4-142-966-**11** (1)

SONY

HD Video Camera

Operating Instructions

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

PMW-10MD

SxS Exmor™ CMOS Sensor CE

WARNING

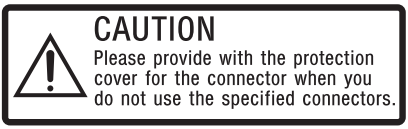
To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

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

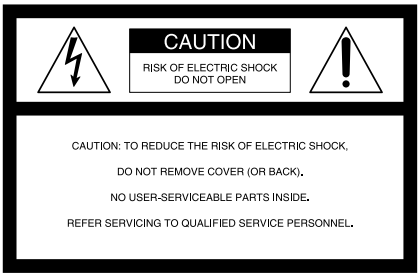
THIS APPARATUS MUST BE EARTHED.

Symbols on the products

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



This label is located on the top panel of the unit.
See *page 51* of these instructions for details about how to attach the connector covers.



This symbol is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

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.

Important Safety Instructions

- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

For the customers in Canada

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

For the customers in Europe

This product with the CE marking complies with both the EMC Directive and the Low Voltage Directive issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European standards:

- EN60065: Product Safety
- EN55103-1: Electromagnetic Interference (Emission)
- EN55103-2: Electromagnetic Susceptibility (Immunity)

This product is intended for use in the following Electromagnetic Environments: E1 (residential), E2 (commercial and light industrial), E3 (urban outdoors), E4 (controlled EMC environment, ex. TV studio).

For the customers in Canada

This unit has been certified according to Standard CSA C22.2 No.601.1.

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 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 EN60601-1-2 and CISPR11, Class B, Group 1)

Important EMC notices for use in the medical environments

- The PMW-10MD 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 PMW-10MD.

List of cables used for EMC tests	
Type of cable	Specifications
Power Supply Cord	2.4 m, non-shielded
CCMC-T20 camera cable	20 m, shielded
BNC Cable	2 m, shielded
RGB Cable	3 m, shielded
DVI-D Cable	2 m, shielded
S-Video Cable	2 m, shielded
D-Sub 9P Cable (RS232C)	3 m, shielded

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 PMW-10MD.

Guidance and manufacturer's declaration - electromagnetic emissions		
The PMW-10MD is intended for use in the electromagnetic environment specified below. The customer or the user of the PMW-10MD should assure that it is used in such an environment.		
Emission test	Compliance	Electromagnetic environment-guidance
RF emissions CISPR 11	Group 1	The PMW-10MD 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 PMW-10MD 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 A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

Warning

If the PMW-10MD 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 PMW-10MD is intended for use in the electromagnetic environment specified below. The customer or the user of the PMW-10MD 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 differential mode ±2 kV common mode	±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 PMW-10MD requires continued operation during power mains interruptions, it is recommended that the PMW-10MD be powered from an uninterruptible power supply or a battery.
Power frequency (50/60Hz) 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 PMW-10MD is intended for use in the electromagnetic environment specified below. The customer or the user of the PMW-10MD 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 PMW-10MD, 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	$d = 1.2\sqrt{P}$ $d = 1.2\sqrt{P}$ 80 MHz to 800 MHz $d = 2.3\sqrt{P}$ 800 MHz to 2.5 GHz
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	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 PMW-10MD is used exceeds the applicable RF compliance level above, the PMW-10MD should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the PMW-10MD.

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 PMW-10MD

The PMW-10MD is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the PMW-10MD can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the PMW-10MD 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.

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.

If you have questions on the use of the above Power Cord / Appliance Connector / Plug, please consult a qualified service personnel.

WARNING: THIS WARNING IS APPLICABLE FOR USA ONLY.
If used in USA, use the UL LISTED power cord specified below.
DO NOT USE ANY OTHER POWER CORD.

Plug Cap	Parallel blade with ground pin (NEMA 5-15P Configuration)
Cord	Type SJT, three 16 or 18 AWG wires
Length	Minimum 1.5 m (4 ft .11in.), Less than 2.5 m (8 ft .3 in.)
Rating	Minimum 10 A, 125 V

Using this unit at a voltage other than 120 V may require the use of a different line cord or attachment plug, or both. To reduce the risk of fire or electric shock, refer servicing to 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
Maximum 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'.

CAUTION

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.

For the customers in Europe

The manufacturer of this product is Sony Corporation, 1-7-1 Konan, Minato-ku, Tokyo, Japan.
The Authorized Representative for EMC, medical devices, and product safety is Sony Deutschland GmbH, Hedelfinger Strasse 61, 70327 Stuttgart, Germany; TEL: (0)711 5858 0; FAX: (0)711 5858 235.
For any service or guarantee matters please refer to the addresses given in separate service or guarantee documents.

For the State of California, USA only

Perchlorate Material - special handling may apply, See www.dtsc.ca.gov/hazardouswaste/perchlorate
Perchlorate Material : Lithium battery contains perchlorate.

For the customers in Taiwan only

廢電池請回收

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Overview

Package Configuration

Make sure you have following items supplied with the Sony PMW-10MD HD Video Camera. The number in parentheses indicates the number of that item supplied.

- Tripod adapter (1)
- Tripod adapter fitting screws (3)
- Lens mount cap (1)
- CR2032 Lithium Battery (backup battery, mounted at the factory) (1)
- Operating Instructions
  - Japanese version (1)
  - English version (1)
  - German version (1)
- Before Using This Unit (1)
- CD-ROM
  - Utility Software for Solid-State Memory Camcorder and Recorder (XDCAM EX Clip Browsing Software, SxS Device Driver Software) (1)
  - Manuals for HD Video Camera (Operating Instructions in PDF) (1)
- Warranty Booklet (1)
- SxS Device Driver Software End-User License Agreement (1)

Features

The PMW-10MD is a two-piece camera consisting of a camera head equipped with three $^1/_2$-inch HD CMOS image sensors, each providing an effective resolution of approximately 2.07 million pixels (1920 × 1080), and a camera control unit (CCU) utilizing SxS [1)] memory cards as its recording medium.
With this camera, you can shoot and record HD video with 1080 effective scanning lines in interlaced mode.

Cutting-edge Camera Technologies

$^1/_2$-inch type three "Exmor"[1)] CMOS sensors

The PMW-10MD is equipped with three newly developed $^1/_2$-inch "Exmor" CMOS Sensors, which deliver excellent picture performance with full HD resolution.

Compact, lightweight camera head

The camera head is compact (35×45×50 mm ($1^7/_{16} \times 1^{13}/_{16} \times 2$ inches)) and lightweight (90 g (3.2 oz)), making it easy to install and attach anywhere.
The separately sold camera cables allow you to use the camera head up to 20 m (66 feet) away from the camera control unit.

Creative Recording Modes and Settings

Picture Profile feature

The Picture Profile feature allows the camera operator to easily call up customized picture-tonal settings to suit particular shooting conditions.

Picture inversion

You can invert the picture horizontally, vertically, or both horizontally and vertically, and record in that state.

Freeze (still images)

You can freeze the video signal and output the frozen picture as a still image.

Slow Shutter function

The PMW-10MD offers a Slow Shutter function for capturing clear images in low-light environments. This allows the shutter speed to be

changed to a maximum of 64-frame accumulation period.

Selectable gamma curves

The PMW-10MD provides various types of gamma curves prepared depending on scenes.

Convenient functions and intuitive operation

Still image recording

You can record still images to SxS memory cards.

Downconvert function

You can downconvert HD signals for output, enabling integration with SD systems.

DVI-D interface

The unit is equipped with an interface for the 1080i and 1080P signal formats.

RS-232C interface

The unit is equipped with an RS-232C interface, allowing it to be controlled from a computer.

For details, contact your Sony dealer or your Sony service representative.

Intuitive operations on front panel

The BRIGHTNESS, RED, and BLUE knobs on the front panel provide an intuitive way to adjust the picture. When rotated to the right, they increase their respective values (giving a brighter picture or stronger colors), and when rotated to the left they decrease their values (giving a darker picture or weaker colors).

A New Generation HD Recording System

New nonlinear recording media

Using SxS memory cards, the PMW-10MD offers nonlinear capabilities such as instant random access and file-based operation.

HD recording using the "MPEG-2 Long GOP" codec

The PMW-10MD records 1920 × 1080 HD images using "MPEG-2 Long GOP" codec compression. This mature "MPEG-2 Long GOP" codec, which is also adopted in the XDCAM[1)] HD and HDV[2)] 1080i series of products, enables you to record stunning-quality HD video and audio with long recording time by efficiently compressing the data.

Selectable bit rates

The PMW-10MD offers a choice of bit rates: either 35 Mbps (HQ mode) or 25 Mbps (SP mode), depending on the desired picture quality and recording time.

Long recording time

By utilizing an efficient compression format, the PMW-10MD records high-quality HD images for long recording time of approx. 100 minutes in HQ mode (35 Mbps VBR) or approx. 140 minutes in SP mode (25 Mbps CBR) on a single 32-GB SxS memory card. Equipped with two SxS memory card slots, the PMW-10MD makes transition seamless without any frame loss, when recording is done across two cards.

High-quality uncompressed audio recording

In addition to HD video recording, the PMW-10MD can record and play back high-quality, two-channel 16-bit, 48-kHz linear PCM uncompressed audio.

IT friendly

The file-based recording in MP4 format allows material to be handled with great flexibility in an IT-based environment, easily available for copying, transferring, sharing, and archiving.

For immediate recording start

In recording on flash memory cards, the PMW-10MD makes each new recording on an empty area of the card. This is extremely convenient, as the camera operator need not worry about accidentally recording over good takes or search through footage for the correct position to start the next recording.

1) Sony, XDCAM, XDCAM EX, SxS, and Exmor are trademarks of Sony Corporation.

2) HDV is a trademark of Sony Corporation and Victor Company of Japan, Limited.

Using the Software

The supplied CD-ROM (labeled "Utility Software for Solid-State Memory Camcorder and Recorder") contains the following software:

SxS Device Driver Software
Driver for using SxS memory cards with a computer having an ExpressCard slot.
Information on installation of the software is included in the ReadMe (Japanese, English, French, German, Italian, Spanish, and Chinese) in PDF format.
This software is intended for general-purpose use. It is not intended for medical use.

XDCAM EX Clip Browsing Software
Application program for operating clips recorded with XDCAM EX-series models on a computer.
Information on installation and operations of the software is included in the User's Guide (Japanese, English, French, German, Italian, Spanish, and Chinese) in PDF format.
This software is intended for general-purpose use. It is not intended for medical use.

Reading the CD-ROM manuals

Preparations

The following program must be installed on your computer in order to read the operation manuals contained on the CD-ROM.

Adobe Reader Version 6.0 or higher

Memo

If Adobe Reader is not installed, you can download it from the following URL:

http://www.adobe.com/

Adobe and Adobe Reader are trademarks of Adobe Systems Incorporated in the United States and/or other countries.

To read the documents

Do the following:

1 Insert the CD-ROM in your CD-ROM drive.

A cover page appears automatically in your browser.
If it does not appear automatically in the browser, double-click on the index.htm file on the CD-ROM.

2 Select and click on the manual that you wish to read.

This opens the PDF file.

Memo

The files may not be displayed properly, depending on the version of Adobe Reader. In such a case, install the latest version you can download from the URL mentioned in "Preparations" above.

Note

If you have lost or damaged the CD-ROM, you can purchase a new one to replace it. Contact your Sony service representative.

System requirements for using the applications

The following operating conditions are recommended for using the software recorded on the CD-ROM:

SxS Device Driver Software

Applicable hardware
Computer conforming to ExpressCard/34 or ExpressCard/54

OS
Microsoft Windows XP SP2 or later, Microsoft Windows Vista, or Mac OS X v10.4.9 or later

For support information on the driver, refer to the following URL:

http://www.sony.net/SxS-Support/

XDCAM EX Clip Browsing Software

OS
Microsoft Windows XP SP3 or higher (32-bit version), Microsoft Windows Vista SP1 or higher (32-bit version), or Mac OS X 10.4.11 or higher or 10.5.1 or higher

CPU

Windows: Intel Pentium 4 2.0 GHz or higher (Intel Core 2 Duo Processor 2.0 GHz or higher recommended)

Macintosh: Intel Core 2 Duo Processor 2.0 GHz or higher (Intel Core 2 Duo Processor 2.4 GHz or higher recommended)

Memory

1 GB (2 GB or more recommended)

- Microsoft, Windows, and Windows Vista are registered trademarks and/or trademarks of Microsoft Corporation in the United States and/or other countries.
- Intel Core and Pentium are trademarks of Intel Corporation in the United States and/or other countries.
- Macintosh and Mac OS are trademarks of Apple Inc. registered in the U.S States and other countries.

Software installation

Do the following to install the software on the CD-ROM on your computer:

1 Insert the CD-ROM in your CD-ROM drive.

A cover page appears automatically in your browser.
If it does not appear automatically in the browser, double-click on the index.htm file on the CD-ROM.

2 Select and click on the software that you wish to install.

The installer for the software starts up. Follow the displayed instructions:

For details, refer to the User's Guide or ReadMe of the software.

Uninstalling an application program

Windows computer

Choose "Start," "Control Panel" then "Add or Remove Programs" and specify the program to be deleted.

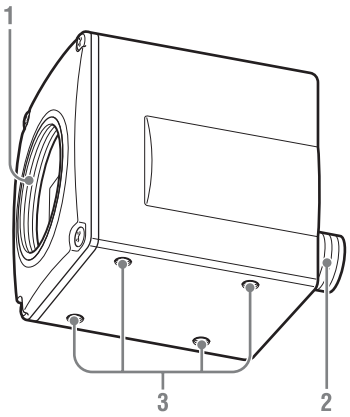
Macintosh computer

Drop the folder of the software (default: /Application/XDCAM EX Clip Browser) into Trash.

Parts Identifications

See the pages enclosed in parentheses ( ) for details about the corresponding function and how to use it.

Camera head

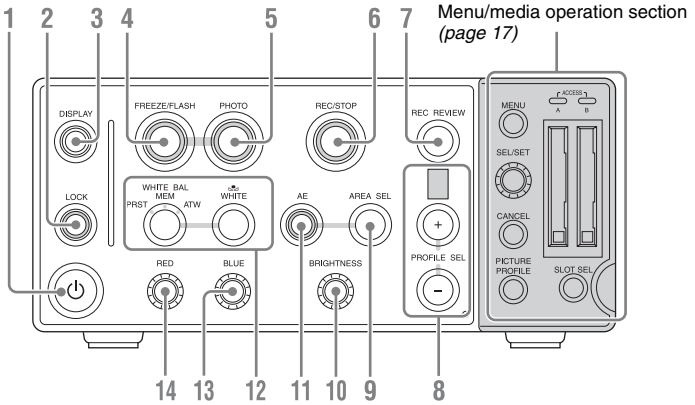


1. **Lens mount** ***(page 19)***
2. **Camera cable connector (20-pin)** ***(page 20)***
3. **Screw holes (M3, depth: 2.5 mm ($^1/_8$ inches))**
   Use these holes to attach the supplied tripod adaptor to the camera head for mounting it on a wall, ceiling or tripod.

Note

If you continue shooting for 20 or more minutes, it is recommended that you use the supplied tripod adaptor to fix the camera head to the tripod.

