

Image Multiplexer

Instructions for Use

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

VMI-40MD



Owner's Record

The model and serial numbers are located at the rear. Record these numbers in the space 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.

Symbols on the products



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



Refer to the operating instructions
Follow the directions in the operating instructions for parts of the unit on which this mark appears.



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

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.

For the customers in Canada

This Class A digital apparatus complies with Canadian ICES-003.

For the customers in Canada

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

Important safeguards/notices for use in the medical environments

1. All the equipments connected to this unit shall be certified according to Standard IEC60601-1, IEC60950-1, IEC60065 or other IEC/ISO Standards applicable to the equipments.
2. Furthermore all configurations shall comply with the system standard IEC60601-1-1. 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 IEC60601-1-1. 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 IEC60601-1 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 IEC60601-1-2 and CISPR11, Class B, Group 1)

Important EMC notices for use in the medical environments

- The VMI-40MD needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in this instructions for use.
- The portable and mobile RF communications equipment such as cellular phones can affect the VMI-40MD.

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 VMI-40MD.

List of cables used for EMC test	
Type of cable	Specifications
XLR cable (in/out)	1.8 m, shield cable
Audio cable (in/out)	1.5 m, shield cable
RS232 cable	1.5 m, shield cable
Composite cable (in/out)	1.5 m, coaxial cable
RGB cable (in/out)	1.8 m, coaxial cable
SDI-cable (in/out)	1.5 m, coaxial cable
HDMI cable (in/out)	1.5 m, coaxial cable
DVI-D cable	1.8 m, coaxial cable
YPbPr cable	1.8 m, coaxial cable
USB cable	1.8 m, shield cable
Foot switch cable	5 m, shield cable

Guidance and manufacturer's declaration-electromagnetic emissions		
The VMI-40MD is intended for use in the electromagnetic environment specified below. The customer or the user of the VMI-40MD should assure that it is used in such an environment.		
Emission test	Compliance	Electromagnetic environment-guidance
RF emissions CISPR 11	Group 1	The VMI-40MD 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 VMI-40MD 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	Not applicable.	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Not applicable.	

Warning

If the VMI-40MD 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 VMI-40MD is intended for use in the electromagnetic environment specified below. The customer or the user of the VMI-40MD 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	±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 differential mode ±2 kV common mode	Not applicable.	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	Not applicable.	Mains power quality should be that of a typical commercial or hospital environment. If the user of the VMI-40MD requires continued operation during power mains interruptions, it is recommended that the VMI-40MD 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 least 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 VMI-40MD is intended for use in the electromagnetic environment specified below. The customer or the user of the VMI-40MD should assure that it is used in such as environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment-guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	<p>Portable and mobile RF communications equipment should be used no closer to any part of the VMI-40MD, including cables, than the recommended separation distance calculated from the equation appliance to the frequency of the transmitter.</p> <p>Recommended separation distance</p> $d = 1.2 \sqrt{P}$ <p>Radiated RF IEC 61000-4-3</p> <p>3 V/m 80 MHz to 2.5 GHz</p> $d = 1.2 \sqrt{P} \quad 80 \text{ MHz to } 800 \text{ MHz}$ $d = 2.3 \sqrt{P} \quad 800 \text{ MHz to } 2.5 \text{ GHz}$ <p>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).</p> <p>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</p> <p>Interference may occur in the vicinity of equipment marked with following symbol:</p> 

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 VMI-40MD is used exceeds the applicable RF compliance level above, the VMI-40MD should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the VMI-40MD.

^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 VMI-40MD

The VMI-40MD is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the VMI-40MD can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (Transmitters) and the VMI-40MD 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.

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.

For the customers in Europe

This product has been manufactured by or on behalf of Sony Corporation, 1-7-1 Konan Minato-ku Tokyo, 108-0075 Japan.

Inquiries related to product compliance based on European Union legislation shall be addressed to the authorized representative, Sony Deutschland GmbH, Hedelfinger Strasse 61, 70327 Stuttgart, Germany.

For any service or guarantee matters, please refer to the addresses provided in the separate service or guarantee documents.

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|--|

Please Read First

Copyright

Using this unit for video and/or audio recording, or distribution over the network or otherwise may in some cases require the permission of the copyright holder of the video or audio. To protect copyright, observe the following points carefully when using this unit.

- When connecting a recording device to this unit and recording video or audio, carefully observe laws relating to copyright.
- Without the permission of the copyright holder, the showing or distribution of video or audio material of which the copyright is held by a third party is prohibited by law.
- With a functional extension, with the object of protecting copyright, the specifications for the video and audio signals that can be input may be changed without notice.
- Under copyright law, you may not use recorded video or audio other than for your personal enjoyment without the permission of the copyright holder. Note that at live performances, shows and exhibitions, even for your personal entertainment shooting may be restricted.

Disclaimer of Liability for Recorded Data

Sony Corporation does not accept any liability whatsoever for any problems arising from a failure to record for any reason. This includes claims for compensation of recorded content, and for any concomitant and consequential damages. Sony Corporation will not repair, restore, or duplicate any recorded content. Your use of this product is subject to these conditions.

Usage Notes

Use and Storage

Do not subject the unit to severe shocks

The internal mechanism may be damaged or the body warped.

Do not cover the unit while operating

Doing so will cause temperatures to rise inside the unit, possibly resulting in failure.

After use

Turn off the on/standby switch.

Note

If the unit will not be used for a long period of time, disconnect the power cord of the AC adaptor.

Shipping

If sending the unit by truck, ship, air or other transportation service, pack it in the shipping carton of the unit.

Care of the unit

When the cabinet becomes dirty

Before cleaning the unit, be sure to power the unit off and disconnect the power plug.

If the body of the unit is dirty, clean it with a soft, dry cloth.

In extreme cases, use a cloth steeped in a little neutral detergent, then wipe dry. Do not use organic solvents such as alcohol or thinners, as these may cause discoloration or other damage to the finish of the unit.

In the event of operating problems

If you should experience problems with the unit, contact your Sony dealer.

Features

The VMI-40MD Image Multiplexer is an interface box that allows multi-image displays of camera images and medical information from the site of a medical procedure, and allows transmission of these displays to other video monitoring equipment.

The VMI-40MD includes the following features.

Compatibility with existing medical equipment

The unit supports a wide range of input signals including SD/HD-SDI, composite, DVI-D, and analog RGB. Multi-image compositions can also be output in a variety of video signal formats including HD-SDI, composite, HDMI, analog RGB, and analog component.

Multiple layout patterns

You can display multiple medical video inputs simultaneously on one screen. A variety of layout patterns are available, including 4, 3, and 2 image layouts and full-screen display.

For details on layout patterns, see “Multiplexer Layout Patterns” (page 16).

Multi-image composition and RGB output

Outputs from this unit are separated into two categories; “Multiplexer” for multi-image layouts and “RGB 2 OUTPUT” for RGB output of input video signals. You can register up to nine multi-image layout patterns and input settings that can be selected in sequence for the Multiplexer. You can select one of the images from these multi-image layouts for output to a separate monitor in enlarged display as the RGB 2 OUTPUT. You can switch between registered settings for the Multiplexer and make RGB 2 OUTPUT selections via the buttons on the front panel of the unit or via a remote terminal or commands sent from a computer.

