the 3D glasses.
- Do not leave the 3D glasses in ambient high-temperature, such as near heating equipment or inside a car.
- Do not put extra pressure on the 3D glasses to avoid them becoming misshapen.
- Make sure hard accessories or buckles not to touch the lens surface of 3D glasses while holding or transporting.
- Avoid wearing the 3D glasses when they are aging, breaking or being damaged. Tiny scratches on the lens surface may interfere with your viewing enjoyment. Laying down or looking away from the screen will lessen the 3D effect or shifts image colors.

On Cleaning

Before cleaning

Be sure to disconnect the AC power cord from the AC outlet.

On cleaning the monitor and 3D glasses

A material that withstands disinfection is used for the front protection plate of the medical use LCD monitor. The protection plate surface is specially treated to reduce light reflection, as are the 3D glasses. When solvents such as benzene or thinner, or acid, alkaline or abrasive detergent, or chemical cleaning cloth are used for the protection plate surface/monitor surface, the performance of the monitor may be impaired or the finish of the surface may be damaged. Take care with respect to the following:

- Clean the protection plate surface/monitor surface/3D glasses with a 50 to 70 v/v% concentration of isopropyl alcohol or a 76.9 to 81.4 v/v% concentration of ethanol using a swab method. Wipe the protection plate surface gently (wipe using less than 1 N force).
- Stubborn stains may be removed with a soft cloth such as a cleaning cloth lightly dampened with mild detergent solution using a swab method and then clean using the above chemical solution.
  Never use solvents such as benzene or thinner, or acid, alkaline or abrasive detergent, or chemical cleaning cloth for cleaning or disinfection, as they will damage the protection plate surface/monitor surface.
- Do not use unnecessary force to rub the protection plate surface/monitor surface with a stained cloth. The protection plate surface/monitor surface may be scratched.
- Do not keep the protection plate surface/monitor surface/3D glasses in contact with a rubber or vinyl resin product for a long period of time. The finish of the surface may deteriorate or the coating may come off.

Disposal of the Unit

Do not dispose of the unit with general waste.
Do not include the monitor with household waste.

Recommendation to Use more than One Unit

As problems can occasionally occur for the monitor, when the monitor is used for safety control of personnel, assets or stable picture, or for emergencies, we strongly recommend you use more than one unit or prepare a spare unit.

On Repacking

Do not throw away the carton and packing materials. They make an ideal container which to transport the unit.
If you have any questions about this unit, contact your authorized Sony dealer.

On Fan Error

The fan for cooling the unit is built in. When the fan stops and the RETURN button on the front panel blinks for fan error indication, turn off the power and contact an authorized Sony dealer.

On Moisture Condensation

If the unit is suddenly taken from a cold to a warm location, or if ambient temperature suddenly rises, moisture may form on the outer surface of the unit and/or inside of the unit. This is known as condensation. If condensation occurs, turn off the unit and wait until the condensation clears before operating the unit. Operating the unit while condensation is present may damage the unit.

Precautions for using this unit safely

- Some people may experience discomfort (such as eye strain, fatigue, or nausea) while watching video images. Sony recommends that all viewers take regular breaks while watching video images. The length and frequency of necessary breaks will vary from person to person. You must decide what works best. If you experience any discomfort, you should stop watching the video images until the discomfort ends; consult a doctor if you believe necessary.
- Avoid watching the display in environments where your head may shake, or while you are walking or performing exercise, because there is a higher possibility that you experience discomfort.

Precautions for connecting this unit with other medical devices

- Before you utilize this device and/or connect this device to any other medical device, please be aware of and abide by the following precautions:
  (a) Before actually using this device for medical practice, please check and confirm that you do not experience any discomfort in your use that could be disruptive or impeditive in conducting your intended activity or medical practice.
  (b) If you experience or are likely to experience such discomfort, please refrain from using this device.
  (c) Generally, discomfort (such as eye strain, fatigue, nausea, or motion sickness) can be provoked by such factors as quick movements or shakiness of video picture, focal position of video pictures, distance between objects and image capturing modules, user's point of gaze in video pictures, other varying conditions of video pictures to be input to this device, and individual user's health conditions.

On simultaneous use with an electrosurgical knife, etc.

If this unit is used together with an electrosurgical knife, etc., the picture may be disturbed, warped or otherwise abnormal as a result of strong radio waves or voltages from the device. This is not a malfunction.
When you use this unit simultaneously with a device from which strong radio waves or voltages are emitted, confirm the effect of this before using such devices, and install this unit in a way that minimizes the effect of radio wave interference.

Features

Compliance with medical safety standards in U.S.A., Canada and Europe

IEC 60601-1 and product safety standards in the U.S.A., Canada and Europe have been obtained for this monitor. The monitor is designed for use in the medical treatment field, with the sheet switch, screen protect panel, etc.

3D

The monitor is a multiple format LCD monitor equipped with a circular micro-polarizer filter, featuring a precise image and high performance. It supports various 3D signal formats, including dual-stream HD-SDI signals, by using an optional input adaptor (BKM-250TGM) for both 2D and 3D signals. The provided 3D glasses are designed to suit the performance of the monitor and for comfort over long hours of use. The 2D/3D SELECT function provides the option of either the 2D or 3D monitor display mode.

Circular micro-polarizer filter

Two input signals are separated into even lines and odd lines on the display and circular polarized before appearing on the screen. Images on the left of the screen are viewed through left lens of the 3D glasses and those on the right are viewed through right lens. With this feature, you can monitor multiple screens at one time.

Comfortable fitting lightweight 3D glasses

The provided 3D glasses are a lightweight and comfortable design for reduced fatigue after extended periods of use. Used with the LMD-2451MT, the glasses provide precise image quality and accurate color reproduction.
BKM-30GM (glasses-type) has a "frame center support" system that fits any face shape. The temple frames are made of flexible material and the lenses are encased in the frame bridge. This avoids distorting images through the lenses, even when adjusting the temples. Additionally, the nose pad and temple tips hold the glasses firmly under sweaty conditions, or in a physical working environment. The BKM-31GM (clip-on-type) attaches to regular eye glasses, and features flip-up lenses and a lightweight design. For additional viewers, BKM-30GM and BKM-31GM are available as optional accessories.

Supporting various 3D input signal formats

With BKM-250TGM (optional), various signals, such as 3G, dual-stream, side-by-side and line-by-line, are supported. While multi-signal formats, including 1080P, 1080i, 1080PsF and 720P, are available, line-by-line typed DVI signals are also supported.

Checkerboard
Left and right HD-SDI input signals are displayed in a grid pattern. The two signals shown in a grid makes for easy adjusting of the iris and color settings for the camera. This function is only available in 2D display mode.

L/R switch
Left and right dual-stream HD-SDI signals can be swapped over without being visually disturbed by black frames. This allows you to easily compare the color and brightness between left and right signals. This function is only available in 2D display mode.

Disparity simulation
The phase of either or both left and right signal for 3D image can shift horizontally. The monitor simulates parallax without the need for 3D rig adjustment. It saves time and effort in setting and adjusting the 3D rig and equipment.

Note

Simulated images cannot be output to any device.

Horopter check
Left/right signals for the 3D image are displayed in selected single colors. This helps you define if the subjects are in front of the determined screen position or behind it. You can carefully adjust the depth of the 3D effect using this feature. This function is only available in 3D display mode.

Flip H
If a half mirror type rig is used, left or right signal will be reversed. With the Flip H feature, signals that are shot this way are horizontally reversed again for normal viewing.

Note

A delay between left and right signals occurs as a result of the signal processing. Because left and right signals are internally synchronized to offset the delay, display speed may decrease before the image reaches the screen.

Payload ID
Channel assign information of payload ID data superimposed on input signals is displayed. You can monitor which of two channels a left/right input signal is assigned to.

Picture

Fully digital 10-bit signal processing circuit
As well as digital signals, all signals including analog signals are converted into digital signals. All signals are processed using a fully digital 10-bit processing circuit so that an image is produced in smooth gradation without any deterioration of quality.

Auto chroma/phase function
The chroma and phase of the decoder are automatically adjusted.

High image-quality/high-resolution WUXGA LCD panel
An WUXGA high-resolution (1,920 × 1,200 dots) panel and high brightness/ultra-wide field of view technology enable you to use the monitor under various lighting conditions and in numerous ways (installing on wall, using several monitors to view an image, and so on.). Because a color filter with wide-color reproduction and LCD materials with high response speed are used, the motion picture of the video signal is displayed clearer. This monitor also performs sampling of signals at high frequencies and provides a high resolution of 700 TV scanning lines or more during the RGB or component signal (480/60I, 575/50I) input.

Input

Accepts analog RGB input signals
Adopting the scan converter allows this monitor to detect VGA, SVGA, XGA and SXGA analog RGB signals input to the HD15 input connector.

For more information, see "About the preset signal" on page 44.

Accepts DVI-D (digital) input signals
Adopting the scan converter allows this monitor to detect VGA, SVGA, XGA and SXGA digital computer signals input to the DVI input connector.
The number of the DVI input connectors can be increased by installing the optional input adaptor into the optional input port.
To view more than SXGA signals when the DVI input is selected, use the cable within 3 m (118 1/8 inches) in length.

For more information, see "About the preset signal" on page 44.

Optional port
Two optional input adaptors can be installed. The composite, Y/C, component, analog RGB, SDI or DVI-D signal can be input depending on the input connectors of the board to be used.

Multi-format
The monitor supports the video, Y/C, RGB, component, SDI (3G/HD/SD, when the optional input adaptor is used) signals and NTSC/PAL color systems. SDI supports not only HD-SDI and SD-SDI, but also 3G-SDI, which transmits twice as much data as HD-SDI

with a Single-link. HD15 (analog) and DVI-D (digital) connectors are equipped for the PC input.

For more information, see "Available signal formats" on page 43.

External sync input
The unit can be operated on the sync signal supplied from an external sync generator.

Functions

APA (Auto Pixel Alignment) function
You can display pictures from the HD15 input connector in the appropriate picture by simply pressing the APA key.

Automatic termination (connector with ⎓ mark only)
The input connector is terminated internally at 75 ohms when nothing has been connected to the output connector. If a cable is connected to the output connector, the internal terminal is automatically released and the signals input to the input connector are output to the output connector (loop-through).

Select color temperature and gamma mode
You can select the color temperature from among three (HIGH, LOW, LOW2) settings and gamma mode from between two settings (2.2, DICOM). You can also adjust the color temperature to the appropriate setting in "USER".

Two-display
Two kinds of input signals are put on the monitor.

For more information, see DISPLAY LAYOUT of "MULTI DISPLAY SETTING" on page 33.

Color space feature
Equipped with Sony's proprietary technology "Chroma TRU". By adjusting the color temperature/space settings for each individual LCD panel, the monitors produce consistent color balance, reducing unit-to-unit variations in color reproduction. Either ITU-R BT.709 or OFF can be selected for the color space settings.

Scan function
You can select the display from among "NORMAL", "OVER", "FULL" and "NATIVE" except the HD15 and DVI input signals.

Select language display
You can select your language for the display from seven languages - English, Chinese, Japanese, Italian, Spanish, German and French.

Power saving function
The monitor enters into power saving mode to reduce the power consumption when no signal is input.

Key inhibit function
You can inhibit the key to prevent missing an operation.

User memory function
You can save the 20 picture settings with the name. The user memory data can be saved or loaded between the monitor and the equipment (PC, etc.) connected in serial remote mode.

Two kinds of ground terminals
Two kinds of ground terminals are built into the monitor to equal the electric potential.

External remote function
The input signal is selected or various items are adjusted by use of the serial (Ethernet) remote function. You can connect this unit to the monitor by the Ethernet (10BASE-T/100BASE-TX) connection and controlled remotely on the network.

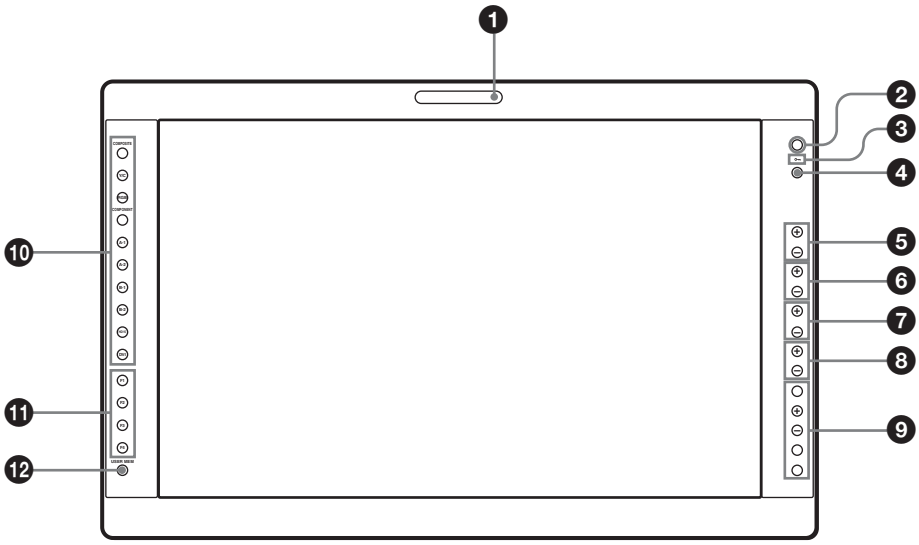
For more information, see SERIAL REMOTE of REMOTE menu on page 38.

Other

Optional stand
It is more convenient to install the monitor on a desk by using the optional stand (SU-560).

Location and Function of Parts and Controls

Front Panel



❶ Tally lamp
You can check the status of the monitor by the color of the tally lamp.
The tally lamp lights in green according to the setting of PARALLEL REMOTE in the REMOTE menu.

❷ Power indicator
When the power is turned on, the power indicator light in green.

❸ (key inhibit) indicator
Lights in green when KEY INHIBIT in the KEY INHIBIT menu is set to ON.