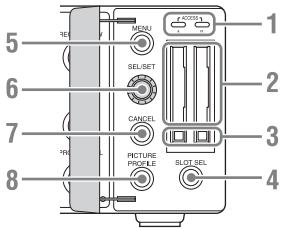
Camera control unit (CCU) front panel



1. **On/Standby button (⏻)** ***(page 21)***
2. **LOCK button**
   Inhibits actions of the other buttons and knobs.
3. **DISPLAY button** ***(page 29)***
4. **FREEZE/FLASH button (*page 45* and *page 47*)**

5. **PHOTO button** *(page 47)*
6. **REC (record)/STOP button** *(page 46)*
7. **REC REVIEW (recording review) button** *(page 46)*
8. **PROFILE SEL (profile selection) + and – buttons and display window** *(page 39)*
9. **AREA SEL (light measurement area selection) button** *(page 36)*
10. **BRIGHTNESS knob** *(page 37)*
11. **AE (automatic exposure) button** *(page 36)*
12. **White balance adjustment section** *(page 34)*
    WHITE BAL button and WHITE button
13. **BLUE (blue gain) knob** *(page 35)*
14. **RED (red gain) knob** *(page 35)*

Menu/media operation section



1. **ACCESS lamps** *(page 26)*
2. **SxS memory card slots** *(page 26)*
3. **EJECT button** *(page 26)*
4. **SLOT SEL button** *(page 27)*
5. **MENU button** *(page 59)*
6. **SEL/SET knob** *(page 59)*
7. **CANCEL button** *(page 59)*
8. **PICTURE PROFILE button** *(page 39)*

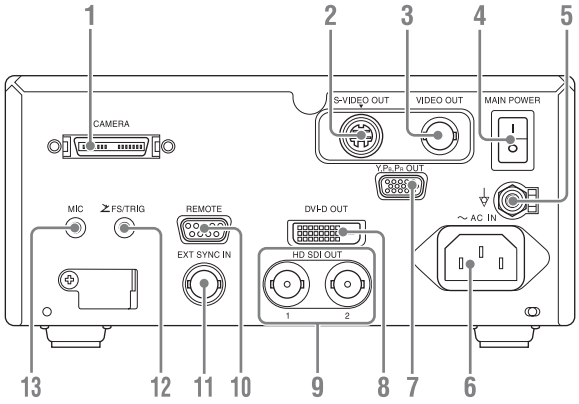
Camera control unit (CCU) rear panel

Note

When the unit is shipped from the factory, connector covers are attached to the following connectors.

- HD SDI OUT 1, 2
- EXT SYNC IN

To use one of these connectors, remove the cover *(see page 51)*.

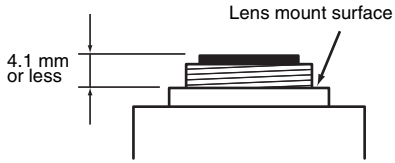


1. **CAMERA connector** *(page 20)*
2. **S-VIDEO OUT (S-video output) connector (mini-DIN 4-pin)** *(page 52)*
3. **VIDEO OUT (composite video output) connector (BNC)** *(page 52)*
4. **MAIN POWER switch** *(page 21)*

5. **Equipotential ground terminal (⏚)**
   Use to make an equipotential ground connection.
6. **∿AC IN (AC power input) connector** ***(page 21)***
7. **Y,P_B,P_R OUT (analog component output) connector (D-sub 15-pin)** ***(page 52)***
8. **DVI-D OUT (DVI output) connector** ***(page 52)***
9. **HD SDI OUT (HDSDI output) 1, 2 connectors (BNC)** ***(page 52)***
10. **REMOTE connector (D-sub 9-pin, RS-232C)** ***(page 55)***
11. **EXT SYNC IN (external synchronization signal input) connector (BNC)** ***(page 24)***
12. **FS/TRIG (foot switch/trigger signal input) jack (mini-jack)** ***(page 56* and *page 57)***
13. **MIC (microphone input) jack (mini-jack)** ***(page 50)***

Lens Mounting

C-mount lenses with the following lens mount surface can be attached to the camera head.

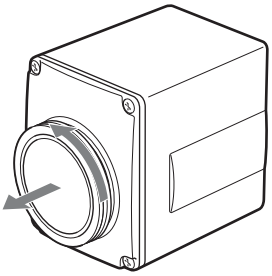


Note

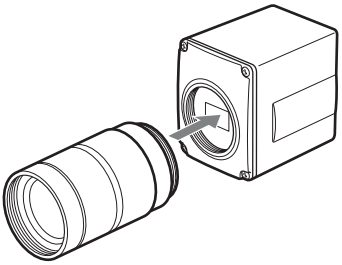
Be sure to use a lens whose projected part from the lens mount surface is 4.1 mm ($^{3}/_{16}$ inches) or less. Mounting the lens with a maximum projection part 4.2 mm or more may damage the internal mechanism of the camera head.

Mounting the lens

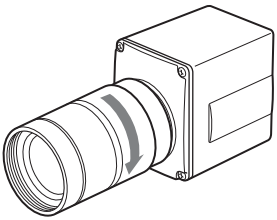
1 Remove the lens mount cap of the camera head.



2 Align the threaded portion of the lens mount with that of the camera mount.



3 Slowly rotate the lens clockwise to fix the lens to the camera head tightly.



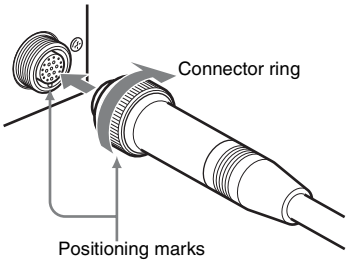
Connection between the Camera Head and CCU

Connect the camera cable connector on the camera head with the CAMERA connector on the CCU using the optional CCMC-T05/T10/T15/T20 Camera Cable.

Notes

- Be sure to turn off the power supply for all equipment when you connect or disconnect the camera cable. Connecting/disconnecting a cable while the power is on may damage this unit.
- Be sure to connect the camera head and CCU with the camera cable before you turn on/off the power of the CCU.
- Insert the connector by pushing it straight in, being careful not to bend the pins.
- Insert the connectors of the cables properly. Loose connection often generates noise. When pulling out a cable, be sure to pull it out by the connector, not the cable itself.
- Starting this unit may require more time than normally when you start it for the first time after exchanging the camera head.
- The CCU is designed to be used with this camera head. Use both together for optimum picture quality.

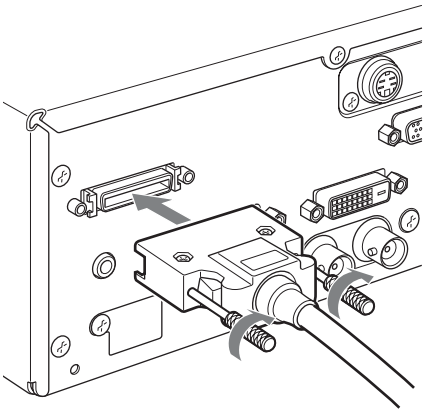
Connecting the camera cable to the camera head



1 Align the positioning marks on the camera cable connector and on the camera cable round plug, and then push the plug in.

2 Turn the connector ring to tighten.

Connecting the camera cable to the CAMERA connector

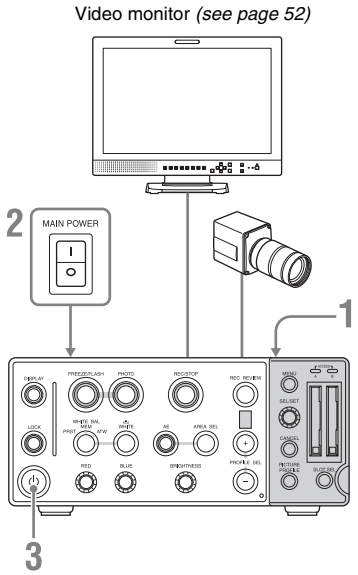


1 Connect the camera cable square plug to the CAMERA connector.

2 Tighten the two screws on the square plug.

Start-up

When you use this unit for the first time after purchasing, the initial settings are required *(see page 21)*.



1 To connect the CCU to AC power source, connect an AC power cord (not supplied) to the ∼AC IN connector on the CCU rear panel.

2 Press the | side of the MAIN POWER switch on the CCU rear panel.

The unit is in the standby state.

3 Press the On/Standby button (⏻).

When the start-up of the unit is completed, the button lights in green. The camera picture appears in the monitor screen.

Note

Starting this unit may require more time than normally when you start it for the first time after exchanging the camera head.

When the initial setting display appears in the monitor screen

The initial setting display appears in the monitor screen in the following situations.

- When you turn the unit on for the first time.
- When you connect the unit to an AC power source and turn it on again after clock settings have been lost. The settings can be lost if the backup battery is exhausted while the unit is being operated without an AC power connection.

For details on the initial settings, see "Setting the Clock" (page 22).

Note

While the initial setting display is shown, no other operation except turning the power off is permitted until you finish the setting for this display.

Turning the power off

Press the On/Standby button again.
The unit enters the standby state. To exit the standby state and power off, press the ○ side of the MAIN POWER switch.

Note

If you turn the MAIN POWER switch off before this unit enters the standby state, settings may be lost.

Setting the Clock

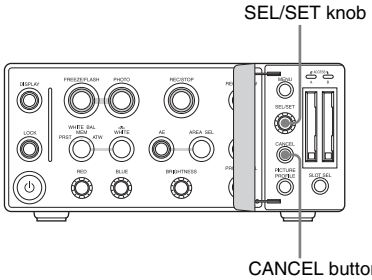
When you turn the unit on for the first time after purchasing or replacing the backup battery *(page 66)*, the initial setting display appears in the monitor screen connected to this unit.
Set the date and time of the built-in clock, using this display.

Time Zone

The value shows the time difference from UTC (Coordinated Universal Time).
Change the setting if needed.

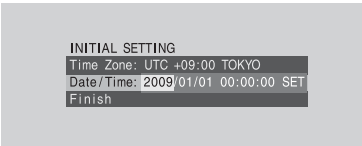
Setting the time and date

To set the date and time, use the SEL/SET knob in the menu/media operation section inside cover of the front panel of the CCU.



1 Turn the SEL/SET knob to set the cursor to "Date/Time" then press the knob.

The cursor moves to the year-setting column.



2 Turn the SEL/SET knob to set the year then press the knob.

The cursor moves to the month-setting column.

3 Set the month, day, hour, minute, and second in sequence in the same manner.

When you press the SEL/SET knob at "SET," the cursor moves back to "Date/Time."

To change a numeric value after entering it

Press the CANCEL button.
The value disappears, and you can enter it again.

4 Move the cursor to "Finish" then press the SEL/SET knob.

The initial setting display disappears, and the clock setting is completed.

Once after the initial setting display disappears, the time zone and date/time settings can be changed using "Time Zone" *(page 62)* and "Clock Set" *(page 62)* of the OTHERS menu.

Notes

- If the clock setting is cleared because of exhaustion of the backup battery while no operation power was being supplied, the initial setting display will be displayed when you turn the unit on at the next opportunity.
- While the initial setting display is shown, no other operation except turning the power off is permitted until you finish the setting for this display.

Recording Signal Format Settings

The recording signal format is specified by bit rate (HQ or SP), number of effective lines, frame rate, and scan system (i).
Recording signal format choices vary with the "Country" setting of the OTHERS menu.

When "Country" is set to "NTSC Area": HQ 1080/60i or SP 1080/60i

When "Country" is set to "PAL Area": HQ 1080/50i or SP 1080/50i

When the recording bit rate is HQ, the camera records at a bit rate of 35 Mbps. When the recording bit rate is SP, the camera records at an HDV-compatible bit rate of 25 Mbps.

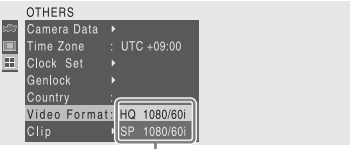
Setting the recording signal format

Use "Video Format" of the OTHERS menu.

1 Display the OTHERS menu and select "Video Format."

For details on menu operations, see "Basic Menu Operations" (page 59).

The format choices are displayed.



Recording signal format choices

2 Turn the SEL/SET knob to select the format then press the knob.

A message that confirms whether you execute setting of "Video Format."

3 Turn the SEL/SET knob to select "Execute" then press the knob. To cancel setting of "Video Format," select "Cancel" then press the knob.

Note

The Video Format setting cannot be changed during recording and during freeze display.

Output signal types and formats

The output signal format depends on the recording signal format. The following table lists the types and formats of camera output signals and signals recorded by this unit.

Recording signal format		HD output signal		SD output signal
		Y,P_B,P_R OUT or HD SDI OUT connectors	**DVI-D OUT connector** [a]	**VIDEO OUT or S-VIDEO OUT connector**
NTSC	HQ 1080/60i	1080/59.94i	1080/59.94i or 1080/59.94P	480/59.94i
	SP 1080/60i			
PAL	HQ 1080/50i	1080/50i	1080/50i or 1080/50P	575/50i
	SP 1080/50i			

a) Interlaced (i) or progressive (P) output signals can be selected with "DVI Out Select" *(see page 61)* in the VIDEO SET menu.

Using genlock

Synchronization (genlock) is required if you want to shoot with two or more PMW-10MD units, or combine this unit with other equipment.
To synchronize, input a sync signal to the EXT SYNC connector. The usable sync signal formats depend on the setting of "Country" *(see page 63)* in the OTHERS menu.

When Country is set to NTSC Area: 1080/59.94i or 480/59.94i

When Country is set to PAL Area: 1080/50i or 575/50i

Notes

- It is not possible to establish genlock during recording of clips or still images pictures It is also not possible to establish genlock of one signal and then to input another sync signal and establish genlock of that signal during recording.
- It is not possible to establish genlock when the sync signal is unstable.
- The subcarrier is not synchronized.

Handling SxS Memory Cards

This unit records audio and video on SxS memory cards (optional) inserted in the card slots.
SxS memory cards are intended for general-purpose use. They are not intended for medical use.

About SxS memory cards

Usable SxS memory cards

Use the following Sony-made SxS memory cards (SxS PRO) with this unit:

- SBP-8 (8GB)
- SBP-16 (16GB)
- SBP-32 (32GB)

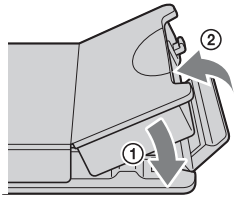
Operations are not guaranteed with memory cards other than SxS PRO.

These cards comply with the ExpressCard standard.

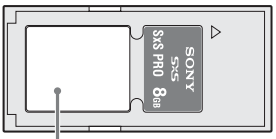
- SxS and SxS PRO are trademarks of Sony Corporation.
- The ExpressCard word mark and logo are owned by Personal Computer Memory Card International Association (PCMCIA) and are licensed to Sony Corporation. All other trademarks are the property of their respective owners.

Notes on using SxS memory cards

- Recorded data may be damaged or lost in the following situations:
  - —If you remove this media or turn off the power while formatting, reading or writing data.
  - —If you use this media in locations subject to static electricity or electrical noise.
- Do not use or store this media in the following locations:
  - —Where recommended operating conditions are exceeded.
  - —Inside a closed car in summer; or in strong sunshine / under direct sunlight / near a heater, etc.
  - —Humid or corrosive location
- Verify the correct direction of insertion before use.
- When storing or carrying this media, put this media in the carrying case and lock it firmly.