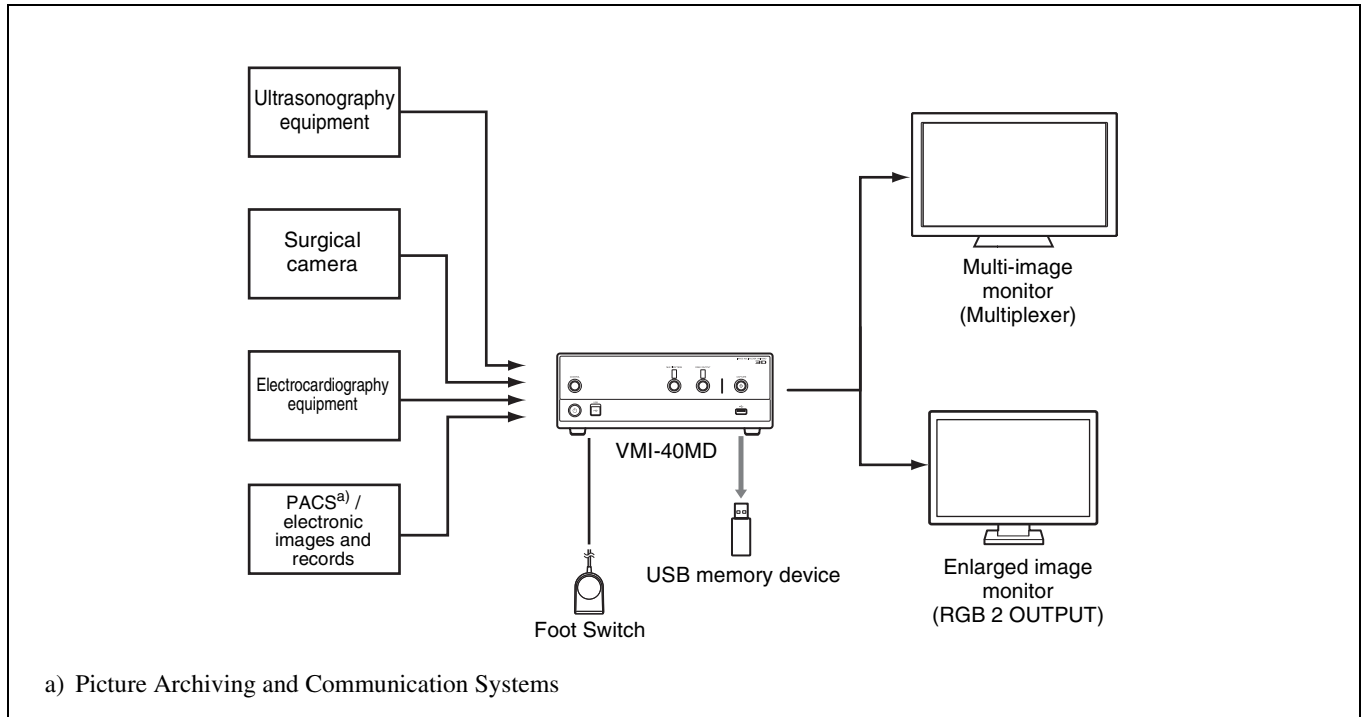
For details, see “Input Video Signals and Video Outputs” (page 15).

Still image capture of displays

You can save still images of multi-image compositions by connecting an external USB memory device. This allows for the procedure status and medical information to be managed collectively.

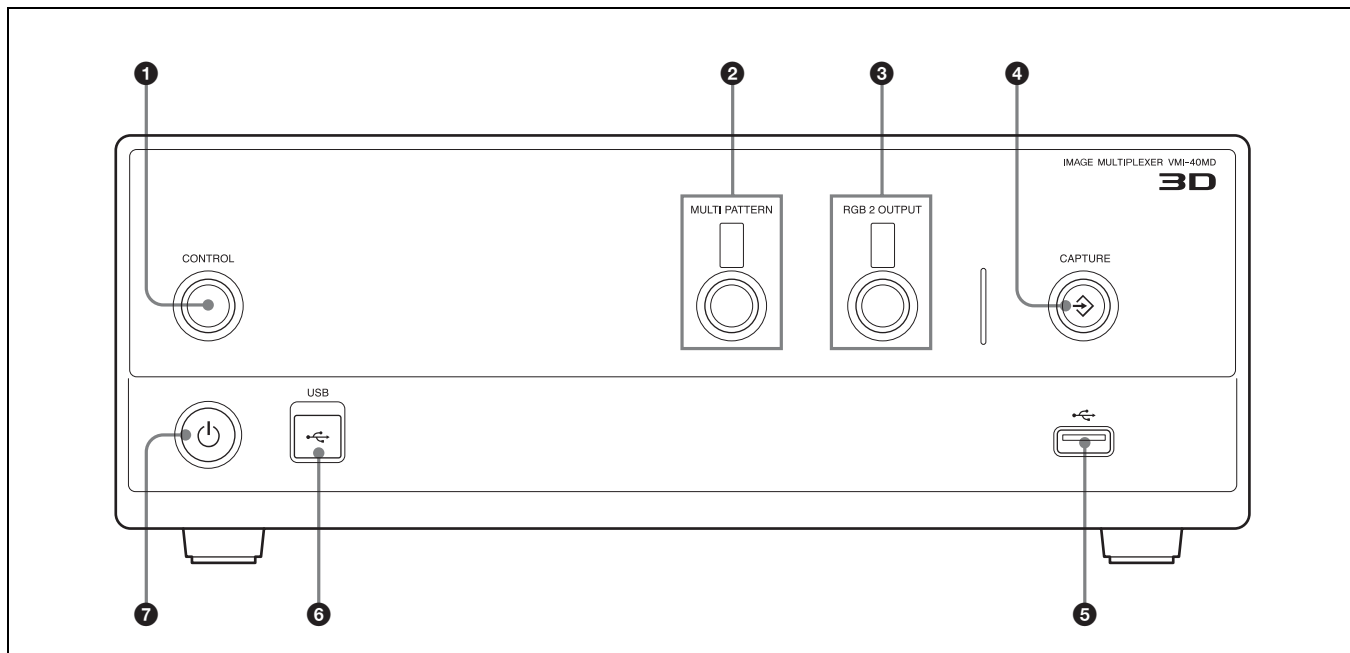
System Configuration Example

System configuration example



Names and Functions of Parts

Front



1 CONTROL button/indicator

The indicator turns off or lights green with each press of the button.

When the indicator is off, the input video signals will be output as described in “*Input Video Signals*” (page 15).

When the indicator is lit green, the video signals input to the HDMI 1 input connector will be output to the RGB output connector, VIDEO output connector, SDI output connector, component connectors, and HDMI output connector.

Note

If the CONTROL indicator is lit and there is no video signal input to the HDMI 1 connector, the display will be blank.

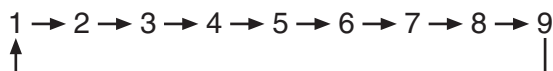
For details on button operations, see “*Troubleshooting*” (page 28).

2 MULTI PATTERN button/display

Use this to select the layout pattern for the Multiplexer.