❹ CONTROL button
Press to display the buttons on the front panel. Press again to clear the display.

❺ CONTRAST buttons
Adjusts the picture contrast.
Press the + button to make the contrast higher or the – button to make it lower.

❻ PHASE buttons
Adjusts color tones.
Press the + button to make the skin tones greenish or the – button to make them purplish.

❼ CHROMA buttons
Adjusts the color intensity.
Press the + button to increase the color intensity or the – button to decrease it.

❽ BRIGHT (brightness) buttons
Adjusts the picture brightness.
Press the + button to increase the brightness or the – button to decrease it.

❾ Menu operation buttons
Displays or sets the on-screen menu.

MENU button
Press to display the on-screen menu.
Press again to clear the menu.

+/– buttons
Press to select the items and setting values.

ENTER button
Press to confirm a selected item on the menu.

To display the signal format
When the menu is not displayed and the button is pressed, the recognized signal format is displayed.

RETURN button
When the menu is displayed and the button is pressed, the value of an item is reset to the previous value.
Also, when the fan stops, this button blinks.

To display the names of functions assigned to the function buttons

When the menu is not displayed and the button is pressed, the function selected in FUNCTION BUTTON SETTING of the USER CONFIG menu is displayed on the side of the F1 to F4 button.

⑩ Input select buttons

Press the button to monitor the signal input to each connector.

A-1, A-2, B-1 and B-2 buttons are used when an optional input adaptor has been installed in the option port.

COMPOSITE button: to monitor the signal through the COMPOSITE IN connector

Y/C button: to monitor the signal through the Y/C IN connector

RGB button: to monitor the RGB signal through the connectors for the R/G/B signal input

COMPONENT button: to monitor the component signal through the connectors for Y/PB/PR signal input

A-1 button: to monitor the signal from connector 1 of the input adaptor installed in the option port A or R/G/B signal from BKM-229X/BKM-256DD installed in the option port A

A-2 button: to monitor the signal from connector 2 of the input adaptor installed in the option port A or Y/PB/PR signal from BKM-229X/BKM-256DD installed in the option port A

B-1 button: to monitor the signal from connector 1 of the input adaptor installed in the option port B or R/G/B signal from BKM-229X/BKM-256DD installed in the option port B

B-2 button: to monitor the signal from connector 2 of the input adaptor installed in the option port B or Y/PB/PR signal from BKM-229X/BKM-256DD installed in the option port B

HD15 button: to monitor the signal through the HD15 input connector

DVI button: to monitor the signal through the DVI-D input connector

⑪ Function buttons

You can turn the assigned function on or off.

The factory setting is as follows;

F1 button: 2D/3D SELECT

F2 button: SCAN

F3 button: ASPECT

F4 button: MULTI DISPLAY

You can assign the function from among SCAN, ASPECT, EXT SYNC, BLUE ONLY, MONO, MULTI DISPLAY, APA, I/P MODE, MIRROR IMAGE, 2D/3D SELECT, L/R SWITCH, DISPARITY SIM., etc., in FUNCTION BUTTON SETTING of the USER CONFIG menu (see page 34).

For details of the function assigned to the function button, see page 34.

⑫ USER MEM (user memory) button

Press to load the picture settings saved in the USER MEMORY menu (on page 39).

Input Signals and Adjustable/Setting Items

Item	Input signal												
	Video*3, Y/C*3	B & W*3	Component*4		RGB*4		SDI			Computer		3D	
			SD	HD	SD	HD	SD*5	HD*6	3G*14	DVI*13	HD15	HD-SDI *14, *15	DVI*15
CONTRAST*1	○	○	○	○	○	○	○	○	○	○	○	○	○
BRIGHT*1	○	○	○	○	○	○	○	○	○	○	○	○	○
CHROMA*1	○	×	○	○	○	○	○	○	○	○	○	○	○
PHASE*1	○ (NTSC)	×	○	○	○	○	○	○	○	○	○	○	○
APERTURE	○	○	○	○	○	○	○	○	○	○	○	○	○
COLOR TEMP	○	○	○	○	○	○	○	○	○	○	○	○	○
COLOR SPACE	○	○	○	○	○	○	○	○	○	○	○	○	○
AUTO CHROMA/ PHASE	○	×	○	○	×	×	×	×	×	×	×	×	×
ACC	○	×	×	×	×	×	×	×	×	×	×	×	×
CTI	○	×	○	×	×	×	×	×	×	×	×	×	×
V SHARPNESS	○	○	○	×	○	×	○	×	×	×	×	×	×
MATRIX*2	×	×	○	×	×	×	×	×	×	×	×	×	×
COMPONENT LEVEL	×	×	○ (480/60I)	×	×	×	×	×	×	×	×	×	×
NTSC SETUP	○ (NTSC)	○ (480/60I)	×	×	×	×	×	×	×	×	×	×	×
SCAN	○	○	○	○	○	○	○	○	○	×*8	×*8	×	×
GAMMA*18	○	○	○	○	○	○	○	○	○	○	○	○	○
ASPECT*10	○	○	○	×	○	×	○	×	×	×*12	×*12	×	×
BLUE ONLY	○	×	○	○	○	○	○	○	○	×	×	○	×
MONO	○	×	○	○	×	×	○	○	○	×	×	○	×
APA	×	×	×	×	×	×	×	×	×	×	○*11	×	×
SIZE	×	×	×	×	×	×	×	×	×	×	○	×	×
SHIFT	○	○	○	○	○	○	○	○	○	×	○	×	×
PITCH	×	×	×	×	×	×	×	×	×	×	○	×	×
DOT PHASE	×	×	×	×	×	×	×	×	×	×	○	×	×
POWER SAVING	○	○	○	○	○	○	○	○	○	○	○	○	○
I/P MODE*7	○	○	○	○	○	○	○	○	×	×*8	×*8	×	×
MULTI DISPLAY	○	○	○	○	○	○	○	○	○	○*9	○*9	○*17	○*9
CHECKERBOARD	×	×	×	×	×	×	×	×	×	×	×	○*16	×
L/R SWITCH	×	×	×	×	×	×	×	×	×	×	×	○*16	×
HOROPTER CHECK	×	×	×	×	×	×	×	×	×	×	×	○	×
DISPARITY SIM.	×	×	×	×	×	×	×	×	×	×	×	○	×

○ : Adjustable/can be set
× : Not adjustable/cannot be set

*1 Adjustment of SUB CONTROL is the same.

*2 When a component signal (480/60I or 480/60P) is input and the COMPONENT LEVEL is set to SMPTE, this can be switchable.

*3 When a BKM-227W is installed, the number of the input connector is increased.

*4 When a BKM-229X is installed, the number of the input connector is increased.

*5 When a BKM-220D, BKM-243HSM or BKM-250TGM is installed, the signal can be input.

*6 When a BKM-243HSM or BKM-250TGM is installed, the signal can be input.

*7 Only the interlace signal is input.

*8 The signal can operate with PRESET 2 to 6 (see page 44).

*9 For details on the input signal available for the multi display, see “For the multi display” (page 46).

*10 The signal cannot operate with PRESET 7 and 8 (see page 44).

*11 The signal can only operate with PRESET 1 (see page 44).

*12 The signal can only operate with PRESET 6 (see page 44).

*13 When a BKM-256DD is installed, the number of the input connector is increased.

*14 When a BKM-250TGM is installed, the signal can be input.
(You can also use BKM-250TG with a serial number 7100001 or later.)

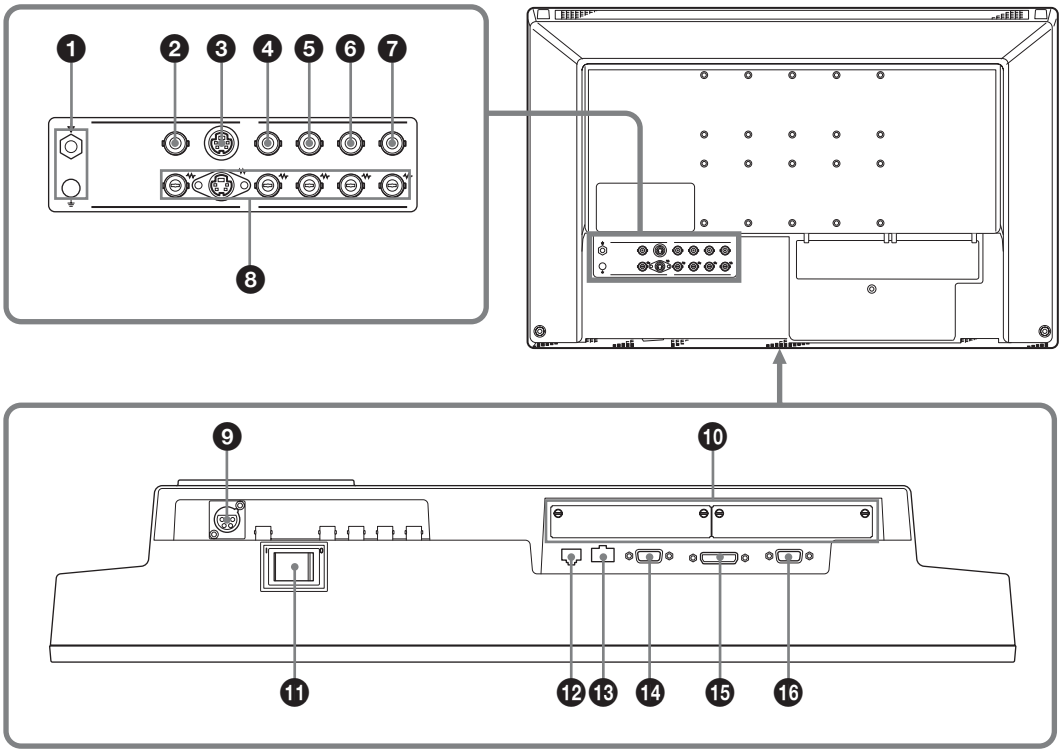
*15 3D display mode is available when selecting 3D in 2D/3D SELECT.

*16 Available when selecting 2D in 2D/3D SELECT.

*17 Displays in 2D display mode when selecting SIDE BY SIDE in DISPLAY LAYOUT.

*18 When COLOR SPACE is set to OFF, this can be switchable.

Rear/Bottom Panel



❶ ⏚/⏚ (Equipotential/Function Earth) terminal
⏚ (equipotential) terminal
Connects the equipotential plug.
⏚ (function earth) terminal
Connects the earth cable.

❷ COMPOSITE IN connector (BNC)
Input connector for composite signals.

❸ Y/C IN connector (4-pin mini-DIN)
Input connector for Y/C signals.

❹ G/Y IN connector (BNC)
Input connector for G of RGB signals and component Y (luminance) signals.

❺ B/P_B IN connector (BNC)
Input connector for B of RGB signals and P_B (blue color difference) of component signals.

❻ R/P_R IN connector (BNC)
Input connector for R of RGB signals and P_R (red color difference) of component signals.

❼ EXT SYNC IN (external sync input) connector (BNC)
When this unit operates on an external sync signal, connect the reference signal from a sync generator to this connector.
To use the external sync signal, press the function button that EXT SYNC is assigned.

Note

When inputting a video signal with the jitters, etc. the picture may be disturbed. We recommend using the TBC (time base corrector).

❽ Loop-through output connectors
Outputs the signals input to the input connectors (❷ to ❼). Connect to the analog input (composite, Y/C, analog component, analog RGB or external sync) of equipment, according to the input signal.
When a cable is connected to one of these connectors, the 75-ohm termination of the corresponding input is automatically released, and the signal input to the input connector is output.

❾ DC 5V/24V IN connector
Connect the DC connector of the supplied AC adaptor.

❿ Optional input port
An optional input adaptor can be installed according to your system configuration (see page 21).
The left side port is A and the right side port is B.
Press the A-1, A-2, B-1 or B-2 button to select the signal.

⓫ ⊙/♁ (ON/OFF) switch

The power is turned on or off.
The monitor is turned on by pressing side ⊙.

⓬ PARALLEL REMOTE connector (modular connector, 8-pin)

Forms a parallel switch and controls the monitor externally.
When the unit is shipped from the factory, a connector cover is attached to this connector. Remove it before using the connector.

For removing the connector cover, see page 22.

For details on the pin assignment and factory setting function assigned to each pin, see page 43.

CAUTION

For safety, do not connect the connector for peripheral device wiring that might have excessive voltage to this port. Follow the instructions for this port.

⓭ SERIAL REMOTE connector (RJ-45)

Connect to the network by using a 10BASE-T/100BASE-TX LAN cable (shielded type, optional).
When the unit is shipped from the factory, a connector cover is attached to this connector. Remove it before using the connector.

For removing the connector cover, see page 22.

For details on this connector, refer to the Interface Manual for Programmers (saved in the supplied CD-ROM, Japanese and English only.)

CAUTION

- When you connect the LAN cable of the unit to peripheral device, use a shielded-type cable to prevent malfunction due to radiation noise.
- For safety, do not connect the connector for peripheral device wiring that might have excessive voltage to this port. Follow the instructions for this port.
- The connection speed may be affected by the network system. This unit does not guarantee the communication speed or quality of 10BASE-T/100BASE-TX.

⓮ SERIAL REMOTE RS-232C connector (D-sub 9-pin, female)

Connect to the RS-232C control connector on external equipment connected to the monitor. The monitor can be operated according to control commands sent from external equipment connected to it.

For details on the pin assignment and factory setting function assigned to each pin, see page 43.

For details on this connector, refer to the Interface Manual for Programmers (saved in the supplied CD-ROM, Japanese and English only.)

⓯ DVI-D input connector (DVI-D)

Inputs DVI Rev.1.0 applicable digital RGB signal.
To view the signals of the SXGA and higher resolution when the DVI input is selected, use the cable within 3 m (118 1/8 inches) in length.

⓰ HD15 input connector (D-sub 15-pin, female)

Inputs an analog RGB video signal (0.7 Vp-p, positive polarity) and sync signal.
The Plug & Play function corresponds to DDC2B.