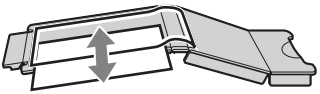


- We recommend that you make a backup copy of important data. Sony accepts no responsibility for any damage or loss of data you recorded.
- Do not apply a label sheet in places other than the label space. When applying the label sheet to this media, do not allow it to protrude from its proper location.



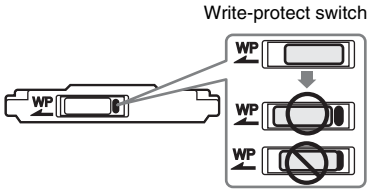
Label space

- SxS memory cards to be used with this unit must be formatted using the format function of this unit. If a card is formatted using other device, it is regarded as of a different format, requiring repeated format operation on this unit. (Formatting or deleting with the function of the unit does not completely delete data on this media. When transferring or disposing of this media, use a commercial data deleting software or destroy the actual body at your own responsibility.)
- If the available recording time on a card is short, clip operation may be restricted. In such a case, delete unnecessary files by using a computer.
- Remove or reinsert the card with the case opened properly.



For write protection

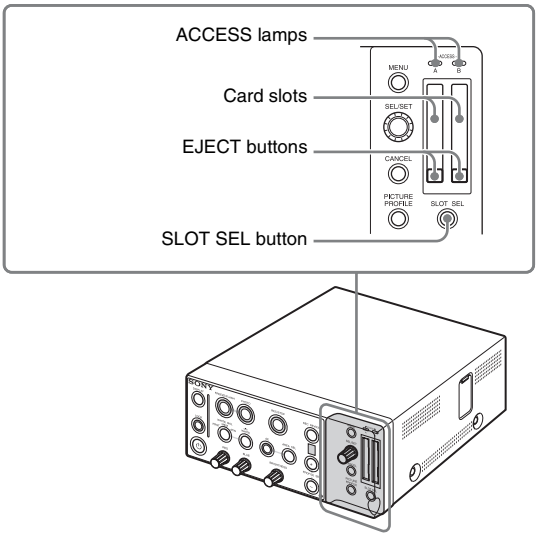
Setting the write-protect switch of the SxS memory card to “WP” disables you to record, edit or delete data.



Note

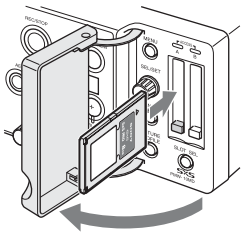
Do not operate the write-protect switch of an SxS memory card while it is set in the unit. Temporarily remove the card from the unit before changing the switch setting.

Inserting/removing an SxS memory card



Inserting an SxS memory card

1 Open the cover, and insert the SxS memory card into the slot.



The ACCESS lamp lights in orange then changes to green once the memory card is ready for use.

2 Close the cover.

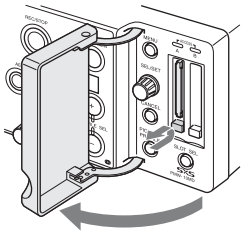
Status indications by the ACCESS lamps

Card slots A and B are accompanied by the respective ACCESS lamps to indicate their statuses.

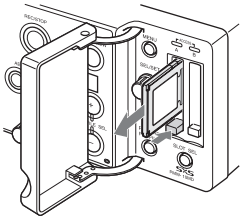
Lamp	Slot statuses
Lights in orange	Accessing the loaded SxS memory card (writing/reading data)
Lights in green	Standby (ready for recording using the loaded SxS memory card)
Off	• No SxS memory card is loaded. • The loaded card is invalid. • An SxS memory card is loaded, but another slot is active.

Removing an SxS memory card

1 Open the cover, once press the EJECT button to release the lock, then pull the button out.



2 Press the EJECT button again to remove the card.



Note

Data are not guaranteed if the power is turned off or a memory card is removed while the card is being accessed. All data on the card may be destroyed. Be sure that the ACCESS lamps are lit in green or off when you turn off the power or remove memory cards.

Switching between SxS memory cards

When SxS memory cards are loaded in both card slots A and B, press the SLOT SELECT button to select the card you wish to use.
If a card becomes full during recording a clip, switching to the other card is automatically executed.

Note

Automatic switching does not take place during recording of still images, even if a card becomes full.

Formatting an SxS memory card

Formatting may be required before using an SxS memory card with this unit. For an SxS memory card that is not formatted or that was formatted with another system, a message to confirm if formatting is to be executed is displayed in the monitor screen.

Note on formatting

Any SxS memory card formatted with a device other than this unit cannot be used with the unit.

To execute formatting

If the message for formatting is displayed, turn the SEL/SET knob to select "Execute" then press the knob.

Formatting begins.
The in-progress message and status bar (%) are displayed, and the ACCESS lamp lights in orange.
When formatting is completed, the completion message is displayed for three seconds.

Recording during formatting

You can perform recording using the SxS memory card in the other card slot while formatting is in progress.

If formatting fails

A write-protected SxS memory card or memory card that cannot be used with this unit will not be formatted.
As a warning message is displayed, replace the card with an appropriate SxS memory card, as per the instructions in the message.

To format by menu operation

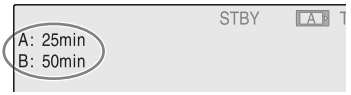
When no formatting message is displayed in the monitor screen, you can execute formatting using "Format Media" *(page 64)* of the OTHERS menu in the same manner.

Notes

- All the data, including recorded pictures and setup files, are erased when a memory card is formatted.
- SxS memory cards to be used with this unit must be formatted using the format function of this unit. Any card formatted with other device must be formatted again with this unit.

Checking the remaining time available for recording

You can check the time remaining for the SxS memory cards loaded in the card slots in the monitor screen.



The available time for recording with the current recording format (recording bit rate) is calculated according to the remaining space of each card and displayed in time units of minutes.

Note

A icon appears if the memory card is write-protected.

Replacing an SxS memory card

- If the available time on two cards in total becomes less than five minutes, a message "Media Near Full," flashing of the REC/STOP button indicator will warn you. Insert a card with sufficient space into the slot unused.
- If you continue recording until the total remaining time reaches zero, the message changes to "Media Full," and recording stops.

Note

Approximately 600 clips can be recorded on one SxS memory card at maximum.
If the number of recorded clips reaches the limit, the remaining time indication becomes "0," and the message "Media Full" is displayed.

Restoring an SxS memory card

If an error occurs with data in a memory card for some reason, the card must be restored.
When an SxS memory card that requires restoration is inserted, the restoration starts automatically.
During restoration, the in-progress message and status bar (%) are displayed, and the ACCESS lamp is lit in orange.
When restoration is completed, the completion message is displayed for three seconds.

If restoration fails

- A write-protected SxS memory card or one on which an error occurred cannot be restored. For such a card, a warning message is displayed. Release the write protection or replace the card, as per the instructions in the message.
- An SxS memory card on which an error occurred may become usable again through repeated formatting.
- The following operation may restore an SxS memory card for which the message "Could not Restore Some Clips" is repeatedly displayed each time you try the restoration process:

  1 Copy necessary clips to another SxS memory card, using the XDCAM EX Clip Browsing Software *(page 54)*.

  2 Format the problem SxS memory card, using the format function of this unit.

  3 Return the necessary clips to the SxS memory card using the XDCAM EX Clip Browsing Software.

Recording during restoration

You can perform recording using the SxS memory card in the other card slot while restoration is in progress.

Screen Display Settings

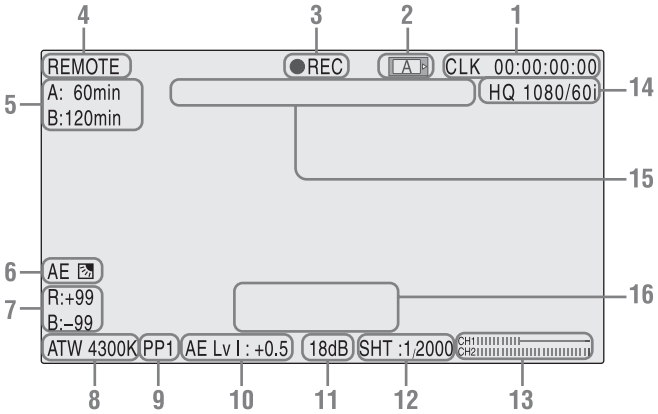
By pressing the DISPLAY button to turn on the information display, you can display the information shown in the following figure. The information is superimposed on the camera output picture in the monitor screen.

To select the information to display

You can use “Display On/Off” *(see page 62)* in the VIDEO SET menu to select the information to display in the monitor screen.

Note

Warning and error messages (15) and notifications and confirmation messages (16) always appear as required, regardless of the state of the DISPLAY button. It is not possible to hide these messages with the Display On/Off settings of the VIDEO SET menu.



1. **Timecode indication**
   Displays timecode (real time).
   CLK **::**:**:** Timecode display in drop-frame mode (when Country in the OTHERS menu is set to NTSC Area)
   CLK **::**:**:** Timecode display in non-drop-frame mode (when Country in the OTHERS menu is set to PAL Area)
2. **Media indication**
   When an SxS memory card is loaded in either of the memory card slot: Displays the SxS memory card slot in which the memory card is loaded.
   When SxS memory cards are loaded in both of the memory card slots: Displays the currently selected SxS memory card slot.

Note

No indication appears when memory cards are not inserted or the memory card in the selected slot is protected.

3. **Operation status indication**
   Displays the operation status of the SxS memory card being currently used.
   ●REC: Recording
   STBY: Recording standby
   FREEZE: Freeze (displaying still image)
   ●REC/FRZ: Freeze during video recording
   CAPTURE: Capturing still image
   REVIEW: Recording review

Note

No indication appears when memory cards are not inserted or the memory card in the selected slot is protected.

4. **Remote status indication**

Displays “REMOTE” when this unit is being operated remotely from a computer connect to the REMOTE connector.

5. **Media remaining capacity indication**
Displays the remaining capacity of the SxS memory cards loaded in each slot.
On the basis of the remaining capacity of the memory cards, the time that can be recorded in the currently selected recording format (recording bit rate) is calculated and displayed in minute units.
The indication “---min” appears when no recording media is loaded, and when an unwritable memory card is loaded. The mark appears when a memory card is protected.

6. **AE function indication**
Displays the currently selected AE function adjustment mode.

 **:** Backlight

: Standard

 **:** Spotlight

You can select the AE function adjustment mode using “AE” *(see page 42)* in the Picture Profile menu.

7. **R and B gain offset indication**
Display the R gain offset adjusted with the RED knob and the B gain offset adjusted with the BLUE knob (–99 to +99).

8. **White balance mode indications**
Displays the current white balance adjustment mode (W:M, W:P, or ATW) and the color temperature.

9. **Picture profile indication**
Displays the number of the currently selected picture profile.

10. **AE level and BRIGHTNESS knob setting indication**
When the AE function is on, displays the current AE level.
When the AE function is off, displays the setting value of the BRIGHTNESS knob (–50 to +21).
Using “Brightness MIN” *(see page 41)* and “Brightness MAX” *(see page 41)* in the Picture Profile menu, you can change the minimum and maximum brightness values which can be set with the BRIGHTNESS knob.

11. **Total gain indication**
When the AE function is on, displays “AGC”.
When the AE function is off, displays the total gain as set according to setting of the BRIGHTNESS knob.

12. **Shutter indication**
When the AE function is on, displays “SHT:AUTO” (because the auto shutter function is turned on automatically).
When the AE function is off, displays one of the following, according to the shutter mode selected with Shutter >Mode *(see page 41)* in the Picture Profile menu.
Off: Shutter off
Speed: “SHT:” and the shutter speed
ECS: “ECS:” and the ECS frequency
SLS (show shutter function): “SLS:” and the number of accumulated frames
EXSLS (ultra-high sensitivity slow shutter function): “SLS:” and the number of accumulated frames

13. **Audio level meters**
Display the audio input levels.

Note

When a microphone is not connected to the MIC connector, the audio level meters may be inaccurate by about three dots because of noise.

14. **Recording format indication**
Displays the setting of “Video Format” (recording format, *see page 63*) in the OTHERS menu.

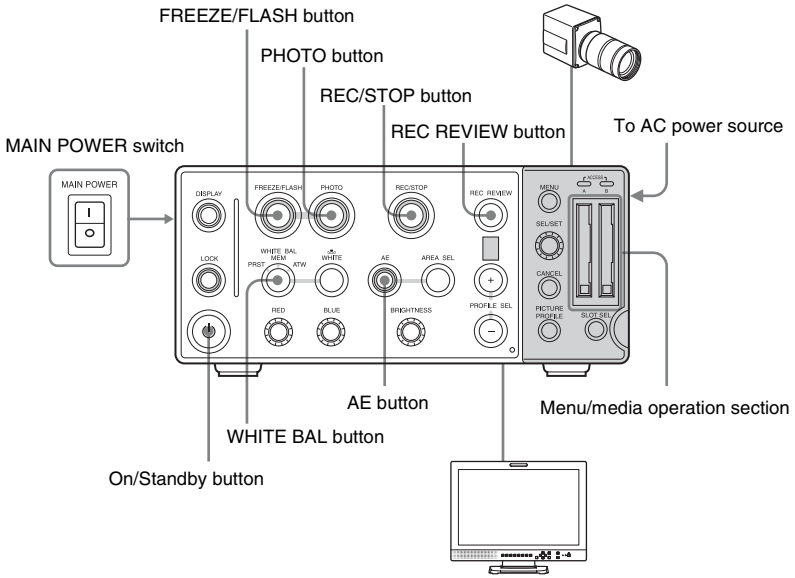
See “Recording Signal Format Settings” (page 23) for more information about recording formats.

15. **Warning and error messages**
Displays warnings and error messages, such as insufficient memory messages. (These messages appear even if the DISPLAY button is off.)

16. **Notifications and confirmation messages**
Displays notifications and confirmation messages, including messages that report the progress or results of execution and message that request confirmation or instructions. (These messages appear even if the DISPLAY button is off.)

Basic Operation Procedure

The basic shooting/recording procedure is as follows.



Preparations

1 Connect the CCU and camera head *(see page 20)*, and connect the CCU to a video monitor *(see page 52)*.

2 Connect the CCU to an AC power source, and press the I side of the MAIN POWER switch *(see page 21)*.

3 Insert an SxS memory card *(see page 26)*.

If you insert a second card, the unit will switch to the second card automatically when the first card becomes full.

Shooting (ATW mode, AE function)

1 Press the On/Standby button to light it.

The unit starts, and the camera output picture appear in the monitor screen.

The initial settings screen appears when the unit starts for the first time. You will need to set the date and time before the camera output picture appears. For details, see "Setting the Clock" (page 22).

2 Select ATW with the WHITE BAL button.

3 Press the AE button to light it.

See "Shooting" (page 45) for details about shooting operations.

Recording video (clips)

1 Press the REC/STOP button.

Recording of a clip starts.

2 Press the REC/STOP button again at the point where you want to stop recording.

Recording of the clip stops, and the unit enters STBY (recording standby) mode.

Notes

- It is not possible to record a still image while recording a clip. (During recording, no still image file is recorded even if you press the FREEZE/FLASH button and the PHOTO button.)
- After you stop recording, it is not possible to start recording again until the ACCESS lamp changes to green.

See "Recording Video" (page 46) for more information about recording clips.