A combination of up to four inputs in any of the seven available layout patterns can be assigned to each of the pattern numbers 1 to 9.

You can cycle through pattern numbers as follows with each press.



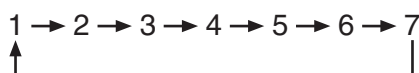
The selected pattern number appears in the display area.

You can also configure whether pattern numbers will be available for selection so that only the patterns you require will be selected. For example, you can configure settings so that only patterns 1, 3, and 6 are selected via this button.

For details, see “*Input Video Signals and Video Outputs*” (page 15).

Notes

- In the factory default settings, patterns are not assigned to pattern numbers 8 and 9, so the layout pattern cycles through the following pattern numbers when the MULTI PATTERN button is pressed.



- If the unit is turned off while the CONTROL indicator is lit green, the pattern number will not be displayed the next time the unit is turned on. In such cases, press the CONTROL button to turn off the CONTROL indicator, and then press the CONTROL button again to make the indicator light green.

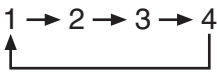
3 RGB 2 OUTPUT button/display

Use this to switch between video signals for the RGB 2 OUTPUT.

The input signals (up to four) configured for the Multiplexer input are switched and output to the RGB 2 OUTPUT in sequence.

You can cycle through output numbers as follows with each press.

If a pattern with three inputs is selected, for example, numbers 1 to 3 will be cycled through in sequence, and if a pattern with two inputs is selected, numbers 1 and 2 will be cycled through.



The selected output number appears in the display area.

For details, see “Input Video Signals and Video Outputs” (page 15).

Note

If the unit is turned off while the CONTROL indicator is lit green, the output number will not be displayed the next time the unit is turned on. In such cases, press the CONTROL button to turn off the CONTROL indicator, and then press the CONTROL button again to make the indicator light green.

4 CAPTURE button/indicator

Use this to capture still images.

For details, see “Saving Still Images to USB Memory Devices” (page 22).

5 USB port (USB Type A)

Connect a USB memory device here.

Notes

- This port does not support common USB devices.
- Hubs and devices with built-in hubs are not supported.

6 USB port (USB Type B)

Use this to connect to a computer.

Note

Hubs and devices with built-in hubs are not supported.

7 ON/STANDBY switch / indicator

When you press this, the unit turns on, the indicator blinks green, and the system starts up. When the indicator lights steadily green, the unit is ready for operation.

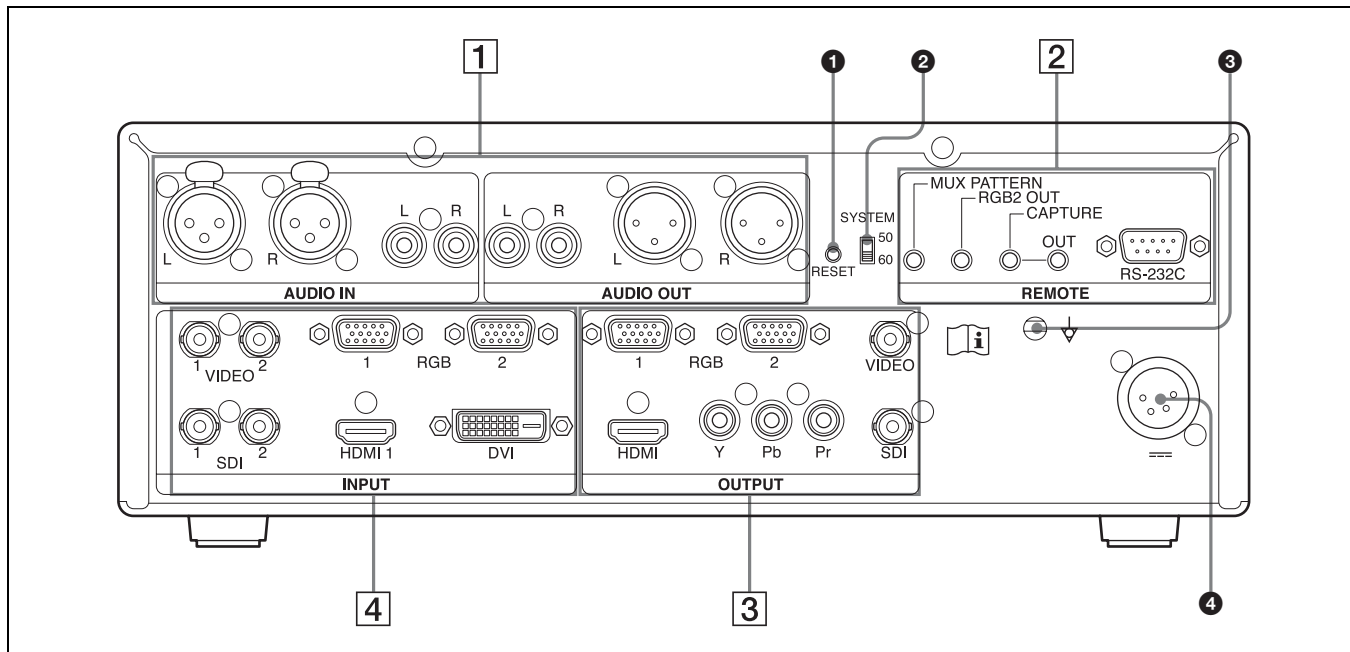
When you press this again, the unit enters standby mode.

Rear

Caution



Do not touch the patient while you are in contact with any of the connector pins. Doing so may have an adverse effect on the patient.



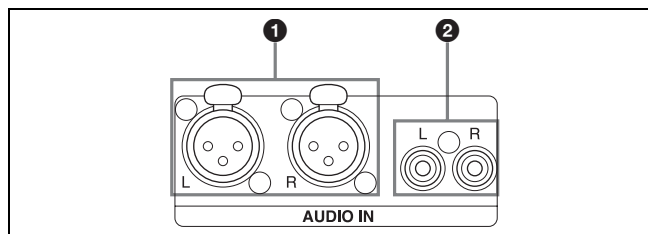
- 1 RESET button**
Press and hold this button for 3 seconds or longer to return settings to default configurations.
- 2 SYSTEM switch**
Sets the output signal frame rate. However, this setting does not apply to RGB output connector 2.
- 3 ⚡ Equipotential grounding terminal**
Use this for equipotential grounding connections.
- 4 = DC24V connector**
Connect the DC connector of the supplied AC adaptor here.

1 AUDIO block

Note

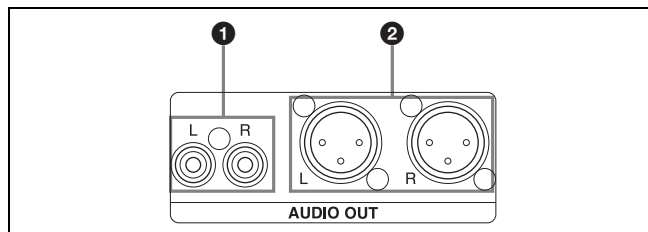
The audio input and output connectors are for converting between XLR and phono jack. Audio signals input in the XLR connectors are output from the phono jack connectors, and audio signals input in the phono jack connectors are output from the XLR connectors.