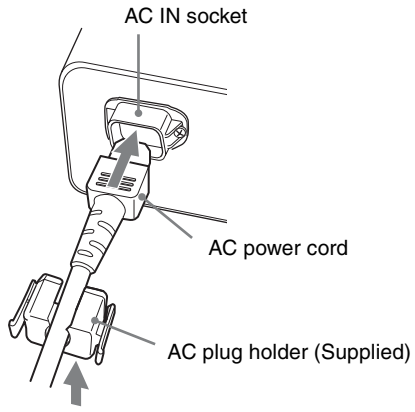
WARNING
Using this unit for medical purposes

This equipment's connectors are not isolated.
Do not connect any device other than one which conforms to IEC 60601-1.
When an information technology device or AV device that uses an alternating current is connected, current leakage may result in an electric shock to the patient or operator.
If use of such a device is unavoidable, isolate its power supply by connecting an isolation transformer, or by connecting an isolator between the connecting cables.
After implementing these measures, confirm that the reduced risk now conforms to IEC 60601-1.

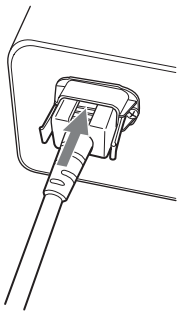
Connecting the AC Power Cord

Connect the supplied AC power cord as illustrated. Two kinds of AC plug holders are supplied with this unit. Use the AC plug holder that fits the AC power cord most securely.

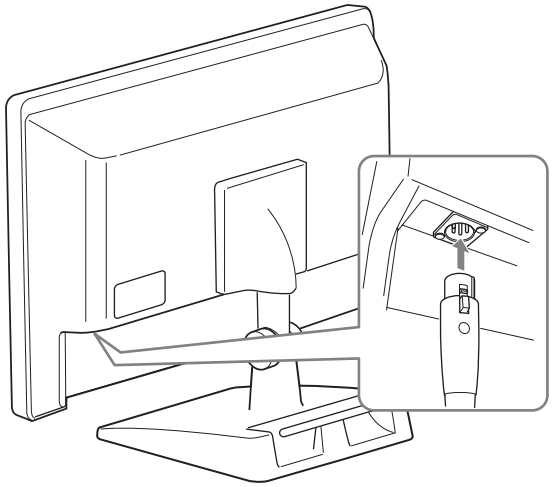
1 Plug the AC power cord into the AC IN socket on the AC adaptor. Then, attach the AC plug holder to the AC power cord.



2 Slide the AC plug holder over the cord until it locks.



3 Insert the DC IN connector into the DC 5V/24V IN connector on the bottom of this unit until it locks.



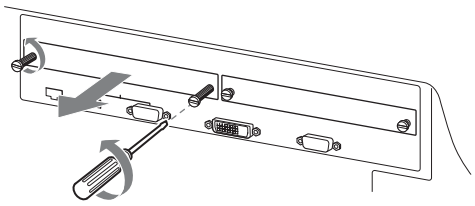
To remove the AC power cord

First, pull out the AC plug holder while pressing the lock levers.
Next, pull out the DC IN connector from the DC 5V/24V IN connector while pressing the lock lever.

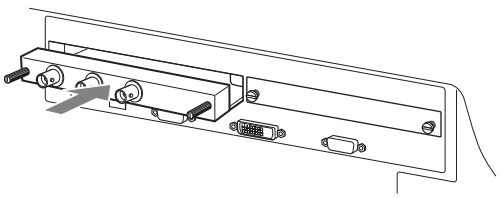
Installing the Input Adaptor

Before installing the input adaptor, disconnect the power cord.

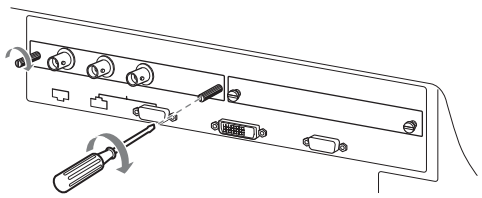
1 Remove the panel of the optional input port.



2 Insert the input adaptor into the port.



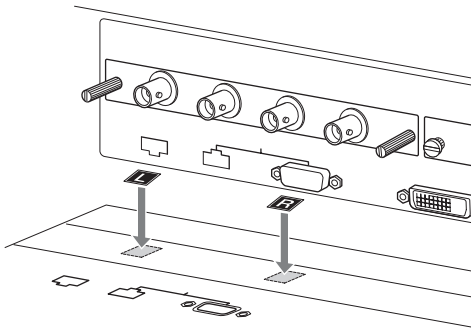
3 Tighten the screws.



Attaching the Provided L/R Labels

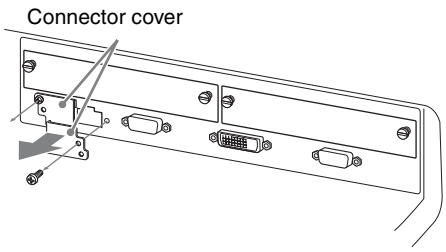
Install the L/R labels on the panel around the input connectors to show channel allocations for inputs.

Examples for attaching



Removing the Connector Cover

When the unit is shipped from the factory, a connector cover is attached to the PARALLEL REMOTE connector and the SERIAL REMOTE connector (RJ-45).
To use the connector, remove the connector cover as follows.
Before removing the connector cover, disconnect the power cord.



1 Remove the screw of the connector cover.

2 Remove the connector cover.

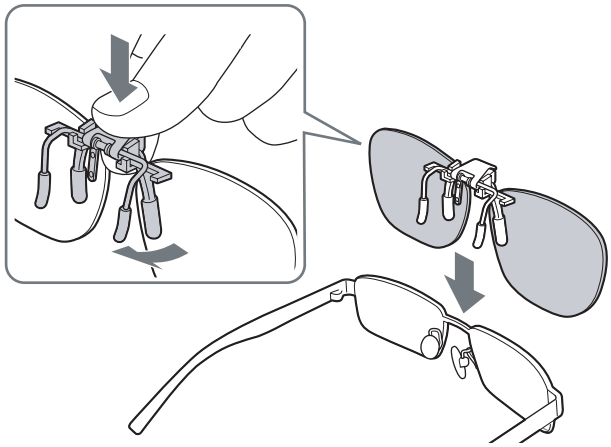
Save the screw and cover, so that you can reattach the cover if necessary.

Caution

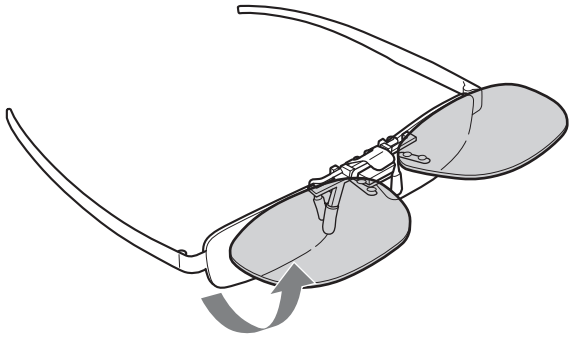
These connectors are designed to allow direct contact with conductive circuits. Weak voltage may be present because of a failure in this unit. To prevent patients from touching these connectors accidentally, attach the connector covers when the connectors are not being used to connect to other devices.

Using the Clip-on-Type 3D Glasses (BKM-31GM)

Clip the clip-on-type 3D glasses (BKM-31GM) to the top part of the frames of your eyeglasses.



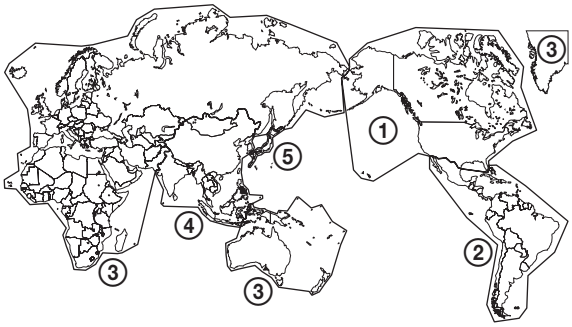
The glass lenses can be flipped up when 3D effect is not required.



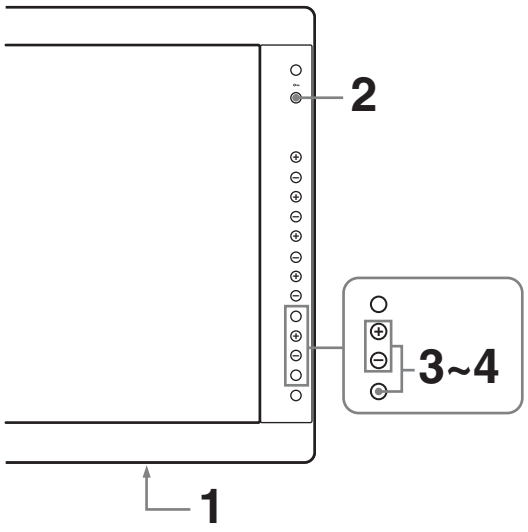
Selecting the Default Settings

When you turn on the unit for the first time after purchasing it, select the area where you intend to use this unit from among the options.

The default setting values for each area

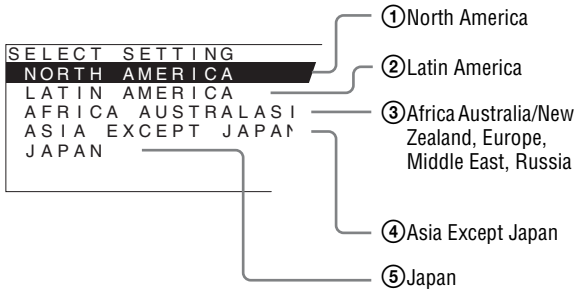


		COLOR TEMP	COMPONENT LEVEL	NTSC SETUP
①**NORTH AMERICA**		LOW	BETA7.5	7.5
②**LATIN AMERICA**	ARGENTINA	LOW	SMPTE	0
PAL&PAL-N AREA	PARAGUAY	LOW	SMPTE	0
	URUGUAY	LOW	SMPTE	0
NTSC&PAL-M AREA	OTHER AREA	LOW	BETA7.5	7.5
③**AFRICA AUSTRALASIA EUROPE MIDDLE-EAST**		LOW	SMPTE	0
④**ASIA EXCEPT JAPAN**	NTSC AREA	LOW	BETA7.5	7.5
	PAL AREA	LOW	SMPTE	0
⑤**JAPAN**		HIGH	SMPTE	0



1 Turn on the unit with the ⊙/⏻ (ON/OFF) switch on the bottom panel.

The SELECT SETTING screen appears.

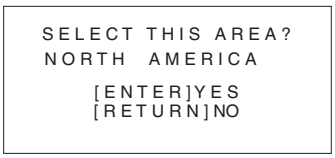


2 Press the CONTROL button.

3 Press the + or – button to select the area where you intend to use the unit and press the ENTER button.

If you select either ①, ③ or ⑤

The confirmation screen is displayed. Confirm the selected area. When the setting is wrong, press the RETURN button to return to the previous screen.

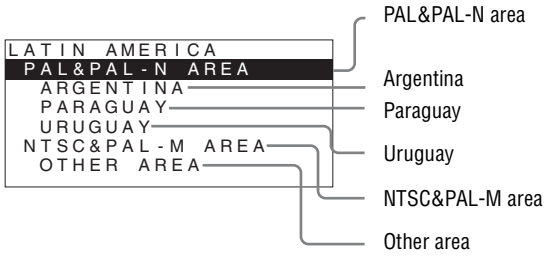


If you select either ② or ④

One of the following screens appears. Press the + or – button to narrow the area further and then press the ENTER button.

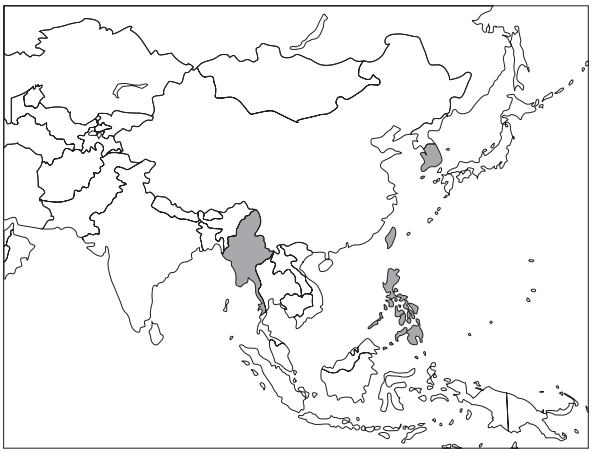
The confirmation screen is displayed. Confirm the selected area. When the setting is wrong, press the RETURN button to return to the previous screen.

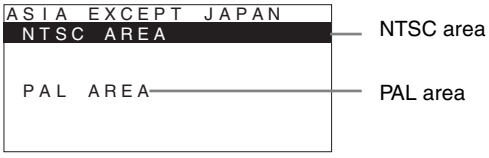
② If LATIN AMERICA is selected:



④ If ASIA EXCEPT JAPAN is selected:

Customers who will use this unit in the shaded areas shown in the map below should select NTSC AREA.
Other customers should select PAL AREA.





4 Press the ENTER button.

The SELECT SETTING screen disappears and the menu item settings suitable for the selected area are applied.

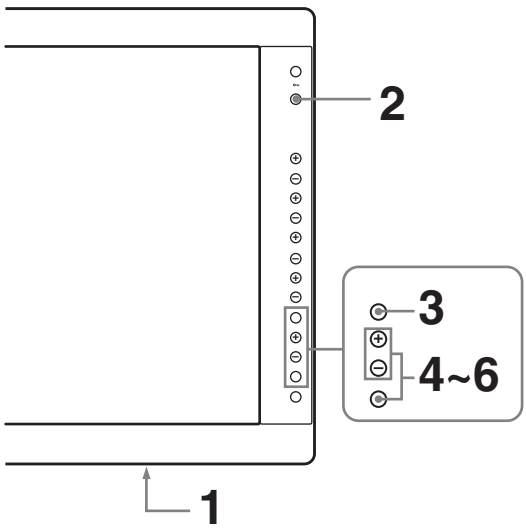
Note

When you have selected the wrong area, set the following items using the menu.
- COLOR TEMP (on page 29)
- COMPONENT LEVEL (on page 32)
- NTSC SETUP (on page 32)

See “The default setting values for each area” (page 23) on the setting value.