To check the most recently shot clip (Rec Review)

Press the REC REVIEW button.
The Rec Review function is activated, and the last three seconds of the most recently recorded clip play in the monitor screen.
When the clip has played to the end, the unit enters STBY (recording standby) mode.

Note

It is not possible to Rec Review a still image.

To delete clips

The Last Clip DEL function allows you to delete the most recently recorded clip.

For details, see "Deleting the last recorded clip" (page 48).

To delete all clips on the memory card, use the All Clips DEL function *(see page 63)*.

Recording still images

1 Press the FREEZE/FLASH button to light it.

The camera output picture freezes.

2 Press the PHOTO button.

The freeze picture in the monitor screen is recorded as a still image.

Notes

- When recording still images, set the bit rate to "HQ" with "Video Format" *(see page 63)* in the OTHERS menu.
- It is not possible to record a still image when color bars *(see page 61)* are displayed.

See "Recording Still Images" (page 47) for more information about recording still images.

Viewing recorded clips and still images

It is not possible to view or play recorded clips and images on this unit. You can view them by loading the SxS memory card that contains the clips and images into a recorder such as the PMW-EX30, or by loading the clips and still image data into a computer.

Refer to the operating instructions of the PMW-EX30 for information about how to play SxS memory cards on the PMW-EX30. See "Operating Clips/Still Images with a Computer" (page 53) for information about how to load clips and still image data into a computer.

Clip (recording data) and clip name

When you stop recording, video, audio and subsidiary data from the start to end of the recording are recorded as a single clip on an SxS memory card.
For each clip recorded with this unit, a clip name of 8 characters (the first four alphanumerics and the second four numerics) is automatically generated.

Example: ABCD0001

The first four alphanumerics can be specified as desired using "Clip" *(page 63)* of the OTHERS menu before you start recording. (It cannot be changed after recording.)
The last half of the clip name (the four-digit number) starts with the number set with "Clip" >"Number Set" in the OTHERS menu. This number is incremented by one with each new clip.

Notes on clips

This unit employs the FAT32 File System. Thus, recorded video materials may be segmented in multiple files depending on the file size.

A long clip can be recorded crossing over two memory cards in slot A and B.

When you copy clips to a hard disk drive, etc. using a computer, it is recommended to use the XDCAM EX Clip Browsing Software on the supplied CD-ROM.

Note

If copying is done using Explorer (Windows) or Finder (MAC), the continuity and relationships of recorded materials may not be maintained.

Image file and directory names

JPEG images files are stored in the directory /DCIM/XXXEXDCF/, where "XXX" is a three-digit number. You can specify this number with "Photo" >"Number Set" *(see page 63)* in the OTHERS menu.

The image files are stored in the directory specified in the above-mentioned manner. The image file name format is "DSC0XXXX.JPG", where "XXXX" is a number from 0001 to 9999. The number is automatically incremented by one for each new image.

Notes

- It is not possible to specify the names assigned to JPEG files.
- Up to 9999 files can be recorded in one directory. However, if a directory already contains a file named "DSC09999.JPG", because files have been moved or deleted, no more image files can be recorded in that directory.

Creating still images from clips

You can use the XDCAM EX Clip Browsing Software installed on your computer to create still images from recorded clips.

The following index marks are automatically added while video is being recorded.

RecStart: Added automatically at the start of video recording

ShotMark1: Added each time the FREEZE/FLASH button is pressed while video is being recorded

ShotMark2: Added each time the FREEZE/FLASH button and then the PHOTO button is pressed while video is being recorded

Refer to the operating instructions of the XDCAM EX Clip Browsing Software for more information about how to search for index marks and how to create still images.

Adjusting the White Balance

The white balance must be adjusted to suit to the color temperature of the light source.
You can select the adjustment mode according to the shooting conditions.
The indicator of the currently selected white balance adjustment mode *(see page 30)* is displayed in the monitor screen.

Preset (PRST) mode

The color temperature is adjusted to the preset value (factory-default value: 3200K) in this mode. Select this mode when there is no time to adjust the white balance or when you wish to fix the white balance to the condition of you set for a Picture Profile.

Memory (MEM) mode

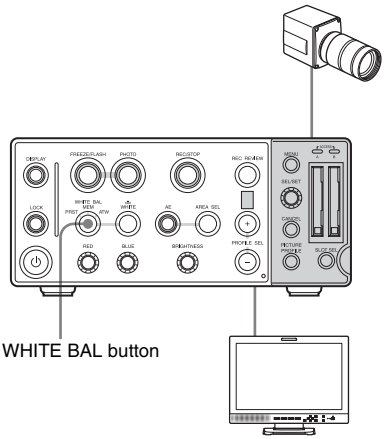
The white balance is adjusted to the value stored in memory.
Pressing the WHITE button executes auto white balance and stores the adjusted value in memory.
You can adjust white gain offset values in order to change the color balance of the output picture with the RED knob or the BLUE knob *(see page 35)*.

ATW (Auto-Tracing White balance) mode

In this mode, the unit automatically adjusts the white balance to the appropriate condition.
When the color temperature of the light source changes, the white balance adjustment is automatically executed.
Five steps of adjustment speed can be selected with "ATW Speed" *(page 42)* in the Picture Profile menu.
You can adjust white gain offset values in order to change the color balance of the output picture with the RED knob or the BLUE knob *(see page 35)*.

Selecting the adjustment mode

You can select Preset mode, Memory mode, or ATW mode with the WHITE BAL button.



ATW: ATW mode
MEM: Memory mode
PRST: Preset mode

Executing auto white balance

Execute auto white-balance adjustment according to the color temperature of the light source.
The adjustment value can be stored in memory.

Note

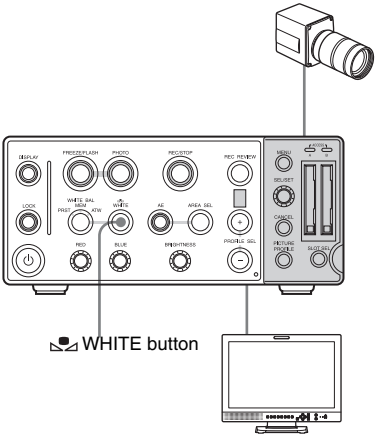
Auto white-balance adjustment cannot be executed in Preset mode.

1 **Place a white subject under the same lighting condition and zoom in on it so that a white area is obtained in the monitor screen.**

A white object (white cloth, a white wall, etc.) near the subject may be used in place. Be careful not to have any spots of high illumination in the monitor screen.

2 **Press the WHITE button.**

Auto white-balance adjustment begins.



During adjustment, an in-progress message is displayed in the monitor screen. When the adjustment is completed successfully, the message changes to a completion message, and the obtained color temperature is displayed.

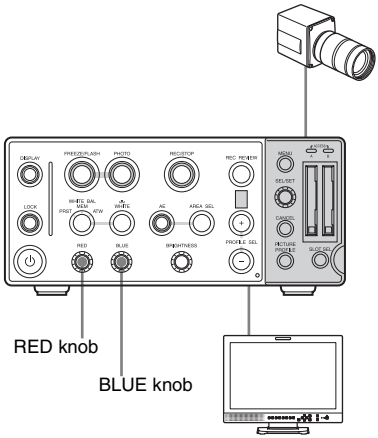
- When you execute the adjustment in Memory mode, the adjusted value is stored in memory.
- When you execute the adjustment in ATW mode, adjustment in ATW is resumed.

If auto white-balance adjustment fails

An error message is displayed in the monitor screen for approximately three seconds.
If the error message is displayed, try auto white-balance adjustment again.
If the error message continues to be displayed after several attempts, consult your Sony dealer or your Sony service representative.

Changing the color balance of the camera output picture

When the white balance adjustment mode is set to Memory or ATW mode, you can adjust white gain offset values in order to change the color balance of the output picture and get a better shot of a specific part of the subject. You can also record with the color balance changed in this way.



Rotate the RED knob or the BLUE knob to adjust the offset value of R or B white gain. Rotate in the clockwise direction to increase the offset value (toward bluish), and rotate in the counterclockwise direction to decrease the offset value (toward reddish).
You can reset the offset value to 0 (factory-default value) by holding the RED or BLUE knob down for one second or longer.
Offset values set in this way are to memory. (Even if the white balance is adjusted again, the saved offset values are reproduced).

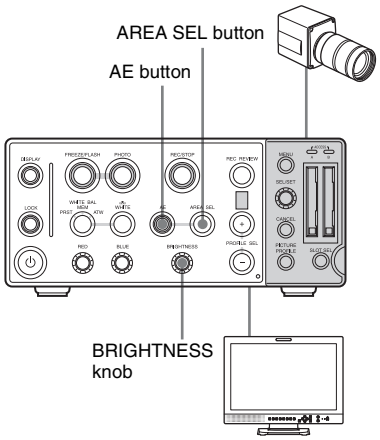
You can also adjust white gain offset values with "White" (see page 42) in the Picture Profile menu.

Adjusting the Brightness

This unit has an AE function that automatically adjusts brightness through a combination of adjustments to the total gain of the video amp and shutter speed settings. You can also adjust the brightness by using the BRIGHTNESS knob, which also adjusts brightness through a combination of total gain and shutter speed settings. If you need to make manual adjustments for special shooting conditions, you can set the total gain and the shutter speed separately in the Picture Profile menu.

Using the AE function

To turn the AE function on, press the AE button, lighting it. The camera controls brightness by switching automatically, according to shooting conditions, between AGC (auto gain control) mode and auto shutter mode.
Use "AE" *(see page 42)* in the Picture Profile menu to set the adjustment level (AE level), the adjustment mode, and the upper and lower limits for AE function setting values.
To specify how light is measured before adjusting the brightness, you can select from among five light measurement areas.

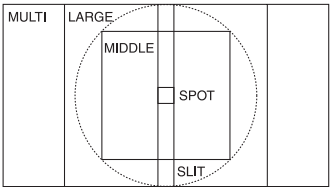


Setting the AE level

The AE level sets the automatic brightness adjustment level, by specifying how much brighter or darker it is than the standard level. You can set the AE level with "AE" >"Level" *(see page 42)* in the Picture Profile menu.
When the AE function is on, you can also rotate the BRIGHTNESS knob to set the AE level. Rotate it clockwise to increase the AE level (make it brighter than the standard level) and rotate it counterclockwise to decrease the AE level (make it darker than the standard level). To reset the AE level to the factory-default value, you can hold down the BRIGHTNESS knob for one or more seconds.

Selecting the light measurement area

Press the AREA SEL (light measurement area selection) button.
A frame around the currently selected light measurement area appears on the monitor screen for three seconds. The following figure shows the light measurement areas that can be selected.



MULTI: Whole screen
LARGE: Same as MULTI vertically, 75% of MULTI horizontally
MIDDLE: 75% of LARGE both horizontally and vertically
SPOT: 10% of LARGE both horizontally and vertically
SLIT: Same as MULTI vertically, 10% of LARGE horizontally

You can select the light measurement area by pressing the AREA SEL button before the display disappears. If MULTI is currently selected, the selection will change in the following order with each press of the AREA SEL button: MULTI → LARGE → MIDDLE → SPOT → SLIT → MULTI.

Note

Selecting the light measurement area is enabled only when the AE button is turned on.

Using the BRIGHTNESS knob

By rotating the BRIGHTNESS knob with the AE function off, you can adjust the brightness through a combination of gain and shutter speed settings. Rotate clockwise for greater brightness (higher gain or slower shutter speed), and rotate counterclockwise for less brightness (lower gain or faster shutter speed).
The setting value is displayed as an integer value with no unit. The setting range can be set with "Brightness MIN" (minimum brightness) and "Brightness MAX" (maximum brightness) in the Picture Profile menu. You can reset the setting value to 0 by holding down the BRIGHTNESS knob for one second or longer.

Note

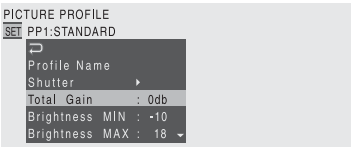
The BRIGHTNESS knob cannot be used to change the brightness when the shutter mode is SLS (slow shutter) or EXSLS (ultra-high sensitivity slow shutter).

Setting the total gain

Set the total gain with "Total Gain" *(page 41)* in the Picture Profile menu.
Total Gain can be set from 0 to 21 dB. Greater values select greater brightness.

Note

"Total Gain" in the Picture Profile menu cannot be set when the AE function is on.



When the AE function is on, the gain of the video amp is adjusted automatically by the AGC function, regardless of the Total Gain setting. The Total Gain setting also changes when the BRIGHTNESS knob is rotated with the AE function off.

Setting the electronic shutter

Using "Shutter" *(page 41)* in the Picture Profile menu, you can set the shutter mode and the shutter speed (the accumulated time that is shot per frame).
When the AE function is on, the unit is in auto shutter mode and the shutter speed is set automatically according to the brightness of the subject. Also, when the AE function is off, the setting of "Shutter" >"ECS Frequency" changes depending on the BRIGHTNESS value when you rotate the BRIGHTNESS knob.

Shutter modes

Speed (standard) mode

Set the shutter speed in seconds.
This mode may be especially effective when you wish to record a quick-moving subject with little blurring and to adjust the brightness.

ECS (Extended Clear Scan) mode

Set the shutter speed as a frequency.
This mode may be used when you wish to adjust the brightness more finely than in Speed mode.

SLS (Slow Shutter) mode

For shooting a subject in low-level lighting conditions. Specify the shutter speed in the number of accumulated frames.

EXSLS (EX Slow Shutter) mode

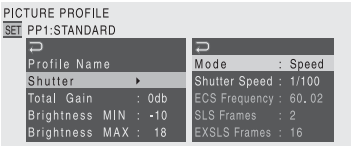
The shutter speed is specified in the number of accumulated frames. Up to 64 frames can be accumulated in this mode, permitting you to obtain low-noise clear pictures in low light levels.

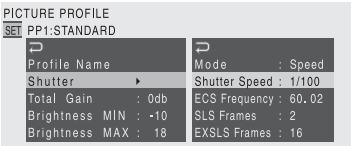
Setting the shutter mode/speed

Use "Shutter" >"Mode" *(see page 41)* and "Shutter" >"Shutter Speed" *(see page 41)* in the Picture Profile menu.

Notes

- "Shutter" in the Picture Profile menu cannot be set when the AE function is on.
- If "Flash" is set to "On" when "Shutter" >"Mode" is set to "SLS" or "EXSLS", "Shutter" >"Mode" is set automatically to "Off".





Speed (standard speed) mode

Set “Mode” to “Speed,” and specify the time ([1/ setting value] sec.) with “Shutter Speed.”
The available setting values vary depending on the current video format (Country setting and Video Format setting).

When the video format is 1080/50i: $^{1}/_{60}$, $^{1}/_{100}$, $^{1}/_{125}$, $^{1}/_{250}$, $^{1}/_{500}$, $^{1}/_{1000}$, $^{1}/_{2000}$, $^{1}/_{4000}$, $^{1}/_{10000}$, $^{1}/_{16000}$

When the video format is 1080/60i: $^{1}/_{60}$, $^{1}/_{100}$, $^{1}/_{125}$, $^{1}/_{250}$, $^{1}/_{500}$, $^{1}/_{1000}$, $^{1}/_{2000}$, $^{1}/_{4000}$, $^{1}/_{10000}$, $^{1}/_{20000}$

ECS (Extended Clear Scan) mode

Set “Mode” to “ECS,” and specify the frequency with “ECS Frequency.”
The available setting values vary depending on the current video format.