AUDIO IN block



- 1 Audio input connectors L and R (3-pin XLR)**
Inputs stereo audio signals.
- 2 Audio input connectors L and R (phono jack)**
Inputs stereo audio signals.

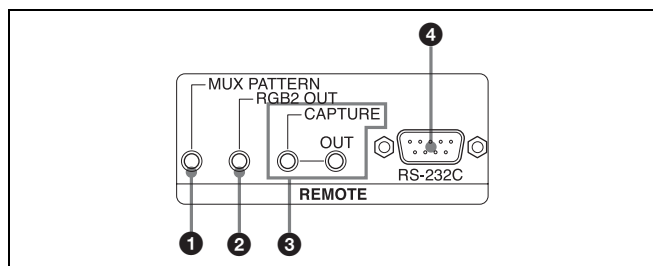
AUDIO OUT block



- 1 Audio output connectors L and R (phono jack)**
Outputs stereo audio signals.

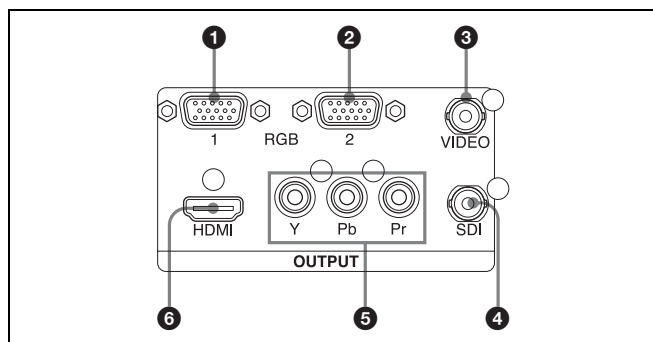
- 2 Audio output connectors L and R (3-pin XLR)**
Outputs stereo audio signals.

2 REMOTE block



- 1 MUX PATTERN (Multiplexer output pattern) contact switch connector (mini jack)**
Use this when using a foot switch to select the layout pattern for the Multiplexer.
- 2 RGB2 OUT contact switch connector (mini jack)**
Use this when using a foot switch to switch the output video signal for the RGB 2 OUTPUT.
- 3 CAPTURE contact switch connector, OUT (capture output) contact switch connector (mini jack)**
Use this when using a foot switch to capture still images.
Signals that are input to the CAPTURE connector are output through the OUT connector unchanged. Use these when a recorder is connected and you want use the same contact switch to start recording, for example.
- 4 RS-232C connector (9-pin D-sub)**
Connects to the device that will control the VMI-40MD via serial communication.

3 OUTPUT block



- 1 RGB output connector 1 (15-pin mini D-sub)**
Outputs RGB signals.
The following signal formats are supported.
- 1920 × 1080 (Full-HD, 60 Hz)
 - 1920 × 1080 (Full-HD, 50 Hz)

- 2 RGB output connector 2 (15-pin mini D-sub)**
Outputs RGB signals.
The following signal formats are supported.
- 1280 × 1024 (SXGA, 60 Hz)
 - 1024 × 768 (XGA, 60 Hz)

Note

SXGA output is selected by default. To select XGA signal output, a change in configuration is required.

An application for configuring the unit's settings is available. For details contact your Sony dealer.

- 3 VIDEO output connector (BNC type)**
Outputs analog composite video signals.
- 4 SDI output connector (BNC type)**
Outputs HD-SDI signals
The following signal formats are supported.
- 1920 × 1080 (50i)
 - 1920 × 1080 (60i)

Note

- 60i is 60 Hz output.
- The SDI output is disabled by default. To enable the SDI output, a change in configuration is required.

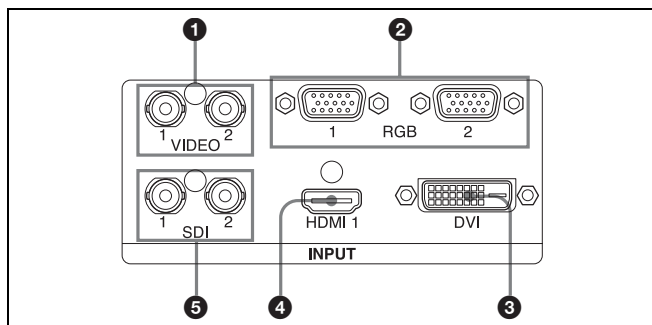
An application for configuring the unit's settings is available. For details contact your Sony dealer.

- 5 Component connectors Y, Pb, Pr (phono jack)**
Outputs HD-format video signals.
The following signal formats are supported.
- 1920 × 1080 (Full-HD, 60i)
 - 1920 × 1080 (Full-HD, 50i)
- 6 HDMI output connector (HDMI-A)**
Outputs HDMI signals.
The following signal formats are supported.
- 1920 × 1080 (Full-HD, 60 Hz)
 - 1920 × 1080 (Full-HD, 50 Hz)

Note

The signal may not be output, depending on the monitor you are using.

4 INPUT block



1 VIDEO input connectors 1 and 2 (BNC type)

Inputs analog composite video signals.

2 RGB input connectors 1 and 2 (15-pin mini D-sub)

Inputs RGB signals.

The following signal formats are supported.

16:9	16:10	4:3
1366 × 768 (FWXGA, 60p) 1920 × 1080 (Full-HD, 60p)	1920 × 1200 (WUXGA, 60 Hz)	640 × 480 (VGA, 60 Hz) 640 × 480 (VGA, 75 Hz) 800 × 600 (SVGA, 60 Hz) 800 × 600 (SVGA, 75 Hz) 1024 × 768 (XGA, 60 Hz) 1280 × 1024 (SXGA, 60 Hz) 1600 × 1200 (UXGA, 60 Hz)

3 DVI (DVI-D) input connector (19-pin DVI)

Inputs DVI-D signals.

The following signal formats are supported.

16:9	4:3
1366 × 768 (FWXGA, 60p) 1920 × 1080 (Full-HD, 60i) 1920 × 1080 (Full-HD, 60p) 1920 × 1080 (Full-HD, 50i) 1920 × 1080 (Full-HD, 50p)	640 × 480 (VGA, 60 Hz) 640 × 480 (VGA, 75 Hz) 800 × 600 (SVGA, 60 Hz) 800 × 600 (SVGA, 75 Hz) 1024 × 768 (XGA, 60 Hz) 1280 × 1024 (SXGA, 60 Hz) 1600 × 1200 (UXGA, 60 Hz)

4 HDMI 1 input connector (HDMI-A)

Inputs HDMI signals.

The following signal formats are supported.

Full-HD	HD	60 Hz	50 Hz
1920 × 1080 (60i) 1920 × 1080 (60p) 1920 × 1080 (50i) 1920 × 1080 (50p)	1280 × 720 (60p) 1280 × 720 (50p)	720 × 480 (60i) 640 × 480 (60p)	720 × 576 (50i)

5 SDI input connectors 1 and 2 (BNC type)

Inputs HD-SDI and SDI signals

The following signal formats are supported.