Selecting the Menu Language

You can select one of seven languages (English, Chinese, Japanese, Italian, Spanish, German, French) for displaying the menu and other on-screen displays. “ENGLISH (English)” is selected in the default setting. The current settings are displayed in place of the ■ marks on the illustrations of the menu screen.



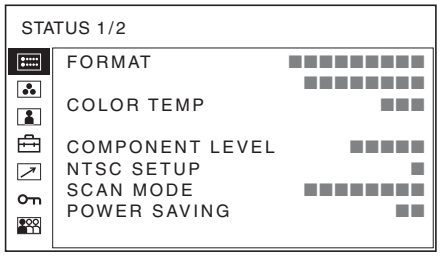
1 Turn on the unit.

2 Press the CONTROL button.

The operation buttons are displayed.

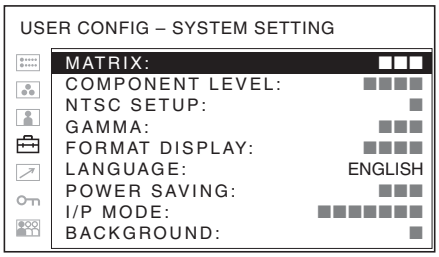
3 Press the MENU button.

The menu appears.
The menu presently selected is shown in yellow.



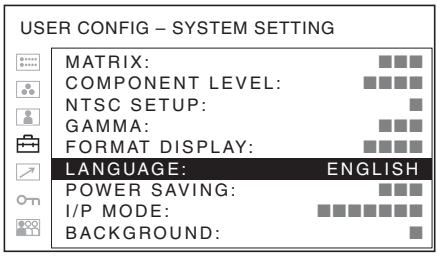
4 Press the + or – button to select SYSTEM SETTING of the USER CONFIG (User Configuration) menu, then press the ENTER button.

The setting items (icons) in the selected menu are displayed in yellow.



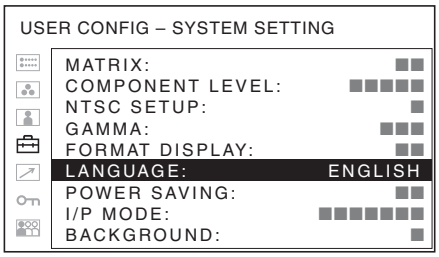
5 Press the + or – button to select "LANGUAGE," then press the ENTER button.

The selected item is displayed in yellow.



6 Press the + or – button to select a language, then press the ENTER button.

The menu changes to the selected language.



To clear the menu

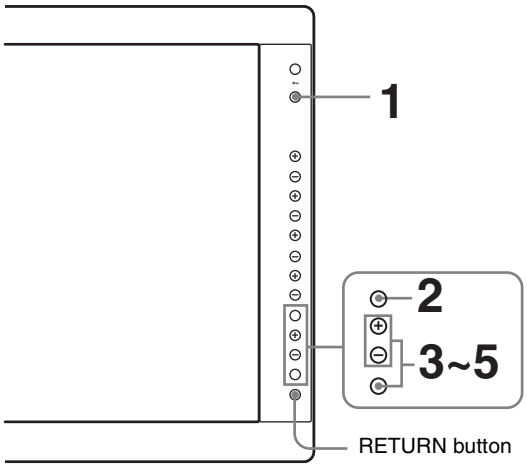
Press the MENU button.
The menu disappears automatically if a button is not pressed for one minute.

Using the Menu

The unit is equipped with an on-screen menu for making various adjustments and settings such as picture control, input setting, set setting change, etc. You can also change the menu language displayed in the on-screen menu.

To change the menu language, see "Selecting the Menu Language" on page 24.

The current settings are displayed in place of the ■ marks on the illustrations of the menu screen.

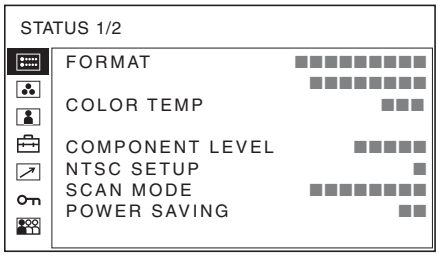


1 Press the CONTROL button.

The operation buttons are displayed.

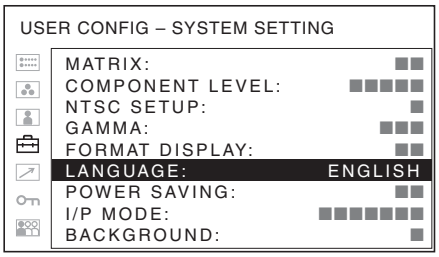
2 Press the MENU button.

The menu appears.
The menu presently selected is shown as a yellow button.



3 Use the + or – button to select a menu, then press the ENTER button.

The menu icon presently selected is shown in yellow and setting items are displayed.



4 Select an item.

Use the + or – button to select the item, then press the ENTER button.
The item to be changed is displayed in yellow.
If the menu consists of multiple pages, press + or – button to go to the desired menu page.

5 Make the setting or adjustment on an item.

When changing the adjustment level:
To increase the number, press the + button.
To decrease the number, press the – button.
Press the ENTER button to confirm the number, then restore the original screen.
When changing the setting:
Press the + or – button to change the setting.
Press the ENTER button to confirm the setting.
When returning the adjustment or setting to the previous value:
Press the RETURN button before pressing the ENTER button.

Notes

- An item displayed in black cannot be accessed. You can access the item if it is displayed in white.
- If the key inhibit has been turned on, all items are displayed in black. To change any of the items, set KEY INHIBIT in the KEY INHIBIT menu to OFF first.

For details on the key inhibit, see page 39.

To return the display to the previous screen

Press the RETURN button.

To clear the menu

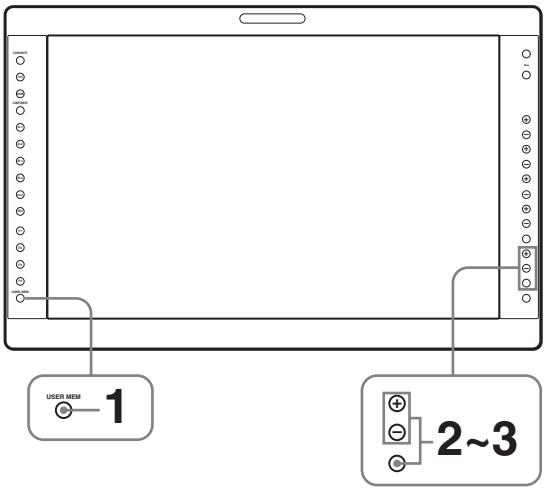
Press the MENU button.
The menu disappears automatically if a button is not pressed for one minute.

About the memory of the settings

The settings are automatically stored in the monitor memory.

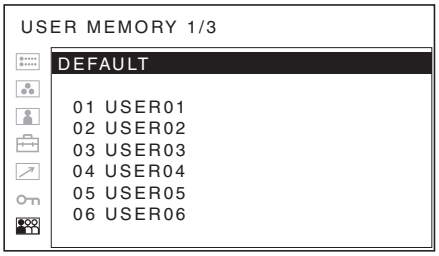
Loading USER MEMORY

You can load the picture settings saved in the USER MEMORY menu (on page 39).



1 Press the USER MEM button.

The USER MEMORY menu appears.



2 Select the memory number.

+ or – button: to select the memory number

3 Press the ENTER button.

After loading the picture settings from the selected memory, the menu disappears.

To stop selecting the memory

Press the USER MEM button.
The USER MEMORY menu disappears.

To reset the settings

Select “DEFAULT”, then press the ENTER button.

Adjustment Using the Menus

Items

The screen menu of this monitor consists of the following items.

STATUS (the items indicate the current settings.)

For the video input

FORMAT
COLOR TEMP
COMPONENT LEVEL
NTSC SETUP
SCAN MODE
POWER SAVING
Model name and serial number
OPTION A and serial number
OPTION B and serial number

For the DVI/HD15 input

FORMAT
fH
fV
COLOR TEMP
POWER SAVING
Model name and serial number
OPTION A and serial number
OPTION B and serial number

COLOR TEMP/SPACE

COLOR TEMP
MANUAL ADJUSTMENT
3D OFFSET
3D OFFSET ADJ.
COLOR SPACE

USER CONTROL

For the video input

AUTO CHROMA/PHASE
SUB CONTROL
PICTURE CONTROL
INPUT SETTING

For the DVI/HD15 input

SUB CONTROL
PICTURE CONTROL

USER CONFIG

SYSTEM SETTING
- MATRIX
- COMPONENT LEVEL
- NTSC SETUP
- GAMMA
- FORMAT DISPLAY
- LANGUAGE
- POWER SAVING
- I/P MODE
- BACKGROUND

MULTI DISPLAY SETTING
- MULTI DISPLAY ENABLE
- DISPLAY LAYOUT
- SUB INPUT SELECT
- POSITION
- FRAME
- SUB PICTURE SIZE

FUNCTION BUTTON SETTING
- F1 BUTTON
- F2 BUTTON
- F3 BUTTON
- F4 BUTTON

COMPUTER DETECT
- DVI
- HD15

OPTION DVI SETTING*1
- EXT 5V(IN)
- EXT 5V(OUT)
- EDID UPDATE
- EDID STATUS

*1 Displayed only when a BKM-256DD is installed.

3D SETTING*2
- 2D/3D SELECT
- 3D SIGNAL FORMAT
- DISPARITY SIM.
- HOROPTER CHECK
- FLIP H
- PAYLOAD ID
- 2D/3D DISPLAY

*2 Displayed only when input signals from BKM-250TGM or DVI/BKM-256DD are selected.

REMOTE

PARALLEL REMOTE
SERIAL REMOTE

KEY INHIBIT

KEY INHIBIT

USER MEMORY

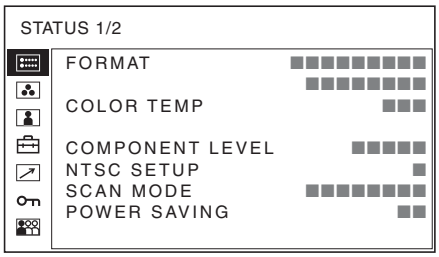
01 to 20

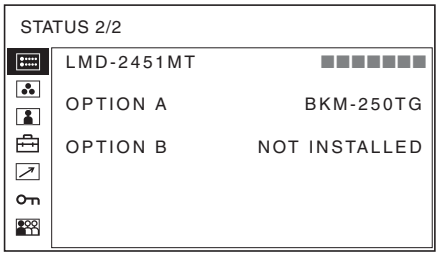
Adjusting and Changing the Settings

STATUS menu

The STATUS menu is used to display the current status of the unit. The following items are displayed:

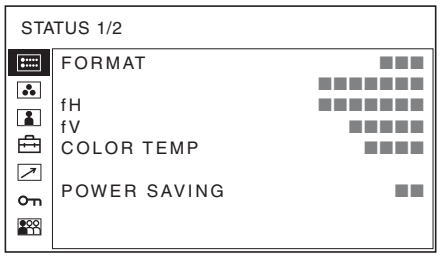
For the video input

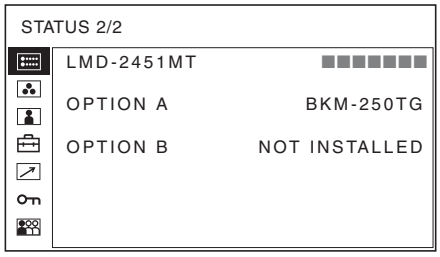




- Signal format
- Color temperature
- Component level
- NTSC setup
- Scan mode
- Power saving
- Model name and serial number
- OPTION A and serial number
- OPTION B and serial number

For the DVI/HD15 input

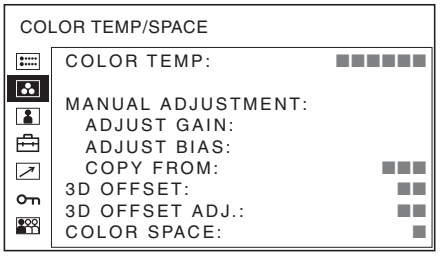




- Signal format
- fH
- fV
- Color temperature
- Power saving
- Model name and serial number
- OPTION A and serial number
- OPTION B and serial number

COLOR TEMP/SPACE menu

The COLOR TEMP/SPACE menu is used for adjusting the picture white balance or color space.
You need to use the measurement instrument to adjust the white balance.
Recommended: Konica Minolta color analyzer CA-210



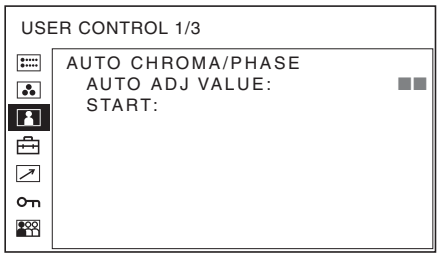
Submenu	Setting
COLOR TEMP	Selects the color temperature from among “HIGH”, “LOW” or “USER” and “LOW2” setting.
MANUAL ADJUSTMENT	If you set the COLOR TEMP to USER setting, the item displayed is changed from black to white, which means you can adjust the color temperature. The set values are memorized. • **ADJUST GAIN**: Adjusts the color balance (GAIN). • **ADJUST BIAS**: Adjusts the color balance (BIAS). • **COPY FROM**: If you select “HIGH”, “LOW” or “LOW2”, the white balance data for the selected color temperature will be copied in the “USER” setting.
3D OFFSET	Selects the desired mode pertaining to the 3D offset adjustment. • **AUTO**: The setting value of 3D offset adjustment is not applied to 2D display mode. The setting value of 3D offset adjustment is applied to 3D display mode. • **OFF**: The setting value of 3D offset adjustment is not applied to either 2D or 3D display mode. • **ON**: The setting value of 3D offset adjustment is applied to both 2D and 3D display modes.
3D OFFSET ADJ.	Available when 3D is selected from 2D/3D SELECT. Defines white balance for 3D viewing in order to provide colors as accurate as those when 3D glasses are not used. You can select from among R GAIN, G GAIN, B GAIN, R BIAS, G BIAS and B BIAS.
COLOR SPACE	Selects the color space either ITU-709 or OFF. OFF sets the color space to the original color reproduction of the LCD panel.