SLS (Slow Shutter) mode

Set “Mode” to “SLS,” and specify the number of accumulated frames with “SLS Frame.”
You can select in the range of 2 to 8 frames.

Note

Slow shutter cannot be used during flash shooting of still images (with “Flash” set to “On”).

EXSLS (EX Slow Shutter) Mode

Set “Mode” to “EXSLS,” and specify the number of accumulated frames with “EXSLS Frames.”
You can select from among 16, 32, and 64 frames.

Note

EX slow shutter cannot be used during flash shooting of still images (with “Flash” set to “On”).

Reducing Flickers

To reduce flickers, try either of the following two methods:

Setting the shutter speed according to the power-supply frequency

Set “Shutter” >“Mode” *(see page 41)* to “Speed” in the Picture Profile menu and set the shutter speed according to the power supply frequency.

When the frequency is 50 Hz

Set the shutter speed to 1/50 or 1/100 seconds.

When the frequency is 60 Hz

Set the shutter speed to 1/60 or 1/120 seconds.

Using the Flicker-Reduction function

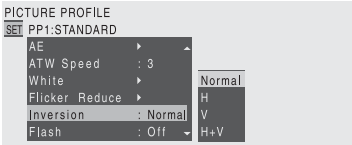
Set “Flicker Reduce” *(page 42)* in the Picture Profile menu to “Auto” or “On” and set “Frequency” to the power-supply frequency (50 Hz or 60 Hz).

Notes

- If the frame rate selected for recording is close to the power-supply frequency, flicker may not be reduced sufficiently even if you activate the Flicker-Reduction function.
- Flicker cannot be corrected when the recording frame rate and the shutter speed are not integral multiples of the power frequency.

Inverting the Picture

You can invert the camera output picture vertically, horizontally, or both vertically and horizontally, and record in that state. Use “Inversion” *(see page 43)* in the Picture Profile menu to turn inversion on and off and to set the inversion direction.



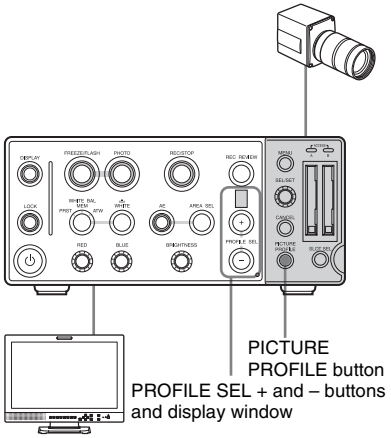
Normal: Do not invert.
H: Invert in the horizontal direction.
V: Invert in the vertical direction.
H+V: Invert in both the horizontal and vertical directions.

Picture Profiles

You can customize the picture quality, depending on the conditions or circumstances of recording, and store them as a picture profile, enabling the picture quality to be resumed just by your selecting the picture profile.
Six different picture profiles (PP1 to PP6) can be stored in memory.
The same standard (reference) values are registered to six picture profiles at the factory.
The Picture Profile menu is available for picture-profile operations.

Registering and recalling picture profiles

Once you store a picture profile, you can call the picture quality registered in the picture profile as follows:



Registering a picture profile

1 **Press the PICTURE PROFILE button.**
The Picture Profile menu is displayed.

2 **Make the settings of the picture profile items.**

For details on the setting items, see "Picture profile items" on page 41.

3 When the settings are completed, press the PICTURE PROFILE button to exit the menu.

Recalling a picture profile

Press the + or – PROFILE SEL button.
The number of the currently loaded picture profile file appears in the display window.
With each press of the + button, you can select picture profile files in the order 1→2→3→4→5→6→1... With each press of the – button, you can select picture profile files in the order 1→6→5→4→3→2→1...
When you change the profile selection, the image characteristics of this unit change according to the loaded picture profile.

Note

The PROFILE SEL + and – buttons are disabled when:
- the LOCK button is on.
- the Picture Profile menu is displayed.
- a freeze image is displayed (the FREEZE button is on).
- during clip recording, "Shutter" >"Mode" in the currently selected Picture Profile menu is set to "EXSLS".

Copying the settings of a picture profile

You can copy the settings of a selected picture profile to another picture profile.

1 Refer to the procedure in "Registering and recalling picture profiles" *(page 39)* and select the source picture profile.

2 Press the PICTURE PROFILE button.
The Picture Profile menu appears.

3 Select "Copy" from the Picture Profile menu.
The picture profile numbers are listed on the bottom of the screen.

4 Specify the target picture profile.
"Execute" and "Cancel" are displayed.

5 Select "Execute."
Copying begins.

When copying ends, the completion message is displayed for three seconds, and the original screen display is restored.

Resetting a picture profile

You can reset a selected picture profile to the factory settings (standard status).

1 Refer to the procedure in "Registering and recalling picture profiles" *(page 39)* and select the source picture profile.

2 Press the PICTURE PROFILE button.
The Picture Profile menu appears.

3 Select "Reset" from the Picture Profile menu.
"Execute" and "Cancel" are displayed.

4 Select "Execute."
Resetting begins.

When resetting ends, the completion message is displayed for three seconds, and the original screen display is restored.

Picture profile items

The factory-default values are shown in bold face (example: **Off**). However, some factory-default values for PP5 and PP6 picture profiles are different from the values shown in bold face.

PICTURE PROFILE SET

Items	Subitems and setting values	Contents
Profile Name Changing the picture profile name	Profile name	Set the profile name in 8 characters at maximum. You can use upper- and lowercase alphabetics, numerics 0 to 9, - (hyphen), _ (underscore) and space.
Shutter Specifying operating conditions of the electrical shutter	Mode **Off** / Speed / ECS / SLS / EXSLS **ECS:** PP5	Select modes of the Electronic Shutter. Selecting "Off" deactivates the shutter.
	Shutter Speed **1/100**	Set the shutter speed when Speed mode is selected. *The available setting values vary depending on the video format being selected (see page 38).*
	ECS Frequency **60.02** **1904:** PP5	Set the ECS frequency when ECS mode is selected. *The available setting values vary depending on the frame rate of the video format selected.*
	SLS Frames **2** to 8	Set the number of frames to accumulate when SLS mode is selected.
	EXSLS Frames **16**, 32, 64	Set the number of frames to accumulate when EXSLS mode is selected.
Total Gain Total gain value	**0** to 21 dB	Set the total gain value.
Brightness MIN Minimum value of the BRIGHTNESS knob	Integer from ±0 to –50 (–**40**)	Set the minimum brightness value that can be set with the BRIGHTNESS knob.
Brightness MAX Maximum value of the BRIGHTNESS knob	Integer from ±0 to +21 (+**18**)	Set the maximum brightness value that can be set with the BRIGHTNESS knob.

PICTURE PROFILE SET

Items	Subitems and setting values	Contents
AE Specifying operating conditions of the AGC	Level –2.0 / –1.5 / –1.0 / –0.5 / **±0** / +0.5 / +1.0 / +1.5 / +2.0 **–1.0:** PP5 **+0.5:** PP6	Set the target level (to make brighter or darker) of AGC and Auto Shutter control. +2.0: Approx. two stop further open +1.5: Approx. one and half a stop further open +1.0: Approx. one stop further open +0.5: Approx. half a stop further open ±0: Standard –0.5: Approx. half a stop further closed –1.0: Approx. one stop further closed –1.5: Approx. one and half a stop further closed –2.0: Approx. two stop further closed
	Mode Backlight / **Standard** / Spotlight	Set the control mode for AGC and Auto Shutter control. Backlight: Backlight mode to reduce darkening of the center subject against lights Standard: Standard mode Spotlight: Spotlight mode to reduce blown-out highlights on the center subject in the spotlight
	Speed–99 to +99 (**+50**)	Set the tracing speed of AGC and Auto Shutter control.
	AGC Limit 3 / 6 / 9 / **12** / 15 / 18 / 21dB	Set the maximum gain in AGC.
	A.SHT Limit 1/100 / 1/150 / 1/200 / 1/250 / 1/500 / 1/1000 / **1/2000** / 1/5000 / 1/10000 / 1/20000 (for 1080/60i) or 1/16000 (for 1080/50i)	Set the maximum shutter speed in Auto Shutter control.
ATW Speed Setting for Auto Tracing White Balance	1 / 2 / **3** / 4 / 5	Set the tracing speed of ATW.The larger number you set, the speed becomes faster.
White White gain offsets and preset white color temperature	R Gain Offset –99 to +99 (**±0**)	Set the R gain offset value. This setting is used when the white balance adjustment mode is Memory or ATW.
	B Gain Offset –99 to +99 (**±0**)	Set the B gain offset value. This setting is used when the white balance adjustment mode is Memory or ATW.
	Preset White 2100 to 10000 (**3200**)	Set the preset color temperature in steps of 100K. This setting is used when the white balance adjustment mode is Preset.
Flicker Reduce Setting Flicker Compensation Mode	Mode Auto / On / **Off**	Set the operation of the Flicker-Reduction function. On: To always activate it Auto: To automatically activate it when flicker is detected. Off: To not activate it
	Frequency **50Hz** / 60Hz	Set to the power supply frequency of the light source causing flicker.

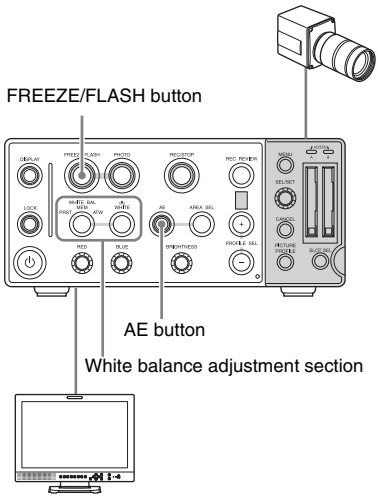
PICTURE PROFILE SET		
Items	**Subitems and setting values**	**Contents**
Inversion Invert the camera output picture.	**Normal** / H / V / H+V	Set the inversion direction for shooting with the camera output picture inverted. Normal: Do not invert. H: Invert in the horizontal direction. V: Invert in the vertical direction. H+V: Invert in both the horizontal and vertical directions.
Flash Setting for synchronized shooting with the flash.	On / **Off**	Synchronized shooting with the flash is possible when this is set to "On." **Note** If "Flash" is set to "On" when "Shutter" >"Mode" is set to "SLS" or "EXSLS", "Shutter" >"Mode" is set automatically to "Off."
Matrix Adjusting the color phase over the entire area with matrix operations	Setting **On** / Off	Set to "On" to activate the color phase adjustment function with matrix operations for the entire picture.
	Select **Type1** / Type2 / Type3 / Type4	Select one of the four types of built-in preset matrixes.
	Level –99 to +99 (±**0**)	Adjust the color saturation for the entire picture area.
	Phase –99 to +99 (±**0**)	Adjust the hue for the entire picture area.
	R-G, R-B, G-R, G-B, B-R, B-G –99 to +99 (±**0**)	Finely adjust the color phase for the entire picture area by independently setting each of the factors.
Detail Adjusting the details to be applied to the picture	Setting **On** / Off	Set to "On" to apply the details to the video signal.
	Level –99 to +99 (±**0**)	Adjust the detail level.
	Frequency –99 to +99 (±**0**)	Set the center frequency of the details. Setting the center frequency higher decreases the details, and setting it lower increases the details.
	Crispening –99 to +99 (±**0**)	Adjust the noise-suppression level. When you set it to a higher level, less noise may be seen, as fine elements of details are deleted leaving only high-level elements. When you set it to a lower level, fine elements are applied while increasing noise.
	H/V Ratio –99 to +99 (±**0**)	Adjust the horizontal-to-vertical ratio of detail elements. A higher value makes the vertical elements increased with respect to the horizontal elements.
	White Limiter –99 to +99 (±**0**)	Limit the white details.
	Black Limiter –99 to +99 (±**0**)	Limit the black details.
	V DTL Creation **Y** / NAM / G / G+R	Select the source signal to generate vertical details from among Y, NAM (G or R whichever is higher), G, and G+R.
	Knee APT Level –99 to +99 (±**0**)	Adjust the knee aperture level (level of details to be applied to the sections above the knee point).

PICTURE PROFILE SET

Items	Subitems and setting values	Contents
Knee Adjusting the knee level	Setting **On** / Off	Set to "On" to compress the high-luminance area of the picture. **Note** Knee is fixed and cannot be changed when the electric shutter is in SLS or EXSLS mode.
	Auto Knee **On** / Off	Set to "On" to automatically set the best knee conditions according to the luminance level of the picture. With "Off" the knee conditions can be manually adjusted independently of the luminance level of the picture.
	Point 50 to 109 (**90**)	Set the knee point when Auto Knee is "Off."
	Slope –99 to +99 (±**0**)	Set the knee slope (volume of compression) when Auto Knee is "Off."
	Knee SAT Level 0 to 99 (**50**)	Adjust the knee saturation level for the area over the knee point.
Gamma Adjusting the gamma compensation level and selecting the gamma curve	Level –99 to +99 (±**0**)	Adjust the gamma compensation level.
	Select Type1 / Type2 / **Type3** / Type4	Select one of the four types of the preset reference curve provides for gamma compensation.
Black Adjusting the black	–99 to +99 (±**0**)	Adjust the master black level.
Black Gamma Adjusting the black gamma level	–99 to +99 (±**0**)	Adjust the level of black gamma function that emphasizes only the dark areas of the picture to clear the tones or on the contrary de-emphasizes it to reduce noise.
Low Key SAT Adjusting the low key saturation	–99 to +99 (±**0**)	Adjust the level of the low key saturation to heighten the colors only in the dark areas of the picture or pale them to reduce noise.
Copy Copying a picture profile	Execute / Cancel	Select "Execute" to copy. *For details, see "Copying the settings of a picture profile" (page 40).*
Reset Resetting a picture profile	Execute / Cancel	Select "Execute" to reset. *For details, see "Resetting a picture profile" (page 40).*

Shooting

When the unit starts, video being shot on this unit (camera output picture) is output from all of the video output connectors (VIDEO OUT, S-VIDEO OUT, Y,PB,PR OUT, DVI-D, and HD SDI OUT1, 2 connectors) on the CCU rear panel.



Viewing camera output pictures

Connect a video monitor to one of the video output connectors.

See "Connecting Video Monitors" (page 52) for details.

Adjusting camera output pictures

You can automatically adjust the white balance and the brightness.

To automatically adjust the white balance

Select ATW with the WHITE BAL button.
The white balance will be automatically adjusted.

For manual adjustment, see "Adjusting the White Balance" (page 34).

To automatically adjust the brightness

Press the AE button, lighting it.
The brightness will be automatically adjusted by AGC (auto gain control) and Auto Shutter setting.

For manual adjustment, turn the AE function off. For details, see "Adjusting the Brightness" (page 36).

You can use a registered picture profile to adjust camera output pictures.

For details, see "Picture Profiles" (page 39).

Freezing a frame of the camera output picture

Press the FREEZE/FLASH button to light it.