16:9		4:3	
Full-HD	HD	60 Hz	50 Hz
1920 × 1080 (60i) 1920 × 1080 (50i)	1280 × 720 (60p) 1280 × 720 (50p)	720 × 480 (60i)	720 × 576 (50i)

Input Video Signals and Video Outputs

Outputs from this unit are separated into two categories; “Multiplexer” for multi-image layouts and “RGB 2 OUTPUT” for RGB output of input video signals. This section describes input video signals that are supported by the unit, layout patterns for the Multiplexer, and the RGB 2 OUTPUT path.

Note

An application for configuring the unit’s settings, assigning layout patterns, and performing controls is available from Sony.

For details, contact your Sony dealer.

Input Video Signals

The unit can handle up to five video signals and three computer signals.

The five video signals are assigned to Inputs 1 to 5, and the three computer signals are assigned to Inputs 6 to 8. Two of the video signals are specified as vsrc1 and vsrc2, and two of the computer signals are specified as psrc1 and psrc2. These four signals are output to the Multiplexer and the RGB 2 OUTPUT.

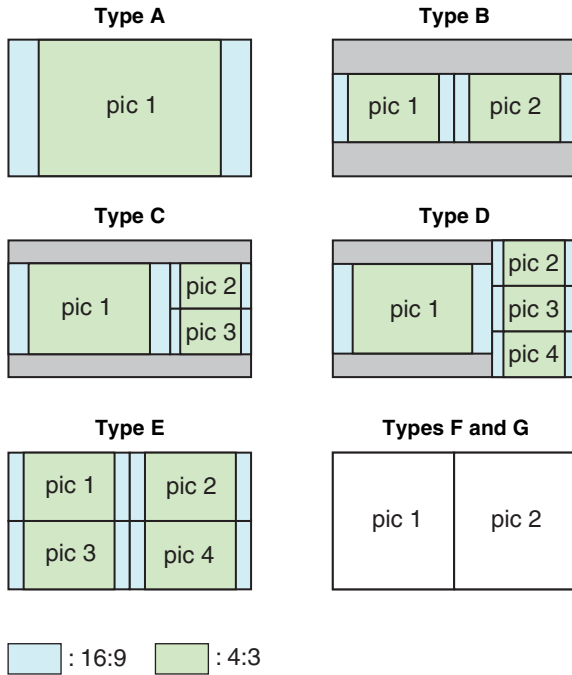
Type	Input video signal		Name (default)	Output (default)
Video signal	Input 1	HDMI	HDMI	vsrc 1
	Input 2	SDI/ HD-SDI 1	SDI1	vsrc 2
	Input 3	SDI/ HD-SDI 2	SDI2	
	Input 4	VBS	VIDEO1	
	Input 5	VBS 2	VIDEO2	
Computer signal	Input 6	DVI	DVI	
	Input 7	RGB 1	RGB1	psrc 1
	Input 8	RGB 2	RGB2	psrc 2

Multiplexer Layout Patterns

The following seven multi-image layout patterns (types A to G) are available on this unit. You can assign the layout patterns to any of the pattern numbers 1 to 9.

Note

The layout and output for the Multiplexer will be in Full-HD (1920 × 1080).



Type	Number of images	Name
A	1	signal
B	2	poutp
C	3	1plus 2
D	4	1plus 3
E	4	quad
F	2	3d ^{a) b)}
G	2	3dsq ^{a) c)}

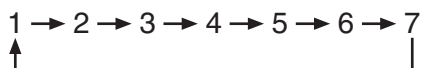
- a) When using 3d or 3dsq, input HD-SDI 1 and HD-SDI 2, and specify SDI1 for pic 1 and SDI2 for pic 2.
 b) The left and right sides are cropped, and only the center of the image (960 × 1080) is displayed in 3D.
 c) The image is squeezed, and the entire image is displayed in 3D.

Default settings for the Multiplexer

Pattern number	Type	Name	pic 1	pic 2	pic 3	pic 4
1	E	quad	vsrc1	vsrc2	psrc1	psrc2
2	A	single	vsrc1	–	–	–
3	B	poutp	vsrc1	vsrc2	–	–
4	C	1plus2	vsrc1	vsrc2	psrc1	–
5	D	1plus3	vsrc1	vsrc2	psrc1	psrc2
6	F	3d	vsrc1	vsrc2	–	–
7	G	3dsq	vsrc1	vsrc2	–	–
8	A	single	vsrc2	–	–	–
9	A	single	psrc1	–	–	–

Note

In the factory default settings, patterns are not assigned to pattern numbers 8 and 9, so the layout pattern cycles through the following pattern numbers when the MULTI PATTERN button is pressed.



Outputs for the RGB 2 OUTPUT

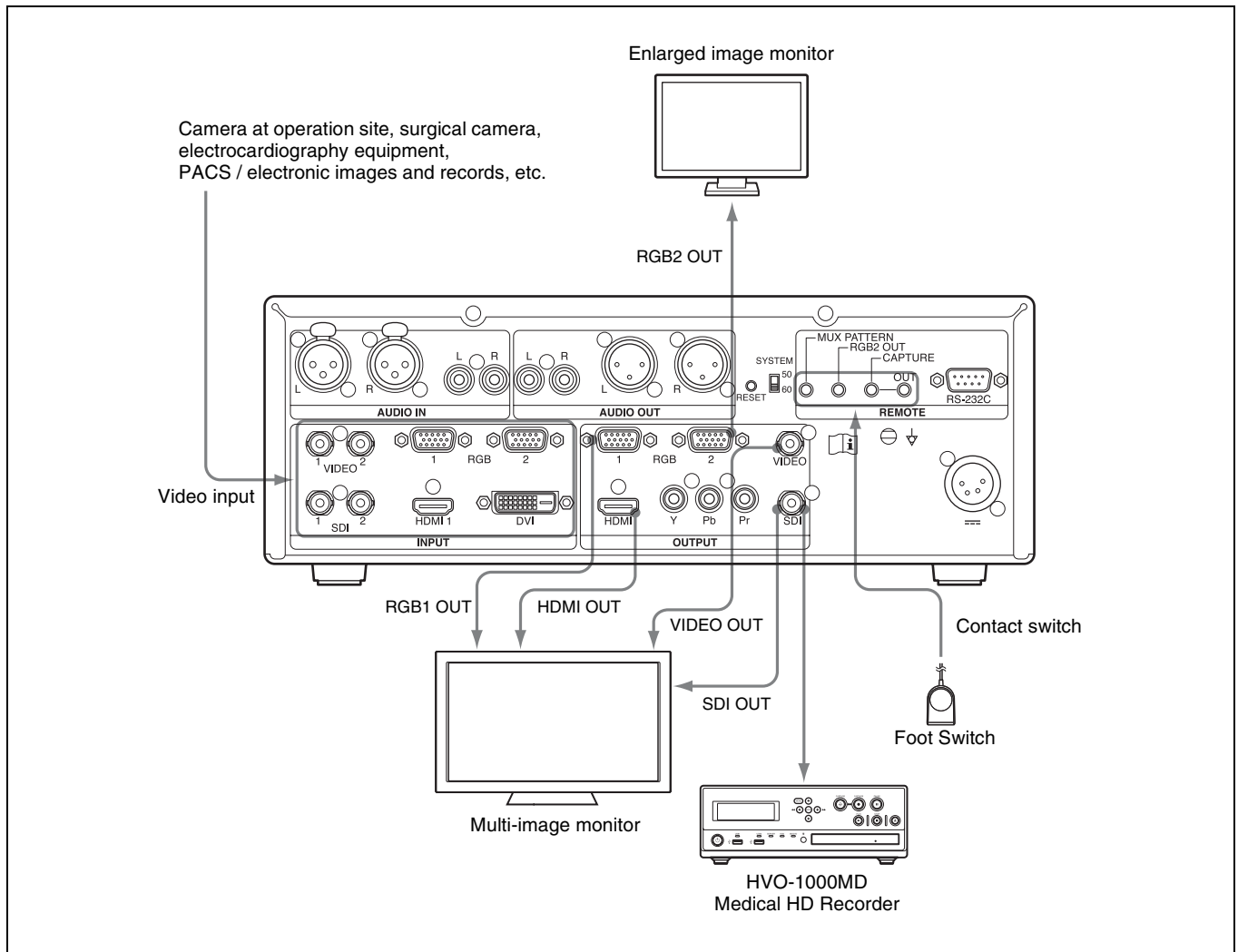
Input signals are assigned to output numbers 1 to 4 as follows for the RGB 2 OUTPUT. You can select 1280 × 1024 (SXGA) (default setting) or 1024 × 768 (XGA) for the images.