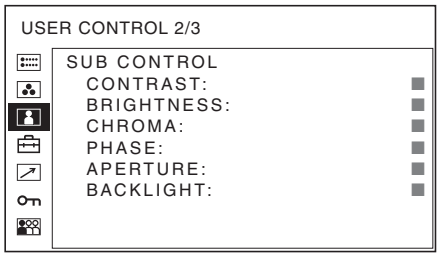
USER CONTROL menu

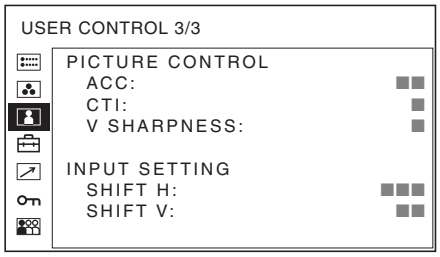
The USER CONTROL menu is used for adjusting the picture.
Items that cannot be adjusted depending on the input signal are displayed in black.

For details of input signals and adjustable/setting items, see page 16.

For the video input



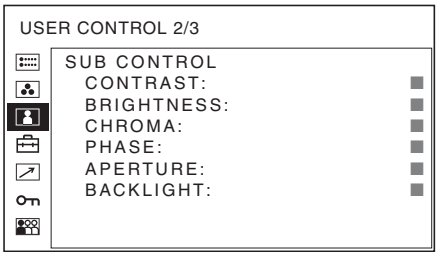


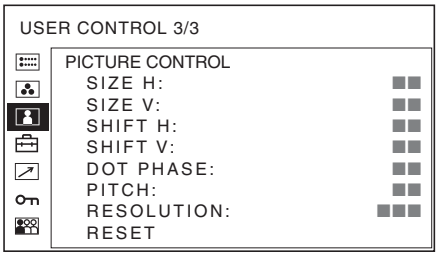


Submenu	Setting
AUTO CHROMA/ PHASE	Adjusts color intensity (CHROMA) and tones (PHASE). • **AUTO ADJ VALUE**: Selects ON or OFF of the auto adjustment. When you set to OFF, this parameter is reset to the factory setting. When you set to ON, the automatically adjusted value is enabled. • **START**: The auto adjustment starts when you display the color bar signals (Full/ SMPTE/EIA) on the screen and press the ENTER button. After adjusting the color intensity, press the MENU button to clear the adjustment screen. After the adjustment is done correctly, the AUTO ADJ VALUE is automatically set to ON.
SUB CONTROL	Adjusts finely the adjustment range of the button on the front panel for CONTRAST, BRIGHTNESS, CHROMA and PHASE. • **CONTRAST**: Adjusts the picture contrast. • **BRIGHTNESS**: Adjusts the picture brightness. • **CHROMA**: Adjusts color intensity. The higher the setting, the greater the intensity. The lower the setting, the lower the intensity. • **PHASE**: Adjusts color tones. The higher the setting, the more greenish the picture. The lower the setting, the more purplish the picture. • **APERTURE**: Adjusts the picture sharpness. The higher the setting, the sharper the picture. The lower the setting, the softer the picture. • **BACKLIGHT:** Adjusts the backlight. When the setting is changed, the brightness of the backlight is changed.
PICTURE CONTROL	Adjusts the picture. • **ACC (Auto Color Control):** Sets ACC circuit on or off. To check the fine adjustment, select OFF. Normally select ON. • **CTI (Chroma Transient Improvement)**: When a low color resolution signal is input, a crisp image can be displayed. When the setting is higher, the picture becomes even more crisp. • **V SHARPNESS**: A crisp image can be displayed. When the setting is higher, the picture becomes even more crisp.
INPUT SETTING	• **SHIFT H**: Adjusts the position of the picture. As the setting increases, the picture moves to the right, and as the setting decreases, the picture moves to the left. • **SHIFT V**: Adjusts the position of the picture. As the setting increases, the picture moves up, and as the setting decreases, the picture moves down.

For the DVI/HD15 input

* The 1/3 menu cannot be adjusted.



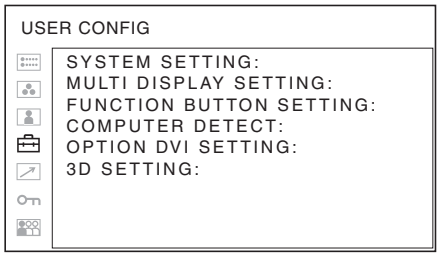


Submenu	Setting
SUB CONTROL	Adjusts finely the adjustment range of the button on the front panel for CONTRAST, BRIGHTNESS, CHROMA and PHASE. • **CONTRAST**: Adjusts the picture contrast. • **BRIGHTNESS**: Adjusts the picture brightness. • **CHROMA**: Adjusts color intensity. The higher the setting, the greater the intensity. The lower the setting, the lower the intensity. • **PHASE**: Adjusts color tones. The higher the setting, the more greenish the picture. The lower the setting, the more purplish the picture. • **APERTURE**: Adjusts the picture sharpness. The higher the setting, the sharper the picture. The lower the setting, the softer the picture. • **BACKLIGHT:** Adjusts the backlight. When the setting is changed, the brightness of the backlight is changed.

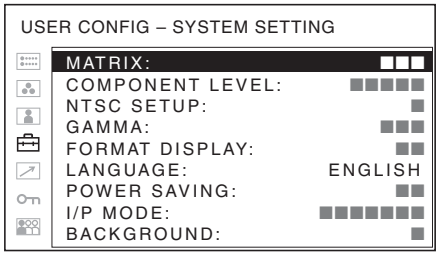
Submenu	Setting
PICTURE CONTROL	Adjusts to monitor the picture more clearly. • **SIZE H**: Adjusts the horizontal size of the picture. The higher the setting, the larger the horizontal size of the picture. The lower the setting, the smaller the horizontal size of the picture. • **SIZE V**: Adjusts the vertical size of the picture. The higher the setting, the larger the vertical size of the picture. The lower the setting, the smaller the vertical size of the picture. • **SHIFT H**: Adjusts the position of the picture. As the setting increases, the picture moves to the right, and as the setting decreases, the picture moves to the left. • **SHIFT V:** Adjusts the position of the picture. As the setting increases, the picture moves up, and as the setting decreases, the picture moves down. • **DOT PHASE**: Adjusts the dot phase. Adjust the picture further for a finer picture after APA (page 35) is adjusted. • **PITCH:** Adjusts the horizontal size of the picture with the left side of the picture fixed. The higher the setting, the larger the width of the picture. The lower the setting, the narrower the width of the picture. • **RESOLUTION:** Sets when the computer signal is input and it is difficult to understand the signal type such as XGA/60 or WXGA/60 **•XGA:** Displayed as XGA signal. **•WXGA:** Displayed as WXGA signal. • **RESET:** Resets the value of SIZE H, SIZE V, SHIFT H, SHIFT V, DOT PHASE and PITCH to the factory preset value.

USER CONFIG menu

The USER CONFIG menu is used for setting the system, multi display, function button, computer detect, option DVI and 3D.



SYSTEM SETTING

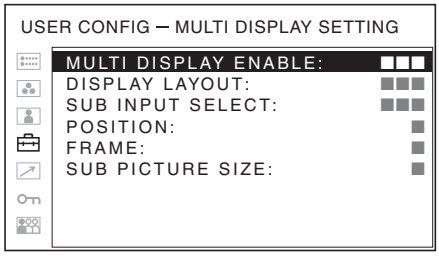


Submenu	Setting
MATRIX	Applied to 480/60I or 480/60P signal. Select 601 or 709.
COMPONENT LEVEL	Selects the component level from among three modes. • **SMPTE:** for 100/0/100/0 signal • **BETA7.5:** for 100/7.5/75/7.5 signal • **BETA0:** for 100/0/75/0 signal
NTSC SETUP	Selects the NTSC setup level from two modes. The 7.5 setup level is used mainly in North America. The 0 setup level is used mainly in Japan.
GAMMA	Selects the appropriate gamma mode from between two settings (“2.2”, “DICOM”). When “2.2” is selected, the setting is roughly same as the gamma mode of the CRT. **Note** When COLOR SPACE is set to OFF, the GAMMA setting is available.

Submenu	Setting
FORMAT DISPLAY	Selects the display mode of the signal format and scan mode. • **AUTO**: The format is displayed for about five seconds when the input of the signal starts. • **ON**: The format is always displayed. • **OFF**: The display is hidden.
LANGUAGE	Selects the menu or message language from among seven languages. • **ENGLISH:** English • **中文:** Chinese • **日本語:** Japanese • **ITALIANO:** Italian • **ESPAÑOL:** Spanish • **DEUTSCH:** German • **FRANÇAIS:** French
POWER SAVING	Sets the power saving mode on or off. When you set to ON, the monitor goes into power saving mode if no signal is input for about one minute.
I/P MODE (picture delay minimum)	Selects to set the delay by the picture processing to the minimum level when the interlace signal is input. • **INTER-FIELD**[*1]: Mode for giving precedence to the picture quality. Performs interpolation depending on the movement of the images between the fields. It takes longer than “FIELD MERGE” or “LINE DOUBLER” for processing the picture. “INTER-FIELD” is the factory setting. • **LINE DOUBLER**: The processing time is shorter. Performs interpolation by repeating each line in the data receiving sequence regardless of the field. As the line flicker is displayed in this mode, it is available for checking the line flicker of the telop work and so on. • **FIELD MERGE**[*2]: The processing time is shorter. Combines the lines in the odd fields and even fields alternately regardless of the movement of images. Suitable for viewing still images. [*1] When MULTI DISPLAY ENABLE is set to ON, INTER-FIELD cannot be selected. [*2] When DISPLAY LAYOUT is set to SIDE BY SIDE, FIELD MERGE cannot be selected.

Submenu	Setting
BACKGROUND	Sets the brightness of the black bars appearing in the upper and lower positions of the screen, or on the sides of the screen. • **OFF**: Displays a darker bar (black). • **ON**: Displays a brighter bar (gray).

MULTI DISPLAY SETTING

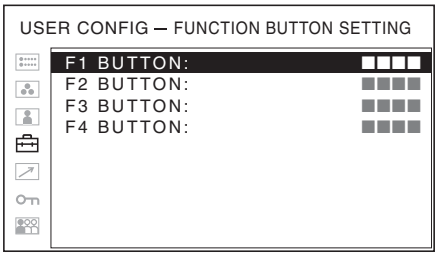


Submenu	Setting
MULTI DISPLAY ENABLE	Selects ON to display the multi display and OFF not to display. **Notes** • When the frame frequency of the main display is different from that of the sub display, the picture may be disturbed. When no signal is input to the main display, the picture may not be displayed correctly. • When you set SUB INPUT SELECT to OFF, MULTI DISPLAY ENABLE is set to OFF automatically. • When MULTI DISPLAY ENABLE is set to ON, APA (page 35) is not available. • When PIP multi display mode is selected, 3D display is only available in the main display. In other multi display modes, images appear in the 2D display.

Submenu	Setting
DISPLAY LAYOUT	• **POP:** The sub display is put by the side of the main display.Either NORMAL or OVER can be selected for the scan mode in the main display. • **PIP:** The sub display appears in an inset window of the main display (for 16:9 display only). • **SIDE BY SIDE:** The main display is put in the left side of the display and the sub display is put in the right side of the display. Either NORMAL or FULL can be selected for the scan mode in the main and sub display. The scan mode of the main and sub display will change at the same time. You cannot set a different scan mode for each display. To switch the scan mode, press the function button assigned to change the scan mode. See "FUNCTION BUTTON SETTING" (page 34) and "About the function assigned to the function button" (page 34). **Notes** • When DISPLAY LAYOUT is set to SIDE BY SIDE, CTI (page 30) is not available. • When SIDE BY SIDE is selected, only 2D display mode is available.
SUB INPUT SELECT	Sets the input signal of the sub display. You can select from among OFF, VIDEO WAVE, OPTION B-2, OPTION B-1, OPTION A-2, OPTION A-1, DVI, HD15, COMPONENT, RGB, Y/C and COMPOSITE. **Notes** • The multi display with COMPOSITE and Y/C, RGB and COMPONENT, HD15 and DVI, OPTION A-1 and OPTION A-2, and OPTION B-1 and OPTION B-2 is not displayed. • When you set SUB INPUT SELECT to OFF, MULTI DISPLAY ENABLE is set to OFF. • The input signal formats available for HD15 and DVI are limited. See "For the multi display" (page 46).
POSITION	Sets the position of the sub display. **When POP is selected:** • **1:** Top • **2:** Center • **3:** Bottom **When PIP is selected:** • **1:** Bottom left • **2:** Bottom right • **3:** Top right • **4:** Top left

Submenu	Setting
FRAME	Sets the position of the main display when POP is selected in DISPLAY LAYOUT. • **RIGHT:** The main display is put by the right side of the sub display. • **LEFT:** The main display is put by the left side of the sub display.
SUB PICTURE SIZE	Sets the sub display size when PIP is selected in DISPLAY LAYOUT. • **1:** Small • **2:** Large

FUNCTION BUTTON SETTING

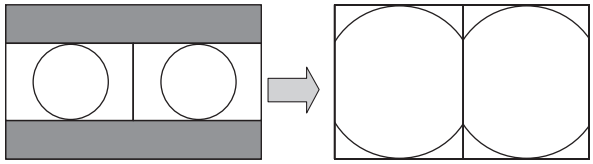


Submenu	Setting
F1 BUTTON to F4 BUTTON	Assigns the function to the function buttons of the front panel and turns the function on or off. You can assign the function from among SCAN, ASPECT, EXT SYNC, BLUE ONLY, MONO, MULTI DISPLAY, APA, I/P MODE, MIRROR IMAGE, 2D/3D SELECT, L/R SWITCH, DISPARITY SIM., etc. **Factory setting** • **F1 button:** 2D/3D SELECT • **F2 button:** SCAN • **F3 button:** ASPECT • **F4 button:** MULTI DISPLAY

About the function assigned to the function button

SCAN

Press to change the scan size of the picture. Press to switch between NORMAL scan (0% scan), OVER scan (20% over scan), FULL and NATIVE (see "Scan mode image" on page 36). NATIVE is effective only when 1080i, 1080P or 720P signal is input. 1080P can be selected when BKM-250TGM is installed.
The scan mode of the picture can also be changed when MULTI DISPLAY ENABLE is set to ON. Selectable scan modes vary depending on the settings in DISPLAY LAYOUT (page 33). When FULL is selected as the SIDE BY SIDE multi display mode, the size of the picture is enlarged while keeping the aspect ratio the same. In this case, the left and right edges of the image are cut off.