Notes

- The camera output picture cannot be frozen when the unit is in one of the following states.
  - The Lock button is turned on.
  - While the initial setting display is being displayed.
  - "Color Bar Type" is set to anything other than "Off".
  - "Shutter" >"Mode" is set to "EXSLS".
  - While an error or prompt message is being displayed.
  - Setting for an item in the Picture Profile menu or in a Setup menu is being changed.
  - While a setting change is being executed.
- Picture breakup occurs if you freeze the camera output while the unit is genlocked.

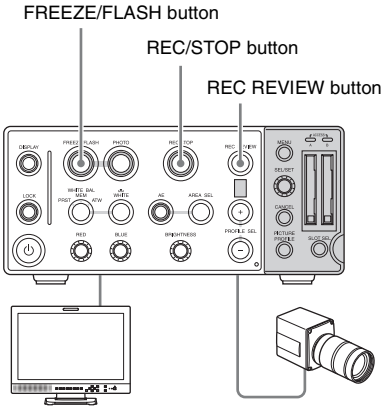
To cancel freeze

Press the FREEZE/FLASH button again, turning it off.

Using the foot switch and synchronizing with a flash unit, you can freeze a camera output picture. See "Shooting with a Flash Unit" (page 56) or "Shooting with a Foot Switch" (page 57).

Recording Video

You can record camera output pictures as video files (clips) on a memory card. When this unit is started with an available memory card, the unit enters the STBY (recording standby) mode.



1 Display the frame at which you will start recording in the monitor screen, and press the REC/STOP button to light it.

Recording starts.

2 Press the REC/STOP button again to turn it off.

Recording stops.
Video from the frame at which recording started to the frame at which recording stopped is stored as "clip".

For details on clips and clip names, see "Clip (recording data) and clip name" (page 32) and "Notes on clips" (page 33).

To record a clip of a freeze picture

Press the FREEZE/FLASH button during recording, the frame being recorded is frozen and stored as clip.

Checking the recorded clip (Rec Review)

Press the REC REVIEW button.
The last three seconds of the most recently recorded clip play in the monitor screen.

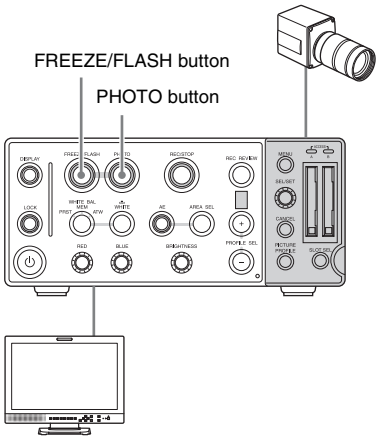
When the clip has played to the end, the unit enters STBY (recording standby) mode.

Note

If you change the Video Format setting after recording a clip, it is not possible to review the clip recorded before the Video Format setting is changed.

Recording Still Images

You can record camera output pictures as still images on a memory card. When this unit is started with an available memory card, the unit enters the STBY (recording standby) mode.



When recording still images, set the bit rate to "HQ" with "Video Format" *(see page 63)* in the OTHERS menu.

1 Display a desired frame in the monitor screen, and press the FREEZE/FLASH button to light it.

The frame freezes.

2 Press the PHOTO button.

The button is turned on and recording of the still image starts. A progress indication (by %) appears in the monitor screen.
When the recording completes, the button is turned off and a message appears. (It may take several minutes to complete recording.)

3 To record the same frame again, repeat step 2. To record another frame, unfreeze the current frame by pressing the FREEZE/FLASH button again then go to step 4.

4 Repeat steps 1 to 3 to record desired still images.

For details on the file names of still images and the directory in which they are stored, see "Image file and directory names" (page 33).

Deleting Clips

The Last Clip DEL function for deleting the last recorded clip and the All Clips DEL function for deleting all clips from a memory card are available.

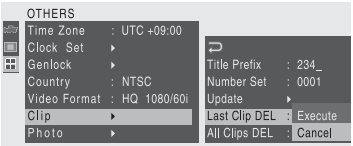
Note

In the subsequent operations, it is not possible to delete while checking individual clips. Also, it is not possible to restore clips that have been deleted. Always check the contents of the clip before operating.

Deleting the last recorded clip

Using Setup menu, the last recorded clip is easily deleted.

1 Select “Last Clip DEL” from “Clip” of the OTHERS menu.



2 Select “Execute.”

The confirmation message is displayed.

3 Select “Execute” again.

The last recorded clip is deleted from the memory card.

For details on menu operations, see “Basic Menu Operations” on page 59.

Deleting all clips

Using the Setup menu, you can delete all recorded clips from the memory card in the selected card slot.

1 Select “All Clips DEL” from “Clip” of the OTHERS menu.

2 Select “Execute.”

The confirmation message is displayed.

3 Select “Execute” again.

All the clips are deleted from the memory card.

Storing/Retrieving the Setting Data

You can store all the menu settings (including picture profiles) as a setup file on an SxS memory card.
By retrieving the stored setup file, the proper setup condition can be immediately obtained.
For the setup file operations, use “Camera Data” of the OTHERS menu.

Note

The Clock Set, Time Zone, Color BarType values are excluded.

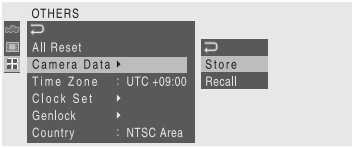
Storing the setup file

Only one setup file can be stored on one SxS memory card.

1 Insert a memory card on which you wish to store the setup file to a card slot.

Check that the media indication *(see page 29)* corresponding to the slot is displayed on the screen. If a memory card in the other slot is selected, press the SLOT SEL button to switch.

2 Select “Camera Data” from the OTHERS menu.



3 Select “Store.”

“Cancel” and “Execute” appear to the right.

4 Select “Execute.”

Writing of data to the memory card begins.

An in-progress message is displayed during writing. When writing is completed, a completion message is displayed.

Notes

- If a setup file already exists on the memory card you specified in Step 1, a message to confirm whether to overwrite the file is displayed.
- If there is not sufficient space on the memory card, an error message is displayed.

Retrieving the setup file

When you retrieve the stored setup file, the settings on this unit are changed according to the file.

1 Insert the memory card on which you stored the setup file into a card slot.

Check that the corresponding memory card icon is displayed in the monitor screen. If a memory card in the other slot is selected, press the SLOT SEL button to switch.

2 Select “Camera Data” from the OTHERS menu.

3 Select “Recall.”

“Cancel” and “Execute” appear to the right.

4 Select “Execute.”

Reading of data from the memory card begins.

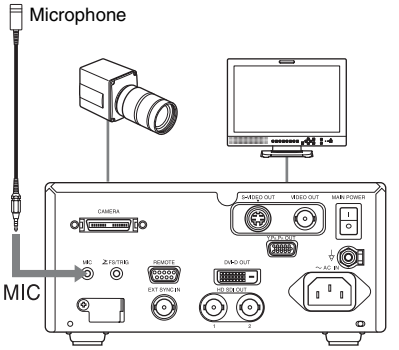
An in-progress message is displayed during data reading. When the read-out is completed, a completion message is displayed. The settings have been changed according to the setup file.

Resetting to the standard values

The current settings you made through various menu and button operations can be collectively returned to the standard statuses (factory-default value) by executing “All Reset” of the OTHERS menu.

Audio Recording

You can record audio input via a microphone to the MIC jack while recording video (clips).



By pressing the DISPLAY button to turn on the information display, you can display the audio level meters *(see page 30)* in the monitor screen (when "Audio Level Meter" of "Display On/Off" in the VIDEO SET menu is set to "On").

Notes

- The factory-default setting for display of audio level meters is Off. If you want to display the audio level meters, select "Display On/Off" *(see page 62)* in the VIDEO SET menu and set "Audio Level Meter" to "On".
- When a microphone is not connected to the MIC connector, the audio level meters may be inaccurate by about three dots because of noise.

Selecting the audio channels to record

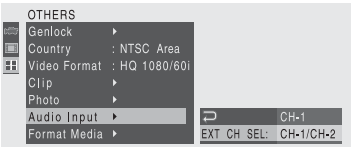
This unit can record up to two channels of uncompressed (Linear PCM) audio. You can select the channel or channels to record with Audio Input in the OTHERS menu.

1 Display the OTHERS menu, and select "Audio Input".

See "Basic Menu Operations" (page 59) for information about menu operations.

2 Press the SEL/SET knob.

3 Turn the SEL/SET knob to set "EXT CH Select" to "CH-1" or "CH-1/CH-2", and then press the knob.

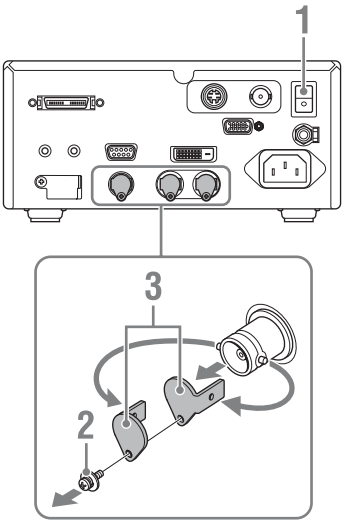


CH-1: Record the signal input to channel 1 on both channel 1 and channel 2.

CH-1/CH-2: Record the signal input to channel 1 on channel 1, and record the signal input to channel 2 on channel 2.

Removing the Connector Covers

When the unit is shipped from the factory, connector covers are attached to the HD SDI OUT 1, 2 connectors and EXT SYNC IN connector. To use one of these connectors, remove the cover as follows.



1 Turn off the MAIN POWER switch.

2 Remove the screw of the connector cover, using a screwdriver that matches the grooves of the screw.

3 Remove the connector cover.

Note

Save the screws 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.

Connecting Video Monitors

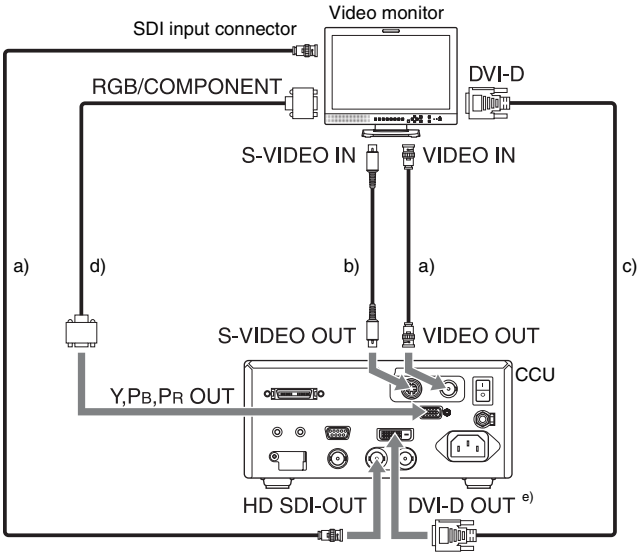
The camera output picture is output from all of the video output connectors (VIDEO OUT, S-VIDEO OUT, Y,PB,PR OUT, DVI-D OUT, and HD SDI OUT1, 2 connectors) on the CCU rear panel. You can check the video by connecting a monitor that supports the respective output signal to any of the connectors.

Signals output from those connectors can contain superimposed text information, including menu settings, and alarm messages. You can supply a video monitor with any of those signals to view the text information.

For details, see "Screen Display Settings" (page 29).

Notes

- Be sure to turn the MAIN POWER switch off when you connect a cable.
- Connect a video monitor to each connector only via a cable. If you use a conversion adaptor, the camera output picture is not output correctly.



a) 75Ω coaxial cable
b) S-video cable
c) DVI cable
d) Component video cable with D-sub and BNC connectors
e) Select the output video format in "DVI Out Select" *(see page 61)* of the VIDEO SET menu.

To select the output mode (aspect ratio) for SD signal

When using an SD signal down-converted for output from the VIDEO OUT and S-VIDEO OUT connectors, you can select the output mode in "Down Converter" *(see page 61)* of the VIDEO SET menu.

Squeeze: To horizontally reduce a 16:9 picture to output a 4:3 picture

Letterbox: To mask the upper and lower areas of a 4:3 picture to display a 16:9 picture in the center of the screen

Edge Crop: To cut the both sides of a 16:9 picture to output a 4:3 picture

Operating Clips/Still Images with a Computer

The clips recorded on SxS memory cards with this unit can be controlled on a computer or edited using the optional nonlinear editing software. For these purposes, the clips/still images on an SxS memory card can be operated by directly loading the card in a unit or by connecting the unit or an SxS memory card USB reader/writer to the computer, using a USB cable as shown below.

Preparations

To use the ExpressCard slot of a computer

If the computer is equipped with an ExpressCard/34 or ExpressCard/54 slot, you can directly insert the SxS memory card containing clips/still images recorded with this unit and access to the files.

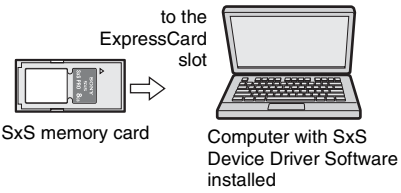
For the operating requirements for the computer, see "Using the Software" on page 14.

Note

The SxS Device Driver Software on the CD-ROM labeled "Utility Software for Solid-State Memory Camcorder and Recorder" must be installed on your computer. Before installation, be sure to read the enclosed SxS Device Driver Software End-User License Agreement.

For information on installation of the driver, refer to the ReadMe on the supplied CD-ROM.
For support information for the driver, visit the following URL:

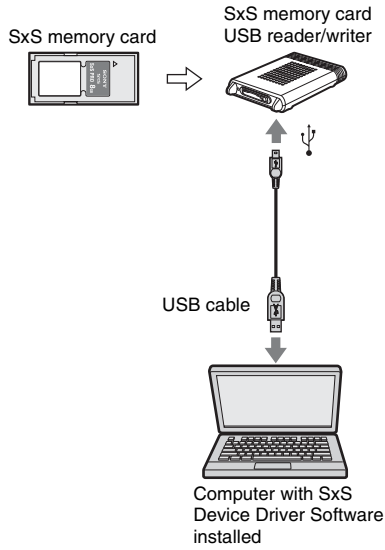
http://www.sony.net/SxS-Support/



With a Windows computer, check that a Removable Disk appears in My Computer. This indicates normal status.
With a Macintosh computer, an icon is displayed on the menu bar.

To use with an SxS memory card USB reader/writer

When you connect an SxS memory card USB reader/writer using a USB cable, the memory card in the slot is acknowledged as an extended drive by the computer.



Note

When connecting the USB cable to the computer, be careful to check the form and direction of the USB connector.

To check the connection

With Windows, check that the memory card is displayed as a removable disk in My Computer. With Macintosh, check that a "NO NAME" or "Untitled" folder was created on the desktop. This indicates that the connection is active. (The folder name on the desktop of the Macintosh computer can be changed as needed.)

Note

The following operations must be eliminated when the access lamp is lit to show writing is in execution.

- Turning the power off or disconnecting the power cord
- Removing the SxS memory card
- Disconnecting the USB cable

When using an SxS memory card USB reader/writer, refer to the operating instructions for it.

Removing an SxS memory card

Windows

1. Click on the icon of “Safely Remove Hardware” on the task bar of the computer.
2. Select “Safely remove SxS Memory Card - Drive(X:)” from the displayed menu.
3. Check that the Safe To Remove Hardware message appears then remove the card.

Macintosh

Drag the SxS memory card icon on the desktop to Trash.
If the SxS memory card icon is located on Finder, click on the eject icon on its side.