Output number	Input
1	vsrc 1
2	vsrc 2
3	psrc 1
4	psrc 2


Connecting Devices

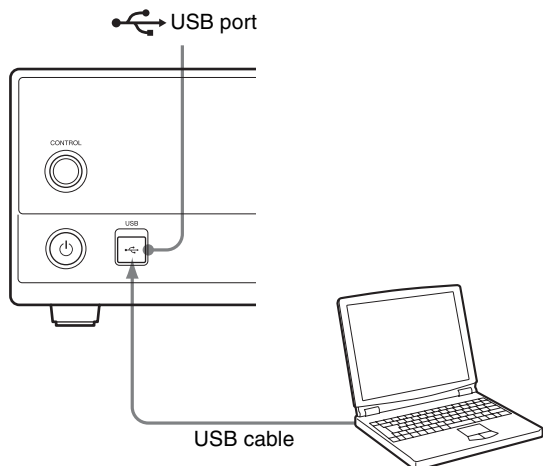
Connect each device to the rear panel of the unit.

Connection example



When connecting to a computer

Connect a USB cable to the  USB port.

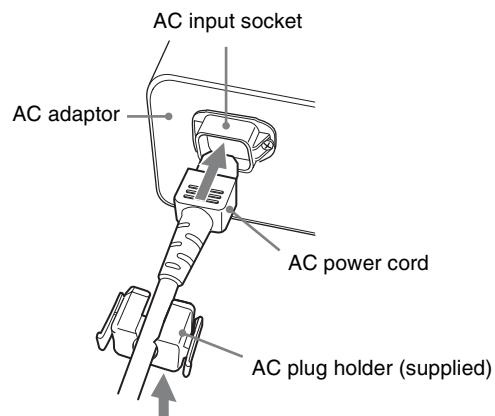


Turning the Unit On and Standby

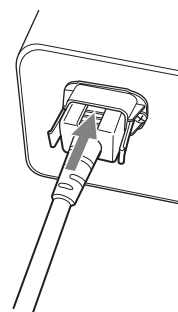
Connecting the Power Cord

Two AC plug holders are supplied with the unit. Use the holder that attaches securely to the plug on the power cord you are using.

- 1 Insert the AC power cord into the AC input socket on the AC adaptor, and attach the AC plug holder to the AC power plug.



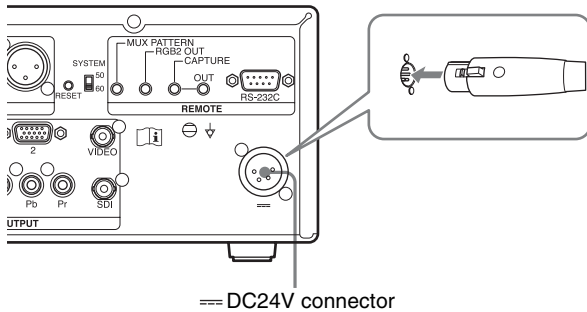
- 2 Secure the AC plug holder until the levers lock into place.



- 3** Insert the DC connector into the \equiv DC24V connector on the rear panel of the unit until it locks into place.

Note

Do not use extension cables on the DC connection cable. Doing so may result in malfunction.



Note

If the unit will not be used for a long period of time, disconnect the power cord of the AC adaptor.

For details on using the AC adaptor, refer to the supplied AC-110MD operating instructions.

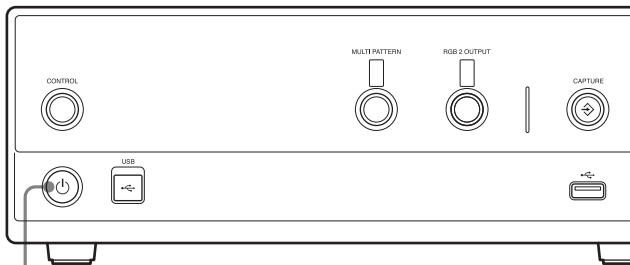
To disconnect the power cord

Push in on the lock levers on both sides of the AC plug holder to release the locks, and disconnect the cord. Next, release the lock on the DC connector at the \equiv DC24V connector, and disconnect the cord.

Turning the Unit On and Standby

To turn on the unit

Press the  ON/STANDBY switch.



 ON/STANDBY switch

When the unit turns on, the ON/STANDBY indicator blinks green and the system starts up.

When the indicator lights steadily green, the unit is ready for operation.

To turn the unit standby

Press the  ON/STANDBY switch again.

The ON/STANDBY indicator turns off, and the unit enters standby mode.

Operation Flow

This section describes the flow of operations through use of the unit's buttons.

For details on controlling the unit via control commands, contact your Sony dealer.

Note

To use the multi-image function, input video signals must be assigned to the layout patterns beforehand.

An application for configuring the unit's settings and performing controls is available from Sony. For details, contact your Sony dealer.

1 Turn the CONTROL button off (not lit).



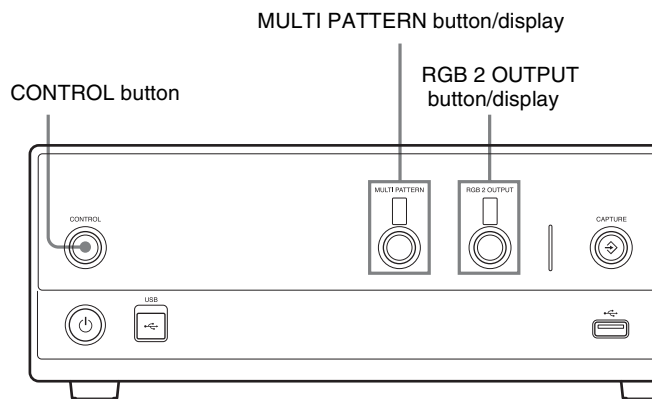
2 Press the MULTI PATTERN button and RGB 2 OUTPUT button to select the layout pattern number for the Multiplexer and the output number for the RGB 2 OUTPUT respectively.