ASPECT

Press to set the aspect ratio of the picture, 4:3 or 16:9.

EXT SYNC (external sync)

Press to operate the unit on an external sync signal through the EXT SYNC IN connector.
EXT SYNC works when the component/RGB signals are input.

MULTI DISPLAY

Press the assigned button to display the multi display. Set the multi display setting in the MULTI DISPLAY SETTING menu (see page 33).

DISPLAY LAYOUT

Press the button to set DISPLAY LAYOUT when the multi display is on. The mode switches in the sequence POP ⟶ PIP ⟶ SIDE BY SIDE with every press of the button (see "DISPLAY LAYOUT" on page 33).

SUB INPUT SELECT

Press the button to set the sub display input signal types when the multi display is on. The mode switches in the sequence COMPOSITE ⟶ Y/C ⟶ RGB ⟶ COMPONENT ⟶ OPTION A-1 ⟶ OPTION A-2 ⟶ OPTION B-1 ⟶ OPTION B-2 ⟶ VIDEO WAVE with every press of the button (see "SUB INPUT SELECT" on page 33).

POSITION

Press the button to set the sub display position when the PIP or POP multi display is on. The mode switches in the sequence when POP is selected: 1 (Top) ⟶ 2 (Center) ⟶ 3 (Bottom), when PIP is selected: 1 (Bottom left) ⟶ 2 (Bottom right) ⟶ 3 (Top right) ⟶ 4 (Top left) with every press of the button (see "POSITION" on page 33).

FRAME

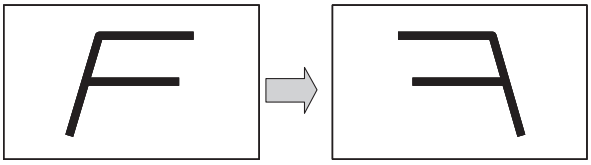
Press the button to set the main display position when the POP multi display is on. The mode switches in the sequence RIGHT ⟶ LEFT with every press of the button (see "FRAME" on page 34).

SUB PICTURE SIZE

Press the button to set the size of the sub display when the PIP multi display is on. The mode switches in the sequence 1 (Small) ⟶ 2 (Large) with every press of the button (see "SUB PICTURE SIZE" on page 34).

I/P MODE
Press the button to set the delay by the picture processing to the minimum level when interlace signal is input. The mode switches in the sequence INTER-FIELD → LINE DOUBLER → FIELD MERGE with every press of the button (see "I/P MODE" on page 32).

MIRROR IMAGE
Press the assigned button to flip and display the video signal horizontally. This function is not available for the PRESET 1 signal and the multi display.



MONO
Press the assigned button to display a monochrome picture. When the buttons is pressed again, the monitor switches automatically to color mode.

APA (Auto Pixel Alignment)
Press to adjust the picture automatically to maximum clarity for the signal input to the HD15 input connector. For finer according to the input signal, see "DOT PHASE" on page 31.
When the menu screen or the multi display is displayed, APA does not function.

Note

If the APA operation does not finish correctly depending on the input signal, adjust DOT PHASE (page 31).

BLUE ONLY
Press the assigned button to eliminate the red and green signals. Only blue signal is displayed as an apparent monochrome picture on the screen. This facilitates "chroma" and "phase" adjustments and observation of VCR noise.

2D/3D SELECT
Press the button to switch from 2D display mode to 3D display mode. For detailed 3D display settings, select 2D/3D SELECT under the 3D SETTING menu. Pressing the button again switches to 2D display mode. Install BKM-250TGM to display HD-SDI signal in 3D.

3D SIGNAL FORMAT
Press the button to set input signal format for 3D display. The mode switches in the sequence 3G-B → DUAL → SEQUENTIAL → SIDE BY SIDE → LINE BY LINE → AUTO1 → AUTO2 with every press of the button (see "3D SIGNAL FORMAT" on page 37). Install BKM-250TGM to display HD-SDI signal in 3D.

Note

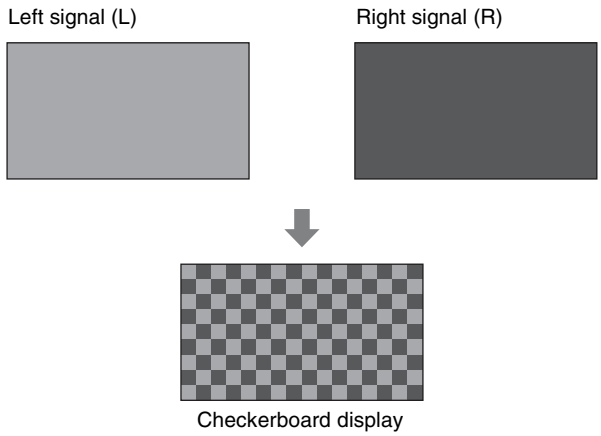
This function is only available in 3D display mode.

CHECKERBOARD
When displaying 2D images, press the button to display input signals from the IN (INPUT)-1 and IN (INPUT)-2 connectors in grid pattern. Two input signals can be monitored on the screen at a time. Pressing the button again displays the input signals in default pattern. Install BKM-250TGM to display HD-SDI signal in 3D.

Note

This function is only available in 2D display mode.

Checkerboard display



L/R SWITCH
Press the button to quickly switch between a dual-stream HD-SDI signal from IN (INPUT)-1 connector on BKM-250TGM and one from IN (INPUT)-2 connector. You can easily compare the two input signals. Install BKM-250TGM to display HD-SDI signal in 3D.

Note

This function is only available in 2D display mode.

HOROPTER CHECK
Press the button to select display formats in monitoring left/right signals for 3D image display. Select the desired format from HOROPTER CHECK (page 38) under the 3D SETTING menu. Pressing the button again switches to default display format. Install BKM-250TGM to display HD-SDI signal in 3D.

Note

This function is only available in 3D display mode.

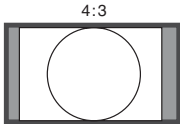
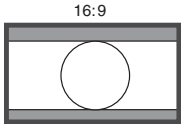
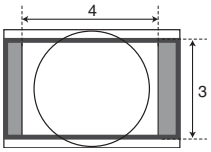
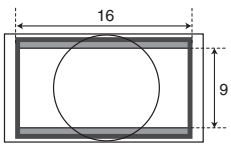
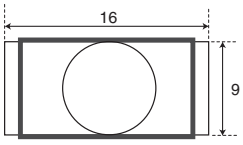
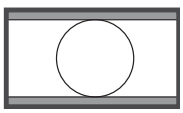
DISPARITY SIM. (disparity simulation)
Press the button to change the phase of left/right signals for 3D image display. You can monitor the depth of 3D images using simulated 3D effect. Press the + or – button to adjust the phase of the selected signal(s). Select the signal(s) you want to adjust from DISPARITY SIM. under the 3D SETTING menu before using this function button. Pressing the button again stores the setting values you set. Install BKM-250TGM to display HD-SDI signal in 3D.

Note

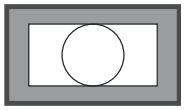
This function is only available when 3G-B*, DUAL, AUTO1, or AUTO2 is selected in 3D SIGNAL FORMAT.

* Install BKM-250TGM to display HD-SDI signal in 3D.

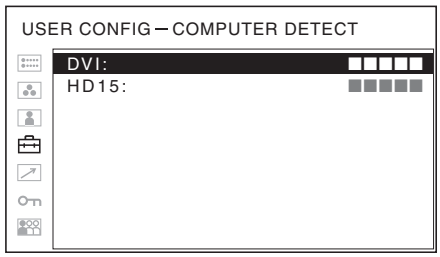
Scan mode image

Input	4 : 3	16 : 9
NORMAL (zeroscan)	 1600 × 1200	 1920 × 1080
OVER (20% over scan)	 1600 × 1200	 1920 × 1080
FULL	–	 1920 × 1200
NATIVE (1080i, 1080P)	–	 1920 × 1080

1080P is effective only when BKM-250TGM is installed.

Input	4 : 3	16 : 9
NATIVE (720P)	–	 1280 × 720

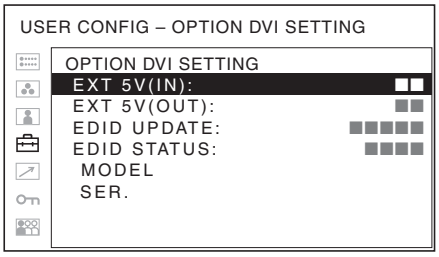
COMPUTER DETECT



Submenu	Setting
COMPUTER DETECT	The appropriate preset memory is set for the signal from DVI and HD15 input connector. Select “PRESET1” for the standard computer signal. Select “PRESET2” to “PRESET8” when the computer signal is not standard (on page 44). The preset memory is set for each input connector of DVI and HD15. **Note** “PRESET7” and “PRESET8” will only be displayed when “DVI” is selected.

OPTION DVI SETTING

* This settings are displayed only when a BKM-256DD is installed.

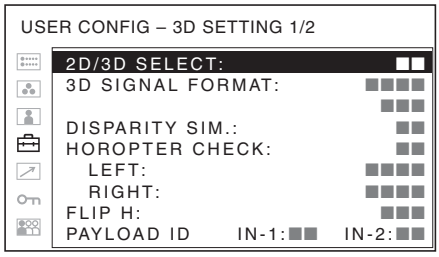


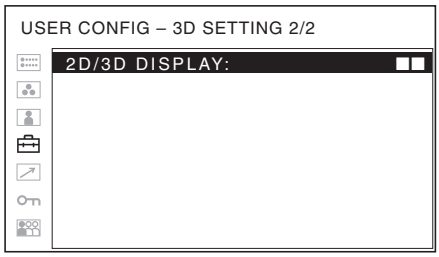
Submenu	Setting
EXT 5V(IN)	Selects ON to output external 5 V power from the DVI input connectors and OFF not to output.

Submenu	Setting
EXT 5V(OUT)	Selects ON to output external 5 V power from the DVI output connectors and OFF not to output.
EDID UPDATE	Downloads the EDID information from the main unit (the monitor) to the BKM-256DD. Select "START," and then press the ENTER button to start downloading the EDID information automatically. During download, "EDID UPDATING…" is displayed and the CONTROL button cannot be operated. When download finishes correctly, "COMPLETE!" is displayed. When a fault occurs, "ERROR" is displayed. Press the RETURN button to display the on-screen menu.
EDID STATUS	The information downloaded to the BKM-256DD from the EDID of the main unit (the monitor) is displayed. • **MODEL**: Model name of the monitor • **SER.**: Serial number of the monitor

3D SETTING

* This setting menu is displayed only when input from BKM-250TGM or DVI is selected.
* Only 2D/3D SELECT is displayed when DVI input is selected.
* Install BKM-250TGM to display HD-SDI signal in 3D.
* The IN (INPUT)-1 connector on BKM-250TGM can be used for left signal input, and the IN (INPUT)-2 connector for right signal input.
* 720/50P and 720/60P signals are displayed in the NATIVE scan mode.

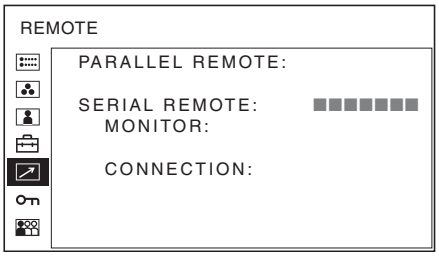




Submenu	Setting
2D/3D SELECT	Switches between 2D and 3D display mode. • **2D:** Displays input signals for 2D display mode. • **3D:** Displays input signals for 3D display mode.
3D SIGNAL FORMAT	Selects input signal format for 3D display. • **3G-B*:** Displays 3G Level-B HD-SDI signals for 3D display mode. **•INTER:** Displays 1080/50i or 1080/60i signal. **•PROG:** Displays 1080/24P, 25P, 30P or 720/50P, 60P signal. **•PSF:** Displays 1080/24PsF or 1080/25PsF signal. • **DUAL:** Displays dual-stream HD-SDI signals for 3D display mode. **•INTER:** Displays 1080/50i or 1080/60i signal. **•PROG:** Displays 1080/24P, 25P, 30P or 720/50P, 60P signal. **•PSF:** Displays 1080/24PsF or 1080/25PsF signal. • **SEQUENTIAL:** Displays field sequential HD-SDI signals for 3D display mode. • **SIDE BY SIDE:** Displays side-by-side typed HD-SDI signals for 3D display mode. **•INTER:** Displays 1080/50i or 1080/60i signal. **•PROG:** Displays 1080/24P, 25P, 30P or 720/50P, 60P signal. **•PSF:** Displays 1080/24PsF or 1080/25PsF signal. • **LINE BY LINE:** Displays line-by-line typed HD-SDI signals for 3D display mode. • **AUTO1:** 3D display mode is automatically selected for 3G Level-B HD-SDI signals. Other formats are displayed in 2D display mode. • **AUTO2:** When 3G Level-B 3G-SDI signals are input, the channel assign information enables 3D display mode and 2D display mode to be automatically switched. * When signals in formats other than 3G-B are input for 3D display mode, the message "NOT AVAILABLE" appears.
DISPARITY SIM.	Adjusts the phase of left/right input signals. You can monitor the depth of 3D images using simulated 3D effect. • **LR:** Shifts the phase of left and right channels at the same time. • **RIGHT:** Shifts the phase of right channel. • **LEFT:** Shifts the phase of left channel.