Note

Do not select “Card Power Off” from the SxS memory card icon displayed on the menu bar.

Using the XDCAM EX Clip Browsing Software

To copy clips to the local disk of a computer, the XDCAM EX Clip Browsing Software must be used.
Install the XDCAM EX Clip Browsing Software on the CD-ROM labeled “Utility Software for Solid-State Memory Camcorder and Recorder” to your computer.
Although the data regarding recorded materials are stored over multiple files and folders, you can easily handle the clips without considering such data and directory structure by using the XDCAM EX Clip Browsing Software.

Note

If you operate, e.g. copy or delete the clips on the SxS memory card by using the Explorer (Windows) or Finder (Macintosh), the subsidiary data contained by the clips may not be maintained. To avoid such a problem, use the XDCAM EX Clip Browsing Software.

See page 14 for the operating requirements, and refer to the User’s Guide contained in the CD-ROM.

For support information on the XDCAM EX Clip Browsing Software, visit the web site shown on the cover page of the CD-ROM.

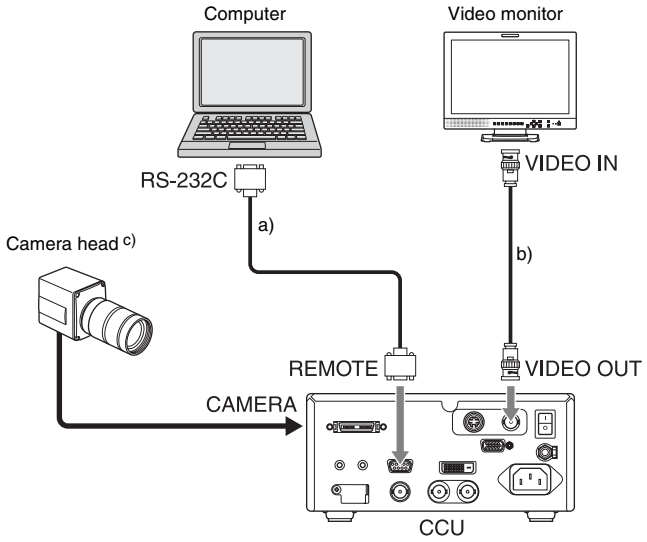
Using image editing software

To edit JPEG still images on your computer, use Windows Explorer to copy them to your computer’s local hard disk and then edit them with a preinstalled or commercial image editing program.
The still image file format complies with the DCF 2.0 standard, which specifies a camera file system, and with the Exif 2.2 and Exif 2.21 image file format standards for digital still cameras.
Still image files are stored in the directory / DCIM/XXXEXDCF/ (where XXX is a three-digit number specified with “Photo” >“Number Set” *(see page 63)* in the OTHERS menu).

Operating the Unit with a Computer

You can operate this unit with a computer connected via the RS-232C interface.

For details on RS-232C protocols and cables for connection between this unit and a computer, contact your Sony dealer or your Sony service representative.



a) 9-pin remote control cable
b) 75Ω coaxial cable
c) For connecting the camera head, see page 20

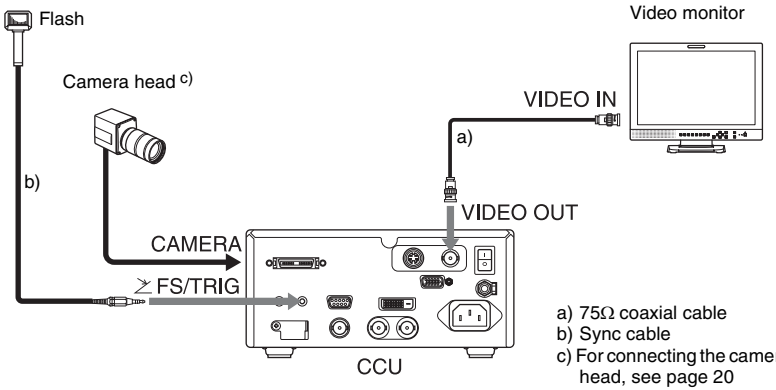
Shooting with a Flash Unit

You can connect a flash to this unit and freeze the camera output picture while the flash is lit.

Note

If "Flash" is set to "On" when "Shutter" >"Mode" is set to "SLS" or "EXSLS" in the Picture Profile menu, "Shutter" >"Mode" is set automatically to "Off".

For details on usable flash units, contact your Sony dealer or your Sony service representative.



Shooting with flash

1 In the currently active Picture Profile menu, set "Flash" to "On".

See "Registering and recalling picture profiles" (page 39) for information about how to recall picture profiles. See "Basic Menu Operations" (page 59) for information about menu operations.

2 Make the following setting under "Photo" in the OTHERS menu.

Flash TRG: Flash trigger mode (CMOS or OPEN_CL)

Num of Frames: Number of accumulated frames for flash execution (4 or 6)

Delay: Delay on flash execution.
When Num of Frames is 4, set 0 and 1 to 8. When Num of Frames is 6, set 0 and 1 to 12.

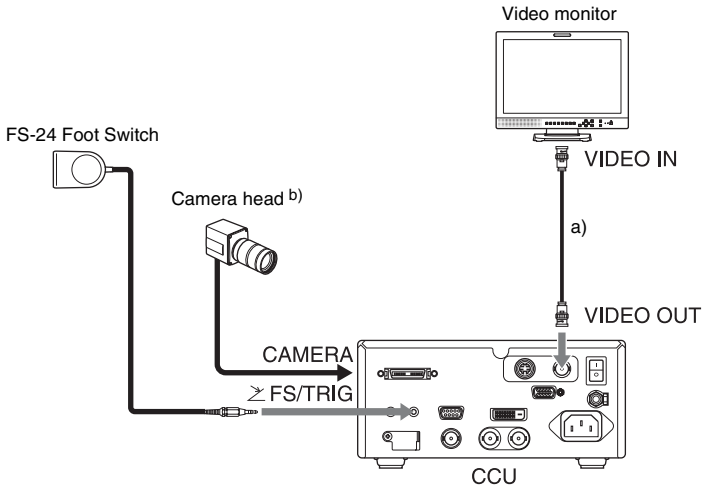
Number Set: Number of the directory in which to store the recorded image files (100 to 999)

See "Basic Menu Operations" (page 59) for information about menu operations.

3 Press the FREEZE/FLASH button to light it.

Shooting with a Foot Switch

You can connect a foot switch to this unit and use it for the same operations as the FREEZE/FLASH button and the PHOTO button.



a) 75Ω coaxial cable
b) For connecting the camera head, see page 20

Shooting with the foot switch

You can freeze the camera output picture by pressing the foot switch and releasing it immediately (the same operation as the FREEZE/FLASH button *(see page 45)*). With the camera output picture frozen, you can then record a still picture by pressing the foot switch for two seconds or longer (the same operation as the PHOTO button *(see page 47)*).

Note

The same function as the PHOTO button (see above) is enabled when “Flash” is set to “Off.” (When “Flash” is set to “On,” only the same function as the FREEZE/FLASH button is enabled.)

Overview of the Setup Menus

This unit permits you to make various settings for recording with Setup menus in the monitor screen.

For connections of a video monitor, see "Connecting Video Monitors" on page 52.

Setup menu configuration

The following menu icons are displayed when you press the MENU button, permitting you to select the corresponding menus.

CAMERA SET menu

For setting the items related to recording other than those on picture quality *(page 61)*.

The picture-quality items are set with the Picture Profile menu *(page 41)*.

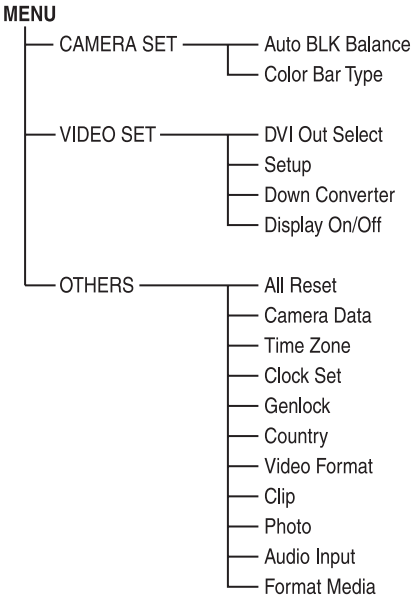
VIDEO SET menu

For setting the items related to video outputs *(page 61)*.

OTHERS menu

For setting the other items *(page 62)*.

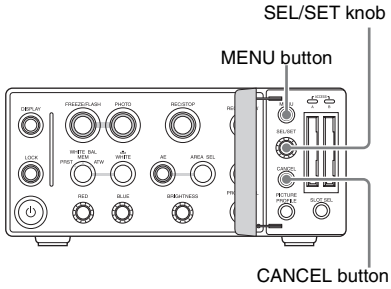
Setup menu layers



Basic Menu Operations

This section covers basic operations for setting the Setup menu items.

Menu controls



MENU button

To turn the Setup menu display on/off.

SEL/SET knob

When you turn it, the cursor moves in the corresponding direction, permitting you to select menu items or setting values. When you press it, the selected value or setting is confirmed, or the selected operation is executed.

CANCEL button

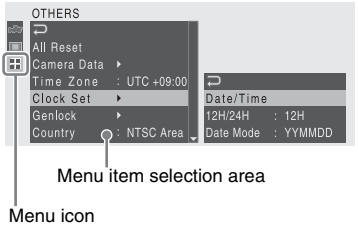
To return to the previous layer of the menu. An uncompleted change is canceled.

Displaying the Setup menu

Press the MENU button.

The menu icons appear in the monitor screen. The cursor is displayed on the icon of the menu used last, and the corresponding menu item selection area is displayed to the right.

Example: When the cursor is located at (OTHERS menu icon)



Setting the Setup menus

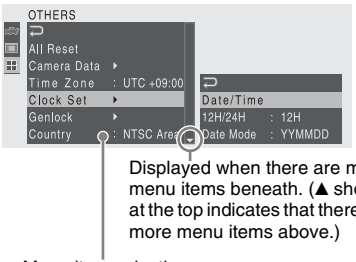
1 Turn the SEL/SET knob to set the cursor to the icon of the menu you wish to set.

The selectable menu items are displayed in the menu item selection area to the right of the icon.

2 Press the SEL/SET knob.

The cursor moves to the menu item selection area.

- The menu item selection area can show 7 lines at maximum. When all the selectable items cannot be displayed at one time, you can scroll the display up or down by moving the cursor.
- A triangle appears at the upper or lower right corner of the menu item selection area to indicate that scrolling is enabled.

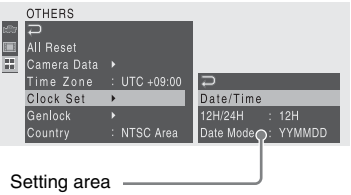


- A ▶ symbol is displayed to the right of any item that has subitems.
- The current setting value is displayed to the right of an item that has no subitems.
- To return to the previous layer, select ⮌ or press the CANCEL button.

3 Turn the SEL/SET knob to set the cursor to set the cursor to the menu item

you wish to set then press the knob to proceed.

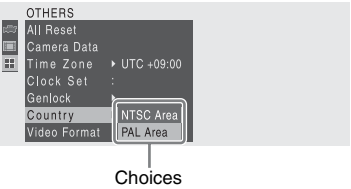
The setting area appears to the right of the menu item selection area, and the cursor moves to the top of its subitems.



- The subitems and their current values are displayed.
- To return to the previous layer, select ⮌ or press the CANCEL button.

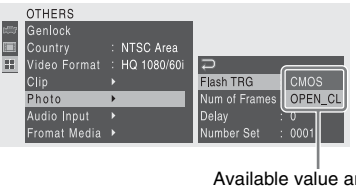
When you select an item that has no subitems and to be only On /Off or switched, the choices are displayed to the right of the item. In this case, proceed to step **5**.

Example



4 For the item that has subitems, turn the SEL/SET knob to set the cursor to the subitem you wish to set then press the knob to proceed.

The available values of the selected subitems are displayed, and the cursor moves to the current value.



- The available value area can show seven lines at maximum. When all the selectable values cannot be displayed at one time, you can scroll the display up or down by moving the cursor.
  A triangle appears at the upper or lower right corner of the available value area to indicate that scrolling is enabled.
- For items having a wide range of available values (example: –99 to +99), the available value area is not displayed. The current setting is highlighted instead, indicating that the setting is ready for change.

5 Select the desired value by turning the SEL/SET knob to make the setting.

The setting is changed, and the new setting is displayed.
When you select “Execute” for an execution item, the corresponding function is executed.

For an item that requires your confirmation

When you select an item that you must confirm before execution in step **3**, the menu display temporarily disappears, and a confirmation message is displayed. Following the instructions of message, specify whether to execute or cancel.

Entering a character string

When you select an item for which a character string, such as a time value or filename, is to be specified, the input area for the character string is highlighted, and “SET” appears at the right end.

1 Select characters by turning the SEL/SET knob then press the knob to proceed.

The cursor moves to the next column.

2 Perform setting in the same manner up to the last column/digit.

The cursor moves to “SET.”

3 Press the SEL/SET knob.

The setting is completed.

Terminating the menu operation

Press the MENU button.

The normal camera output picture is resumed.

Setup Menu List

The functions and available settings of menus are listed below.
The factory-default values are shown in bold face (example: **1080i**).

CAMERA SET menu

CAMERA SET

Menu items	Subitems and setting values	Contents
Auto BLK Balance Execute of auto black balance	Execute/Cancel	Select "Execute" to adjust the black balance automatically. **Note** Set Video Format to HQ 1080/60i before executing this item.
Color Bar Type Selecting on/off of the color bar output the type of color bars	Multi / 75% / 100%/**Off**	Turn the color bar output on or off and select the type of color bars. Multi: To output multiformat color bars 75%: To output 75% color bars 100%: To output 100% color bars Off: To not output any color bar

VIDEO SET menu

VIDEO SET

Menu items	Setting values	Contents
DVI Out Select Setting the from the DVI-D OUT connector output	**1080i** / 1080P	Select the format of the video signal output from the DVI-D OUT connector.
Setup Setting 7.5% setup for the composite signal	On / **Off**	Set whether to add 7.5% setup to the output signal from the VIDEO OUT connector when a format of NTSC is selected (Invalid when a format of PAL is selected).
Down Converter Selecting the operation mode of the down converter	**Squeeze** / Letterbox / Edge Crop	Set the output mode (aspect) for SD output from the VIDEO OUT and S-VIDEO OUT connectors. Squeeze: To horizontally reduce a 16:9 picture to output a 4:3 picture Letterbox: To mask the upper and lower areas of a 4:3 picture to display a 16:9 picture in the center of the screen Edge Crop: To cut the both sides of a 16:9 picture to output a 4:3 picture

VIDEO SET		
Menu items	**Setting values**	**Contents**
Display On/Off Selecting the items to be displayed in the monitor screen	Audio Level Meter On / **Off**	Turn the audio level meters on/off.
	Timecode **On** / Off	Turn the timecode indication on/off.
	Rec Status **On** / Off	Turn the operation status indication on/off.
	Media Remain **On** / Off	Turn the media remaining capacity indication and media indication (icon showing media connection status) on/off.
	AE Mode **On** / Off	Turn the AE function indication on/off.
	AE Level **On** / Off	Turn the AE level and BRIGHTNESS knob setting indication on/off.
	White Balance Mode **On** / Off	Turn the white balance mode indication on/off.
	Picture Profile **On** / Off	Turn the picture profile indication on/off.
	RB Gain **On** / Off	Turn the R and B gain offset indication on/off.
	Total Gain **On** / Off	Turn the total gain indication on/off.
	Shutter Setting **On** / Off	Turn the shutter indication on/off.
	Video Format **On** / Off	Turn the recording format indication on/off.