Video is output in the selected patterns.

Controlling a VMI-40MD Unit

Compose multi-images and output them to monitors or other displays.

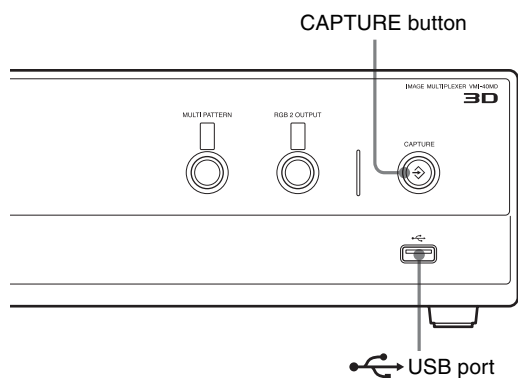


Saving Still Images to USB Memory Devices

Capture specific points in the video as still images and save them to a USB memory device.

Note

This unit only supports USB 2.0 compliant specification USB memory devices that are up to 32 GB in size and formatted in the FAT32 Windows standard.



- 1 Connect the USB memory device to the USB port.
- 2 Press the CAPTURE button.

Still image data is saved to the USB memory device.

Note

The “vmi_photo” folder will be automatically created in the root directory of the USB memory device. Still image data is saved in JPEG format in the “vmi_photo” folder. File names are created in the “XXXX_ΔΔΔΔΔ.jpeg” format. (XXXX is the last four digits of the unit’s serial number, and ΔΔΔΔΔ is a sequential number.)

Caution

- Depending on the capacity of the USB memory device, saving may take several seconds to complete. Do not perform any other operations while saving is in progress (i.e., while the access indicator on the USB memory device is blinking).
- The CAPTURE button lights while saving to the USB memory device is in progress. Do not remove the USB memory device during this time.
- If the remaining space on the USB memory device is not sufficient, the CAPTURE button will blink rapidly. In such cases, replace the USB memory device with another.

- We recommend using a Sony USB memory device. Using USB memory devices from other manufacturers may result in malfunction.
- The unit is not equipped with a clock function, so the timestamp for recorded files is not an accurate representation of the date and time of recording.

Command List

The following are the control commands used to configure and operate the unit when a computer is connected.

For details on controlling the unit via control commands, contact your Sony dealer.

General

Command format	Details	Response	Default setting
	command execute undefined command busy state	ok error syntax busy	

Switchboard control

Command format	Details	Response	Default setting
control next	status: on, off	ok control=<status> error syntax, No busy return	
mux next	no: 1-9	ok mux={no} error syntax, No busy return	
select next	no: 1-4	ok select={no} error syntax, No busy return	
capture exec	photo saving usb memory is not inserted cannot write to usb memory usb memory is full usb memory is write- protected	ok: when command executed busy:saving photo ... error no usb error cannot write error usb full error usb write protected error syntax, No busy return	

Firmware update

Command format	Details	Response	Default setting
firmware upgrade <file name>	when re-command firmware upgrade usb memory is not inserted no file in the usb memory any other error occurred when upgrade inquire, count: 0-100	Start busy: upgrading firmware ... error no usb error no file error other progress <count> error syntax, No busy return	

Input signal settings

Item	Command format	Details	Response	Default setting
Input name assignment	input{no} <OSD Label>	no: 1-8 8 string length max, useful A-Z, a-z, 0-9, -, _	ok, error syntax, error string length too long error unsupported character No busy return	input1 : HDMI input2 : SDI1 input3 : SDI2 input4 : VIDEO1 input5 : VIDEO2 input6 : DVI input7 : RGB1 input8 : RGB2
Video input assignment	vsrc{no1} input{no2}	no1: 1-2, no2: 1-5	ok, error syntax, No busy return	vsrc1 input1 vsrc2 input2
Computer input assignment	psrc{no1} input{no2}	no1: 1-2, no2: 6-8	ok, error syntax, No busy return	psrc1 input7 psrc2 input8

Multiplexer settings

Item	Command format	Details	Response	Default setting
Layout settings	mux{no1} <pattern> pic{no2} <src> Sample: mux1 quad pic1 vsrc1 pic2 vsrc2 pic3 psrc1 pic4 psrc2	no1: 1-9, no2: 1-4, pattern: single, poup, 1plus2, 1plus3, quad, 3D, 3DSQ src: vsrc1, vsrc2, psrc1, psrc2	ok, error syntax, No busy return	mux1 : quad pic1 vsrc1 pic2 vsrc2 pic3 psrc1 pic4 psrc2 mux2 : single pic1 vsrc1 mux3 : poutp pic1 vsrc1 pic2 vsrc2 mux4 : 1plus2 pic1 vsrc1 pic2 vsrc2 pic3 psrc1 mux5 : 1plus3 pic1 vsrc1 pic2 vsrc2 pic3 psrc1 pic4 psrc2 mux6 : 3d pic1 vsrc1 pic2 vsrc2 mux7 : 3dsq pic1 vsrc1 pic2 vsrc2 mux8 : - mux9 : -

Item	Command format	Details	Response	Default setting
Layout enable/disable	mux{no} <ability>	no: 1-9 ability: enable, disable	ok, error syntax, No busy return	mux1 : enable mux2 : enable mux3 : enable mux4 : enable mux5 : enable mux6 : enable mux7 : enable mux8 : disable mux9 : disable

RGB2 settings

Item	Command format	Details	Response	Default setting
Enable/disable	select{no} <ability>	no: 1-4 ability: enable, disable	ok, error syntax, No busy return	selector1 : enable selector2 : enable selector3 : enable selector4 : enable
Output image size	rgb2 <picture size>	picture size: xga, sxga	ok, error syntax, No busy return	sxga

SDI output settings

Item	Command format	Details	Response	Default setting
Select enable/disable	sdiout <ability>	ability: enable, disable	ok, error syntax, No busy return	sdiout disable

Caption display settings

Item	Command format	Details	Response	Default setting
Select enable/disable	caption <ability>	ability: enable, disable	ok, error syntax, No busy return	caption enable

Control settings

Item	Command format	Details	Response	Default setting
Control enable/disable	control <ability>	ability: enable, disable	ok, error syntax, No busy return	control enable
Key enable/disable	key <name> <ability>	name: mux, select ability: enable, disable	ok, error syntax, No busy return	mux : enable select : enable
Switchboard enable/disable	sw port <ability>	ability: enable, disable	ok, error syntax, No busy return	enable

Default value settings

Item	Command format	Details	Response	Default setting
Factory default settings	set default		ok, error syntax, No busy return	