Submenu	Setting
HOROPTER CHECK	Changes display formats in monitoring left/right input signals. This helps to differentiate between left and right signals. • **NORMAL:** Displays video signals. • **BLUE:** Displays video signals as RGB blue color component. • **RED:** Displays video signals as RGB red color component. • **MONO:** Displays video signals as grayscale image. • **BLACK:** Displays black signals. (No video signals)
FLIP H	Changes display patterns (normal/ horizontally reversed display) in monitoring left/right input signals. • **OFF:** Deactivates the reversing function. • **LEFT:** Horizontally reverses left signal. • **RIGHT:** Horizontally reverses right signal.
PAYLOAD ID	Displays the channel assign information of payload ID superimposed on input signals from the IN (INPUT)-1 and IN (INPUT)-2 connector on BKM-250TGM. Going out of the 3D SETTING menu renews channel assign information. • **-:** Payload ID is not superimposed on signals. • **x:** Channel assign information is detected as Link-3 or Link-4. • **LEFT:** Channel assign information is detected as Link-1. • **RIGHT:** Channel assign information is detected as Link-2. Payload ID is only available when DUAL or AUTO2 is selected in 3D SIGNAL FORMAT.
2D/3D DISPLAY	Sets the on-screen indication of the display mode currently viewed. Selecting AUTO or ON displays “2D” or “3D” at the top center of the screen according to the display mode selected. • **AUTO:** “2D” or “3D” is displayed for about five seconds after switching between the 2D and 3D display mode. • **ON:** “2D” or “3D” is always displayed. • **OFF:** The display is hidden.

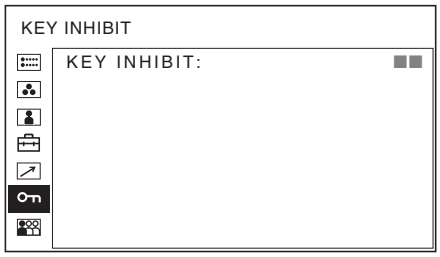
REMOTE menu



Submenu	Setting
PARALLEL REMOTE	Selects the PARALLEL REMOTE connector pins for which you want to change the function. You can assign various functions to pins 1 to 4 and pins 6 to 8. The following lists the functions you can assign to the pins. • – – – (“– – –”: No function is assigned.) • COMPOSITE • Y/C • RGB • COMPONENT • DVI • HD15 • OPTION A-1 • OPTION A-2 • OPTION B-1 • OPTION B-2 • OVERSCAN • FULL • NORMAL • NATIVE • 4:3 • 16:9 • TALLY G • EXT SYNC • BLUE ONLY • MONO • MIRROR IMAGE • 2D/3D SELECT • CHECKERBOARD • L/R SWITCH • HOROPTER CHECK • DISPARITY SIM. **Note** If you use the PARALLEL REMOTE function, you need to connect cables. For more details, see page 43.
SERIAL REMOTE	Selects the mode to be used. • **OFF:** SERIAL REMOTE does not function. • **RS-232C:** The monitor is controlled by the command of RS-232C. • **ETHERNET**: The monitor is controlled by the command of Ethernet.

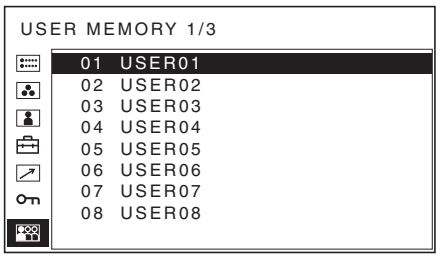
Submenu	Setting
MONITOR	Set the monitor setting. **MONITOR ID:** Sets the ID of the monitor. **GROUP ID:** Sets the group ID of the monitor. **IP ADDRESS:** Sets the IP address. **SUBNET MASK:** Sets the subnet mask. (255.255.255.000) **DEFAULT GATEWAY:** Sets the default gateway on or off. **ADDRESS:** Sets the default gateway. **CANCEL:** Selects to cancel the setting. **CONFIRM:** Selects to save the setting.

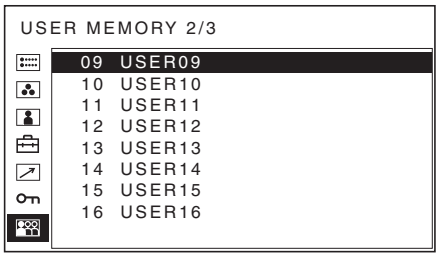
KEY INHIBIT menu

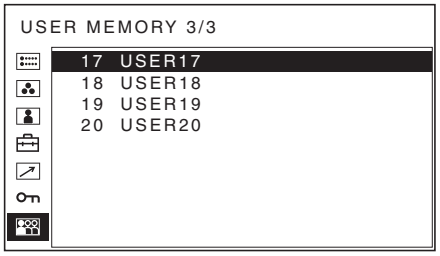


You can lock the setting so that they cannot be changed by an unauthorized user.
Select OFF or ON.
If you set to ON, all items are displayed in black, indicating the items are locked.

USER MEMORY menu







Submenu	Setting
01 to 20	You can save the setting of the following functions. • CONTRAST • BRIGHTNESS • CHROMA • PHASE • SCAN • ASPECT COLOR TEMP/SPACE menu • COLOR TEMP • ADJUST GAIN • ADJUST BIAS • 3D OFFSET ADJ. • COLOR SPACE USER CONTROL menu • APERTURE SYSTEM SETTING menu • GAMMA • I/P MODE

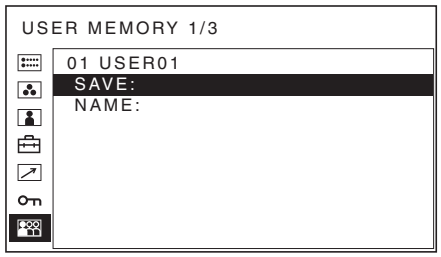
Saving the user memory

You can save the 20 picture settings with the name. To load the picture in the saved setting, see “Loading USER MEMORY” on page 27.

To save the picture setting

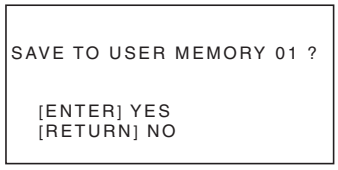
1 Press the + or – button to select the memory number in the USER MEMORY menu, then press the ENTER button.

The USER MEMORY setting menu appears.



2 Select “SAVE”, then press the ENTER button.

The menu for confirming the memory appears.



3 Press the ENTER button.

The current picture settings are saved and the USER MEMORY setting menu appears.

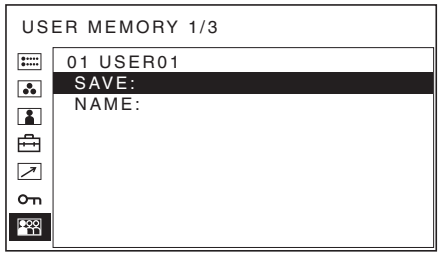
To close the menu without saving the setting

Press the RETURN button.
The USER MEMORY setting menu appears.

To change the name

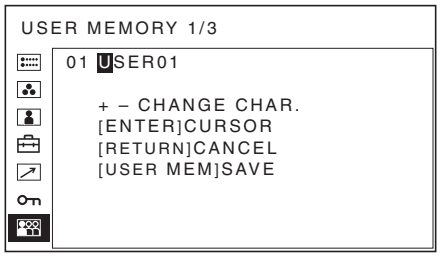
1 Press the + or – button to select the memory number in the USER MEMORY menu, then press the ENTER button.

The USER MEMORY setting menu appears.



2 Press the – button to select “NAME”, then press the ENTER button.

The menu for setting the user name appears.



3 Change the user name.

- Press the ENTER button to move the cursor to the character position to be changed.
- Press the + or – button to change the character.
  Usable characters: “A to Z”, “0 to 9”, “.”, “/”, “,”, “_”, “-”, “(space)”
  Usable number of characters: Maximum 18 characters.
- Enter a space to clear the character.
- When the ENTER button is pressed after changing the character, the character is confirmed and the cursor moves to the following character.

4 Press the USER MEM button.

The settings are saved and the USER MEMORY setting menu appears.

To close the menu without saving the setting

Press the RETURN button.
The USER MEMORY setting menu appears.

Troubleshooting

This section may help you isolate the cause of a problem and as a result, eliminate the need to contact technical support.

- **The display is colored in green or purple** ⟶ Select the correct input by pressing RGB or COMPONENT button.
- **The unit cannot be operated** ⟶ The key protection function works. Set the KEY INHIBIT setting to OFF in the KEY INHIBIT menu.
- **The black bars appear at the upper and lower positions of the display** ⟶ When the signal aspect ratio is different from that of the panel, the black bars appear. This is not a failure of the unit.

Specifications

Picture performance

LCD panel a-Si TFT Active Matrix
Pixel efficiency 99.99%
2D viewing angle (LCD panel specifications) (up/down/left/right, contrast > 10 : 1)
89°/89°/89°/89° (typical)
3D viewing angle
See “3D Viewing Angle (vertical)” on page 50.
Scan Normal 0%
Over scan 20%
Efficient picture size
518.4 × 324.0, 613.2 mm (w/h, dia)
($20^1/_2 \times 12^7/_8$, $24^1/_4$ inches)
Resolution H 1,920 dots, V 1,200 lines
Aspect ratio 16 : 10

Input

Composite input (NTSC/PAL) connector
BNC type (1)
1 Vp-p ± 3 dB sync negative
Y/C input connector
4-pin mini-DIN (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)
RGB/component input connectors
BNC type (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 type (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 input connector
Parallel remote
Modular connector 8-pin (1)

Serial remote
D-sub 9-pin (RS-232C) (1)
RJ-45 modular connector (ETHERNET) (1)
Optional input port
2 ports
Signal format:
H: 15 kHz to 45 kHz
V: 48 Hz to 60 Hz
DC IN connector
DC 5 V/24 V (output impedance 0.05 ohms or less)

Output

Composite output connector
BNC type (1)
Loop-through, with 75 ohms automatic terminal function
Y/C output connector
4-pin mini-DIN (1)
Loop-through, with 75 ohms automatic terminal function
RGB/component output connectors
BNC type (3)
Loop-through, with 75 ohms automatic terminal function
External synchronized output connector
BNC type (1)
Loop-through, with 75 ohms automatic terminal function

General

Power
LCD monitor (LMD-2451MT)
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-229X are installed)
Operating conditions
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 1,060 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 1,060 hPa
Accessories supplied
AC adaptor (AC-110MD) (1)
AC power cord (1)
AC plug holder (2)
3D glasses (glasses-type) (1)
3D glasses (clip-on-type) (1)
L/R labels (1)
Before Using This Unit (1)
CD-ROM (including the Instructions for Use) (1)
Quick Reference (1)
When you First Use the Monitor (1)
Service Contact List (1)
European Representative (1)
Optional accessories
SDI 4:2:2 input adaptor
BKM-220D
HD/D1-SDI input adaptor
BKM-243HSM
NTSC/PAL input adaptor
BKM-227W
Analog component input adaptor
BKM-229X
3G/HD/SD-SDI input adaptor
BKM-250TGM
DVI-D input adaptor
BKM-256DD
Monitor stand
SU-560
3D glasses (glasses-type)
BKM-30GM
3D glasses (clip-on-type)
BKM-31GM
Shield Frame
CFV-B100
3D Eye Shield Kit
CFV-E30SK
3D Eye Shield
CFV-E30D
2D Eye Shield Kit
CFV-E20SK
2D Eye Shield
CFV-E20D
3D glasses specifications (supplied)
Glasses-type
Dimensions (W/H):
Approx. 146 × 38 mm (5 3/4 × 1 1/2 inches)
Mass: Approx. 18 g (0.63 oz)
UV light reduction:
99% (280 nm - 380 nm)
Clip-on-type
Dimensions (W/H):
Approx. 131 × 45 mm (5 1/4 × 1 13/16 inches)
Mass: Approx. 16 g (0.56 oz)
UV light reduction:
99% (280 nm - 380 nm)

Medical Specifications

Protection against electric shock:
Class I
Protection against harmful ingress of water:
Ordinary
Degree of safety in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide:
Not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide
Mode of operation:
Continuous

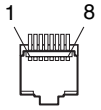
Design and specifications are subject to change without notice.

Notes
- Always verify that the unit is operating properly before use. SONY WILL NOT BE LIABLE FOR DAMAGES OF ANY KIND INCLUDING, BUT NOT LIMITED TO, COMPENSATION OR REIMBURSEMENT ON ACCOUNT OF THE LOSS OF PRESENT OR PROSPECTIVE PROFITS DUE TO FAILURE OF THIS UNIT, EITHER DURING THE WARRANTY PERIOD OR AFTER EXPIRATION OF THE WARRANTY, OR FOR ANY OTHER REASON WHATSOEVER.
- SONY WILL NOT BE LIABLE FOR CLAIMS OF ANY KIND MADE BY USERS OF THIS UNIT OR MADE BY THIRD PARTIES.
- SONY WILL NOT BE LIABLE FOR THE TERMINATION OR DISCONTINUATION OF ANY SERVICES RELATED TO THIS UNIT THAT MAY RESULT DUE TO CIRCUMSTANCES OF ANY KIND.