Query commands

Item	Command format	Details	Response	Default setting
Input	input inquire		input1 <OSD Label> input2 <OSD Label> input3 <OSD Label> input4 <OSD Label> input5 <OSD Label> input6 <OSD Label> input7 <OSD Label> input8 <OSD Label> vsrc1 input{no} vsrc2 input{no} psrc1 input{no} psrc2 input{no} total line count=12 error syntax, No busy return	
Multiplexer	mux inquire		mux1 <pattern> pic{no} <src> mux2 <pattern> pic{no} <src> mux3 <pattern> pic{no} <src> mux4 <pattern> pic{no} <src> mux5 <pattern> pic{no} <src> mux6 <pattern> pic{no} <src> mux7 <pattern> pic{no} <src> mux8 <pattern> pic{no} <src> mux9 <pattern> pic{no} <src> mux1 <ability> mux2 <ability> mux3 <ability> mux4 <ability> mux5 <ability> mux6 <ability> mux7 <ability> mux8 <ability> mux9 <ability> total line count=18 error syntax, No busy return	
Select	select inquire		select1 <ability> select2 <ability> select3 <ability> select4 <ability> rgb2 <picture size> total line count=5 error syntax, No busy return	



Item	Command format	Details	Response	Default setting
Control	control inquire		control <ability> key mux <ability> key selector <ability> sw port <ability> total line count=4 error syntax, No busy return	
SDI output	sdiout inquire		sdiout <ability> total line count=1 error syntax, No busy return	
Caption	caption inquire		caption <ability> total line count=1 error syntax, No busy return	
Current settings	current inquire	status: on, off no: 1-9 no: 1-4	control <status> mux{no} select{no} total line count=3 error syntax, No busy return	
Device	device inquire	count: x.x.x.x no: 00000001- 99999999 count: x.xx	version <count> serial <no> board <count> total line count=3 error syntax, No busy return	
Update	upgrade inquire	count: 0-100	progress:{count} error syntax, No busy return	

RS-232C format

Baud rate: 38400
 Data length: 8 bit
 Start bit: 1 bit
 Stop bit: 1 bit
 Parity: none
 Flow control: none

Troubleshooting

Check the following before sending the unit for repairs. If the problem persists, contact your Sony dealer.

Symptom	Cause and solution
The unit does not turn on when the  ON/STANDY switch is pressed.	<ul style="list-style-type: none"> The power cord of the AC adaptor or the DC connection cable is not connected. <ul style="list-style-type: none"> → Check that the cord is properly connected to the power outlet.
The buttons on the unit do not function. Pattern number selection and other operations do not function properly.	<ul style="list-style-type: none"> Static electricity can have adverse effects on the functioning of the unit. <ul style="list-style-type: none"> → Turn off the  ON/STANDY switch, and disconnect the AC adaptor. Wait a moment before reconnecting the AC adaptor and turning on the unit.
The unit turns on, but images do not appear or are distorted.	<ul style="list-style-type: none"> The connection cables are disconnected from the input and output connectors on the rear panel of the unit. <ul style="list-style-type: none"> → Make sure that the cables are connected properly (<i>page 13</i>). The input and output connections on the rear panel of the unit are incorrect. <ul style="list-style-type: none"> → Make sure that the cables are connected properly (<i>page 13</i>). The CONTROL indicator is lit, and there is no video signal input to the HDMI 1 connector. <ul style="list-style-type: none"> → Check the CONTROL button (<i>page 11</i>). The connection cables are damaged. <ul style="list-style-type: none"> → Check the cables.

Symptom	Cause and solution
There is no audio, or the audio is noisy.	<ul style="list-style-type: none"> The connection cables are disconnected from the input and output connectors on the rear panel of the unit. <ul style="list-style-type: none"> → Make sure that the cables are connected properly (<i>page 13</i>). The input and output connections on the rear panel of the unit are incorrect. <ul style="list-style-type: none"> → Make sure that the cables are connected properly (<i>page 13</i>). The connection cables are damaged. <ul style="list-style-type: none"> → Check the cables.

Specifications

General

Power requirements

Image Multiplexer (VMI-40MD)
DC IN: 24 V 1.5 A (supply from AC adaptor)
AC adaptor (Sony, AC-110MD)
AC IN: 100 V to 240 V, 50/60 Hz
1.53 A to 0.58 A

Operating environment

Temperature: 5 °C to 35 °C (41 °F to 95 °F)
Humidity: 20% to 80% (no condensation)
Pressure: 700 hpa to 1,060 hpa

Storage and transport environment

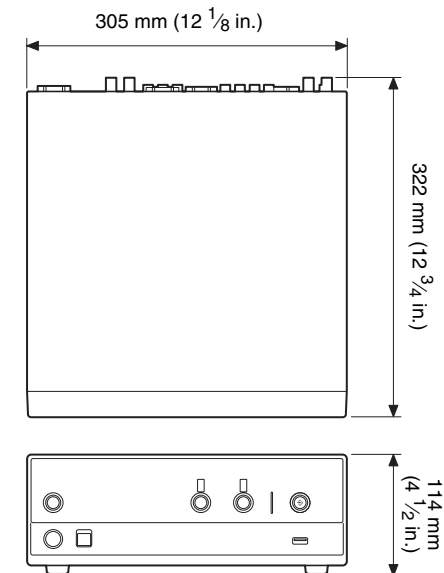
Temperature: -20 °C to +60 °C (-4 °F to +140 °F)
Humidity: 20% to 90% (no condensation)
Pressure: 700 hpa to 1,060 hpa

Mass

Approx. 4 kg (8.8 lb.) (main unit only)

Dimensions

305 × 114 × 322 mm (12 1/8 × 4 1/2 × 12 3/4 in.) (w × d × h, including protrusions)



AV input connectors

VIDEO IN (BNC) (2)

NTSC/PAL, 1.0 Vp-p, 75 Ω, sync negative

SDI IN (BNC) (2)

SD-SDI: SMPTE259M compliant
HD-SDI: SMPTE292M compliant

DVI IN (DVI-D) (1)

3.3 Vp-p

RGB IN (15-pin mini D-sub) (2)

0.7 Vp-p (R, G, B)

HDMI IN (HDMI-A) (1)

3.3 Vp-p

AUDIO IN (XLR) (2)

+4 dBm, balanced

AUDIO IN (phono jack) (2)

unbalanced

AV output connectors

COMPONENT (phono jack) (3)

1.0 Vp-p (Y) 0.7 Vp-p (B-R, R-Y), 75 Ω, sync negative

VIDEO OUT (BNC) (1)

NTSC/PAL, 1.0 Vp-p, 75 Ω, sync negative

SDI OUT (BNC) (1)

HD-SDI, 0.8 Vp-p, 75 Ω

HDMI OUT (HDMI-A) (1)

3.3 Vp-p, 50 Ω

RGB OUT (15-pin mini D-sub) (2)

0.7 Vp-p (R, G, B), 75 Ω

AUDIO OUT (XLR) (2)

+4 dBm (during 600 Ω load), balanced

AUDIO OUT (phono jack) (2)

unbalanced

Other interfaces

USB port (USB Type A) (1)

USB 2.0 compliant, for still image capture

USB port (USB Type B) (1)

USB 2.0 compliant, for control

RS-232C (9-pin D-sub) (1)

for REMOTE

Mini jack (4) for REMOTE

Equipotential connector (1)

Supplied accessories

Before Using this Unit (1)

CD-ROM (Instructions for Use) (1)

AC-110MD AC adaptor (1)

Warranty booklet (1)

Optional accessories

FS-24 Foot Switch

(The FS-24 has an ingress protection rating of IPX3, and cannot be used in operating rooms.)

Design and specifications are subject to change without notice.

Medical Specifications

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

Note

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Version 2.1, February 1999

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