Pin assignment

PARALLEL REMOTE connector

Modular connector
(8-pin)



Pin number	Functions
1	Designating Y/C input signal
2	Designating RGB input signal
3	Designating OPTION A-1 input signal
4	Designating OPTION A-2 input signal
5	GND
6	Tally lamp ON/OFF
7	Full screen
8	Over scan

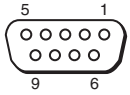
You can allocate functions using the REMOTE menu (see page 38).

Wiring required to use the Remote Control

Connect the function you want to use with a Remote Control to the Ground (Pin 5).

SERIAL REMOTE (RS-232C) connector

D-sub 9-pin, female



Pin number	Signal
1	NC
2	RX
3	TX
4	NC
5	GND
6	GND
7	RTS
8	CTS
9	NC

Available signal formats

The unit is applicable to the following signal formats. For details on the input signal available for HD15, DVI and BKM-256DD, see page 44.

System	Composite Y/C BKM-227W	RGB Component BKM-229X	BKM-220D	BKM-243HSM	BKM-250TGM 2D	BKM-250TGM 3D
575/50I (PAL)	○	○	○	○	○	–
480/60I (NTSC)*1	○	○	○	○	○	–
576/50P	–	○	–	–	–	–
480/60P	–	○	–	–	–	–
1080/ 24PsF*1	–	○*2	–	○	○	○
1080/25PsF	–	○*2	–	○	○	○
1080/24P*1	–	○*2	–	○	○	○
1080/25P	–	○*2	–	○	○	○
1080/30P*1	–	○*2	–	○	○	○
1080/50I	–	○	–	○	○	○
1080/60I*1	–	○	–	○	○	○
720/50P	–	○*2	–	○	○	○
720/60P*1	–	○	–	○	○	○
1080/50P	–	–	–	–	○	–
1080/60P*1	–	–	–	–	○	–

○ : Available
– : Not available
*1 The frame rate is also compatible with 1/1.001.
*2 Component only

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

PRESET 1

HD15

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

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

Resolution	Dot clock [MHz]	fH [kHz]	fV [Hz]	Sync. polarity	
				Horizontal	Vertical
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

DVI/BKM-256DD

Range of DVI input signal (available to 1920 × 1080/ 60 Hz)
Vertical frequency: 50.0 Hz to 85.1 Hz
Horizontal frequency: 31.5 kHz to 77.0 kHz
Dot clock: 25.175 MHz to 148.500 MHz
Picture size, phase: automatic discrimination by the DE (Data Enable) signal

PRESET 2

	Preset signal	fH [kHz]	fV [Hz]
HD15	1514 × 483	31.5	60
	1476 × 576	31.3	50
	1920 × 1080	33.75	60
	1920 × 1080	28	50
DVI/ BKM-256DD	1280 × 483	31.5	60
	1280 × 576	31.3	50
	1920 × 1080	33.75	60
	1920 × 1080	28	50
	1280 × 720	45.0	60
	1280 × 1024	63.2	60
	1280 × 1024	64.0	60

PRESET 3

	Preset signal	fH [kHz]	fV [Hz]
HD15	720 × 483	31.5	60
	720 × 576	31.3	50
	1280 × 720	45.0	60
	1280 × 720	37.5	50
DVI/ BKM-256DD	720 × 483	31.5	60
	720 × 576	31.3	50
	1280 × 720	45.0	60
	1280 × 720	37.5	50

PRESET 4

	Preset signal	fH [kHz]	fV [Hz]
HD15	640 × 480	31.5	60
	1024 × 768	48.4	60
	1280 × 960	60.0	60
DVI/ BKM-256DD	1024 × 768*1	33.75	60
	1024 × 768	48.4	60
	1280 × 960*1	33.75	60
	1280 × 960	60.0	60

*1 Available only for HD-SDI signal (1080/60I)

PRESET 5

	Preset signal	fH [kHz]	fV [Hz]
HD15	640 × 480	31.5	60
	800 × 600	31.3	50
	1280 × 1024	66.44	60
DVI/ BKM-256DD	800 × 600	46.9	75

PRESET 6

	Preset signal	Signal standards
HD15	576/50P	ITU-R BT.1358
	480/60P	SMPTE-293M
	1080/50I	SMPTE-274M
	1035/60I	SMPTE-260M/BTA S-001B
	1080/60I	SMPTE-274M/BTA S-001B
	720/60P	SMPTE-296M
	720/50P	SMPTE-296M
DVI/ BKM-256DD	576/50P	ITU-R BT.1358
	480/60P	SMPTE-293M
	1080/50I	SMPTE-274M
	1035/60I	SMPTE-260M/BTA S-001B
	1080/60I	SMPTE-274M/BTA S-001B
	720/60P	SMPTE-296M
	720/50P	SMPTE-296M

PRESET 7 (Selected using DVI in the menu)*2

Preset signal	fH [kHz]	fV [Hz]
1422 × 1064	33.75	60
712 × 480	15.734	60
704 × 572	15.625	50

PRESET 8 (Selected using DVI in the menu)*2

Preset signal	fH [kHz]	fV [Hz]
1280 × 1008	33.75	60
712 × 480	15.734	60
704 × 572	15.625	50

*2 Available for the composite, Y/C, component, RGB or SDI signal

For the multi display

PRESET 1

HD15/DVI/BKM-256DD

VESA DMT

Resolution	Dot clock [MHz]	fH [kHz]	fV [Hz]	Sync. polarity	
				Horizontal	Vertical
1280 × 1024 60 Hz	108.000	63.981	60.020	Positive	Positive

VESA CVT

Resolution	Dot clock [MHz]	fH [kHz]	fV [Hz]	Sync. polarity	
				Horizontal	Vertical
1360 × 768 60 Hz	84.625	47.649	59.936	Negative	Positive
1360 × 768 60 Hz	72.000	47.368	59.960	Positive	Negative

Resolution	Dot clock [MHz]	fH [kHz]	fV [Hz]	Sync. polarity	
				Horizontal	Vertical
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 60 Hz	80.125	47.693	59.992	Negative	Positive
1280 × 768 60 Hz	68.250	47.396	59.995	Positive	Negative

PRESET 2

	Preset signal	fH [kHz]	fV [Hz]
HD15	1514 × 483	31.5	60
	1476 × 576	31.3	50
	1920 × 1080	33.75	60
	1920 × 1080	28	50
DVI/ BKM-256DD	1280 × 483	31.5	60
	1280 × 576	31.3	50
	1920 × 1080	33.75	60
	1920 × 1080	28	50
	1280 × 720	45.0	60
	1280 × 1024	63.2	60
	1280 × 1024	64.0	60

PRESET 3

	Preset signal	fH [kHz]	fV [Hz]
HD15	720 × 483	31.5	60
	720 × 576	31.3	50
	1280 × 720	45.0	60
	1280 × 720	37.5	50
DVI/ BKM-256DD	720 × 483	31.5	60
	720 × 576	31.3	50
	1280 × 720	45.0	60
	1280 × 720	37.5	50

PRESET 4

	Preset signal	fH [kHz]	fV [Hz]
HD15	640 × 480	31.5	60
	1024 × 768	48.4	60
	1280 × 960	60.0	60
DVI/ BKM-256DD	1024 × 768*1	33.75	60
	1024 × 768	48.4	60
	1280 × 960*1	33.75	60
	1280 × 960	60.0	60

*1 Available only for HD-SDI signal (1080/60I)

PRESET 5

	Preset signal	fH [kHz]	fV [Hz]
HD15	640 × 480	31.5	60
	800 × 600	31.3	50
	1280 × 1024	66.44	60
DVI/ BKM-256DD	800 × 600	46.9	75

PRESET 6

	Preset signal	Signal standards
HD15	576/50P	ITU-R BT.1358
	480/60P	SMPTE-293M
	1080/50I	SMPTE-274M
	1035/60I	SMPTE-260M/BTA S-001B
	1080/60I	SMPTE-274M/BTA S-001B
	720/60P	SMPTE-296M
	720/50P	SMPTE-296M
DVI/ BKM-256DD	576/50P	ITU-R BT.1358
	480/60P	SMPTE-293M
	1080/50I	SMPTE-274M
	1035/60I	SMPTE-260M/BTA S-001B
	1080/60I	SMPTE-274M/BTA S-001B
	720/60P	SMPTE-296M
	720/50P	SMPTE-296M

PRESET 7 (Selected using DVI in the menu)*2

Preset signal	fH [kHz]	fV [Hz]
1422 × 1064	33.75	60
712 × 480	15.734	60
704 × 572	15.625	50

PRESET 8 (Selected using DVI in the menu)*2

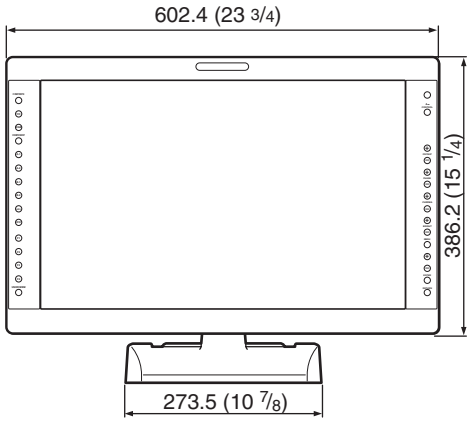
Preset signal	fH [kHz]	fV [Hz]
1280 × 1008	33.75	60
712 × 480	15.734	60
704 × 572	15.625	50

*2 Available for the composite, Y/C, component, RGB or SDI signal

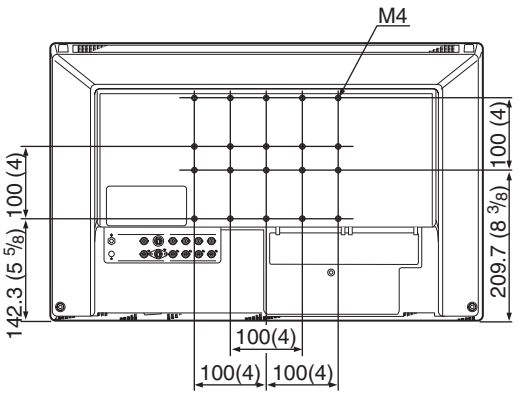
Dimensions

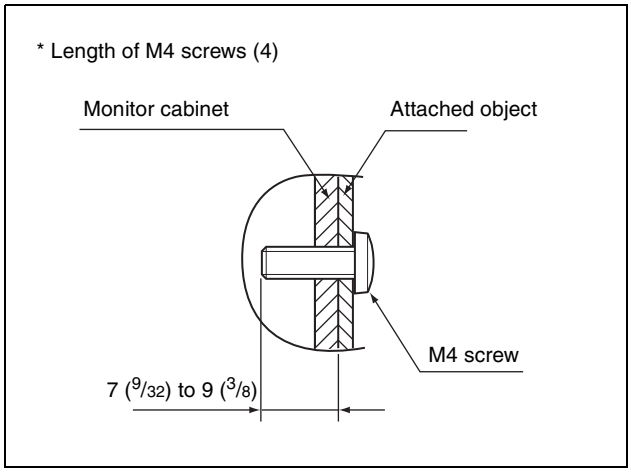
Front

When an optional stand SU-560 is attached



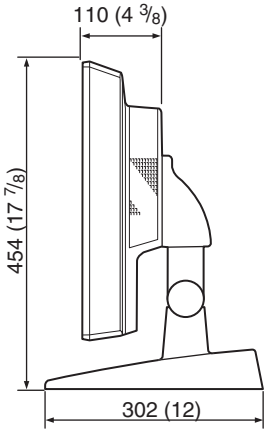
Rear (VESA Mount Instruction)





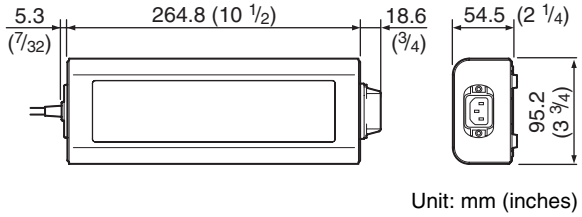
Side

When an optional stand SU-560 is attached



Mass Approx. 8.5 kg (18 lb 12 oz) (when the optional stand and the input adaptor are not installed)
Approx. 8.8 kg (19 lb 6.4 oz) (when the optional stand is not installed and one BKM-250TGM is installed)

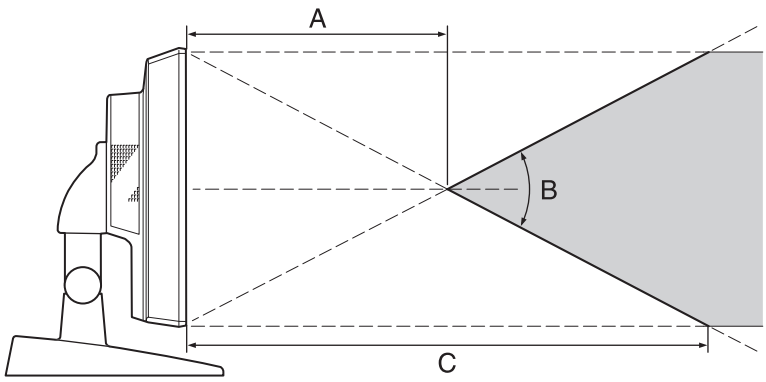
AC adaptor



Unit: mm (inches)

Mass Approx. 1.2 kg (2 lb 10 oz)

3D Viewing Angle (vertical)



Side View

3D Viewing Angle (vertical)
Crosstalk ratio ≤ 7%

A (Typical)	B (Typical)	C (Typical)
320 mm	54°	640 mm

EC REP
Sony Belgium, bijkantoor van
Sony Europe Limited
Da Vincilaan 7-D1, 1935 Zaventem,
Belgium

Sony Corporation
1-7-1 Konan Minato-ku Tokyo,
108-0075 Japan

http://www.sony.net/