OTHERS menu

OTHERS		
Menu items	**Subitems and setting values**	**Contents**
All Reset Resetting to the factory status	Execute/Cancel	Select “Execute” to reset the unit to the factory status.
Camera Data Storing/recalling the menu settings	Store Execute/Cancel	Select “Execute” to store the setting values in an SxS memory card.
	Recall Execute/Cancel	Select “Execute” to retrieve the setting values from an SxS memory card.
Time Zone Setting the time difference	UTC –12:00 to +14:00 **(+9:00)**	Set the time-zone difference from UTC in steps of 30 minutes.
Clock Set Setting the built-in clock	Date/Time	Set the current time and date.
	12H/24H 12H / **24H**	Select the display mode of time. 12H: 12-hour mode 24H: 24-hour mode
	Date Mode **YYMMDD** / MMDDYY / DDMMYY	Select the display mode of the date. YYMMDD: In sequence of year, month, day MMDDYY: In sequence of month, day, year DDMMYY: In sequence of day, month, year

OTHERS

Menu items	Subitems and setting values	Contents
Genlock Setting the genlock phase	GL H Phase –999 to +999 **(±0)**	Set the H phase for genlock.
	H Advance **0H** / 90H	Set the V phase for genlock 90H: When the reference signal is SD, the HD SDI output phase is advanced 90H. When the reference signal is HD, the HD SDI output phase is synchronized and the SD output phase is delayed 90H. 0H: The HD SDI and SD output phases are synchronized to the reference signal.
Country Setting the area for use	**NTSC Area** / PAL Area	Select the color system for the area where you will use the unit. **Note** The output picture may fail to appear on your video monitor if this item is set incorrectly.
Video Format Selecting the recording format	Country: NTSC Area **HQ 1080/60i** SP 1080/60i Country: PAL Area HQ 1080/50i SP 1080/50i	Select the recording format (bit rate, picture size, frame rate, and scan system in combination). • Bit rate HQ or SP • Picture size Fixed to 1080 • Frame rate 50, or 60 • Scan system i (interlace)
Clip Setting for clip name or deletion	Title Prefix **nnn_** (nnn=least three digits of the serial number)	Set the first 4-alphanumeric part of the clip names. You can use upper- and lowercase alphabets, numerics 0 to 9, - (hyphen), and _ (underscore).
	Number Set 000l to 9999	Set the second 4-numeric part of the clip name.
	Last Clip DEL Execute / Cancel	Select “Execute” to delete the last recorded clip.
	All Clips DEL Execute / Cancel	Select “Execute” to delete all clips on the active SxS memory card. **Note** Clips to which OK mark is applied with the XDCAM EX Clip Browsing Software cannot be deleted.
Photo Setting for flash shooting and still image recording	Flash TRG **CMOS** / OPEN_CL	Select the flash trigger signal output mode. CMOS: Select the CMOS level. OPEN_CL: Select the open collector.
	Num of Frames **4** / 6	Set the number of frames accumulated for flash shooting
	Delay When “Num of Frames” is 4: **0** and integer numbers from 1 to 8 When “Num of Frames” is 6: **0** and integer numbers from 1 and 12	Set the delay for flash shooting
	Number Set 100 to 999 **(101)**	Set the directory number in which still images are stored.

OTHERS		
Menu items	**Subitems and setting values**	**Contents**
Audio Input Setting the audio input channel	EXT CH Select CH-1 / **CH-1/CH-2**	Select whether to record the signal input to channel 1 on both channel 1 and channel 2 or record the signal input to channel 1 on channel 1, and record the signal input to channel 2 on channel 2.
Format Media Formatting SxS memory cards	Media (A) Execute / Cancel	Select “Execute” to format the SxS memory card in slot A.
	Media (B) Execute / Cancel	Select “Execute” to format the SxS memory card in slot B.

Appendixes

Important Notes on Operation

On operation and storage locations

Store the unit in a level, ventilated place. Avoid operation or storage in any of the following places.

- Location subject to extremes of temperature (operating temperature range 0°C to 40°C (32°F to 104°F))
- Location subject to direct sunlight for long periods, or close to heating appliances (Note that the interior of a car left in summer with the windows closed can exceed 50°C (122°F).)
- Damp or dusty places
- Locations where the unit may be exposed to rain
- Location subject to severe vibrations
- Location near equipment generating strong electromagnetic emissions
- Location near transmitting stations generating strong radio waves

Avoid violent impacts

Dropping the unit, or otherwise imparting a violent shock to it, is likely to cause it to malfunction.

Do not obstruct ventilation openings

To prevent the unit from overheating, do not obstruct ventilation openings, by for example wrapping the unit in a cloth while it is in operation.

Do not leave the unit with the lens facing the sun

Direct sunlight can enter through the lens, be focused in the unit, and cause fire.

On cleaning

Remove dust and dirt from the surfaces of the lenses or optical filters using a blower.
If the casing or panel is dirty, wipe it gently with a soft dry cloth. In the event of extreme dirt, use a cloth steeped in a neutral detergent to remove the dirt, then wipe with a dry cloth. Applying alcohol, thinners, insecticides, or other volatile solvents may result in deforming the casing or damaging the finish.

On repacking and shipping

- Remove the memory cards before transporting the unit.
- Save the original shipping carton and packing material; they will come in handy if you ever have to ship your unit. For maximum protection, repack your unit as it was originally packed at the factory, and take care not to impart violent shocks in transit.

After use

Turn off the MAIN POWER switch to power off.

If not to be used for an extended period of time

Disconnect the unit from the AC power source.

Phenomena specific to CMOS image sensors

The following phenomena that may appear in images are specific to CMOS (Complementary Metal Oxide Semiconductor) image sensors. They do not indicate malfunctions.

White flecks

Although the CMOS image sensors are produced with high-precision technologies, fine white flecks may be generated on the screen in rare cases, caused by cosmic rays, etc.
This is related to the principle of CMOS image sensors and is not a malfunction.

The white flecks especially tend to be seen in the following cases:

- when operating at a high environmental temperature
- when you have raised the master gain (sensitivity)
- when operating in Slow-Shutter mode

Aliasing

When fine patterns, stripes, or lines are shot, they may appear jagged or flicker.

Flicker

If recording is made under lighting produced by discharge tubes, such as fluorescent, sodium, or mercury-vapor lamps, the screen may flicker,

colors may vary, or horizontal stripes may appear distorted.
In such cases, turn the Flicker-Reduction function on *(see page 38)*.
In some cases, such phenomena may not be improved with the Flicker-Reduction function.
It is recommend to set the electronic shutter speed to $^1/_{100}$ sec. in 50-Hz areas and to $^1/_{60}$ in 60-Hz areas.

Focal plane

Owing to the characteristics of the pickup elements (CMOS sensors) for reading video signals, subjects that quickly move across the screen may appear slightly skewed.
The luminance at the top and bottom of the screen may change when shooting a flashlight or a light source that quickly flashes.

Backup Battery

This unit uses a backup battery to retain various setting data.
A lithium battery (CR2032) for backup is mounted in the unit at the factory.
The backup battery retains the date, time, and timecode in Free Run mode even when no AC power is being supplied.

Service life of the backup battery

When the backup battery's voltage falls, the backup battery low-voltage warning appears in the monitor screen.
If this warning appears, replace the battery as soon as possible.

WARNING

- Battery may explode if mistreated.
  Do not recharge, disassemble, or dispose of in fire.
- Batteries shall not be exposed to excessive heat such as sunshine, fire or the like.

CAUTION

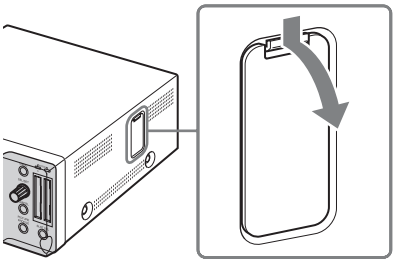
Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.
When you dispose of the battery, you must obey the law in the relative area or country.

Exchanging backup batteries

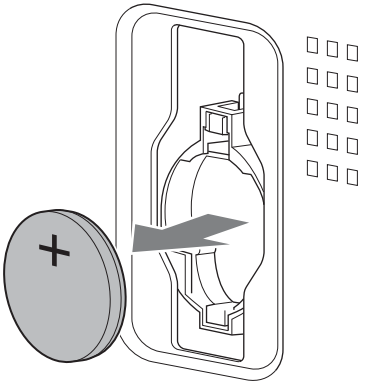
Note

Also turn the MAIN POWER switch off before exchanging backup batteries.

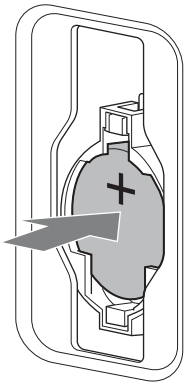
1 **Remove the cover of the backup battery compartment (CCU side panel) by pressing the protrusion on the cover down and pulling forward.**



2 **Press the battery down, hold it so that it does not pop out, and pull forward.**



3 **Insert a new backup battery (CR2032) with the + symbol on the battery facing outside.**



4 **Attach the cover in the original position.**

Troubleshooting

Operating power

Symptoms	Cause	Remedy
The unit does not power on when you press the On/Standby button.	The MAIN POWER switch on the CCU rear panel is turned off.	Turn on the MAIN POWER switch on the CCU rear panel.
	No AC power is being connected.	Connect the unit to AC power source.

Shooting

Symptoms	Cause	Remedy
No picture.	The camera head is not firmly connected to the CCU.	Check the camera head connection.
	The setting of “Country” in the OTHERS menu differs from the setting of your video monitor.	Correct the setting of “Country” *(see page 63)* in the OTHERS menu.
Picture breakup (the video does not display properly).	The camera head is not firmly connected to the CCU.	Check the camera head connection.
The screen goes white when you press the FREEZE/FLASH button to freeze the picture.	“Flash” in the Picture Profile menu is set to “On”, even though no flash unit is connected.	Connect a flash unit. If you are not using a flash unit, set “Flash” *(see page 43)* to “Off”.

Recording

Symptoms	Cause	Remedy
Clip recording does not start when you press the REC/STOP button.	The unit is not powered on.	Press the On/Standby button to start up the unit.
	The SxS memory card is write-protected.	Release the write protection *(page 25)*, or replace the card with a non-protected card.
	The SxS memory card is full.	Replace the card with one having sufficient space.
	The SxS memory card needs restoration.	Remove the card and insert it again *(page 28)*, or replace the card with a useable one.
No still image is recorded when you press the PHOTO button.	The unit is recording video.	Stop the video recording.
	“Video Format” item in the OTHERS MENU is set to “SP”.	Set “Video Format” *(see page 63)* to “HQ”.
The profile selection does not change when you press the PROFILE SEL + or – button during recording.	The current shutter mode is EXSLS.	Stop the recording before pressing the PROFILE SEL + or – button.
	The shutter mode of the picture profile that you want to select is EXSLS.	

Other troubles

Symptoms	Cause	Remedy
Button operations on the front panel have no effect.	The LOCK button is turned on.	Turn the LOCK button off.
	The unit is being controlled from a computer connected to the REMOTE connector.	Cancel control from the computer or disconnect the REMOTE connector, and then restart this unit.

Error/Warning Indications

The unit informs you of situations where warning, caution, or an operation check is required, through messages in the monitor screen. This unit does not emit warning sounds. (Warning sounds may be emitted from devices connected to this unit.)

Error indications

The unit stops operation after the following indications.

Error indication in the monitor screen	REC/STOP button	Cause and measures
E + Error code	Rapidly flashing	The unit may be defective. Turn off the power and consult Sony service personnel. (If power cannot be turned off by turning off the MAIN POWER switch, disconnect the unit from the AC power source.)

Warning indications

When one of the following indications is generated, follow the message to clear the problem The REC/STOP button flashes while an indication is being generated.

Warning indication in the monitor screen	Cause and measures
Media Near Full	Free space on the SxS memory card has become insufficient. Replace the card with another at the earliest opportunity.
Media Full	No space is left on the SxS memory card. Recording cannot be performed. Replace the card with another.
Backup Battery End Please Change.	The remaining power of the backup battery is insufficient. Replace the battery with a new one.
Unknown Media(A)[1)] Please Change.	A partitioned memory card or one that contains recorded clips exceeding the number permitted with this unit is loaded. This card cannot be used with this unit. Remove it and load a compatible card.
Media Error Media(A)[1)] Needs to be Restored	An error occurred with the memory card. The card requires restoration. Remove the card, load it again, and restore it.
Media Error Cannot Record to Media(A)[1)]	Recording cannot be done, as the memory card is defective. It is recommended to replace it with another card after copying the clips, as required.
Media Error Cannot Use Media(A)[1)]	Recording can be done, as the memory card is defective. It cannot be operated with this unit. Replace it with another card.
Media(A)[1)] Error	Recording cannot be done, as an error occurred with the memory card. If this frequently occurs, change the memory card.
Camera unit disconnected	No camera head is connected to the CCU. Connect the camera head to the CCU in the standby state, and restart the unit.
Capture Failed/Set New Photo Dir Number	No more still image files can be recorded in the directory or the specified number is already assigned to a directory with a different name. Set another directory number with Photo >Number Set in the OTHERS menu.

1) (B) for the card in slot B

Specifications

General

Power requirements
100 to 240V AC, 50/60Hz

Power consumption
0.60A-0.36A (recording)

Peak inrush current
(1) Power ON, current probe method: 62 A (240V)
(2) Hot switching inrush current, measured in accordance with European standard EN55103-1: 15 A (230V)

Operating temperature
0ºC to 40ºC (32ºF to +104ºF)

Storage temperature
–20ºC to +60ºC (–4ºF to +140ºF)

Operating humidity
20 to 80% (no condensation allowed)

Storage humidity
20 to 90% (no condensation allowed)

Operating pressure
700 hPa to 1,060 hPa

Storage pressure
700 hPa to 1,060 hPa

Recording formats

Video
HQ mode: MPEG-2 MP@HL, 35 Mbps / VBR
1920 × 1080/59.94i, 50i
SP mode: MPEG-2 MP@H-14, 25 Mbps /CBR
1440 × 1080 /59.94i, 50i

Audio
HQ mode: LPCM (16 bits, 48 kHz, 2 channels)

Recording time
With one SBP-8
SP mode: Approx. 35 min.
HQ mode: Approx. 25 min.
With one SBP-16
SP mode: Approx. 70 min.
HQ mode: Approx. 50 min.
With one SBP-32
SP mode: Approx.140 min.
HQ mode: Approx. 100 min.

Mass Camera head: 90 g (3.2 oz)
Camera control unit: 2.8 kg (6 lb 2.8 oz)

Dimensions (w/h/d)
Camera head: 35×45×50 mm (1 $^{7}/_{16}$× 1 $^{13}/_{16}$×2 inches)
Camera control unit: 200×88×240mm (7 $^{7}/_{8}$×3 $^{1}/_{2}$×9 $^{1}/_{2}$ inches)

Supplied accessories
See "Package Configuration" (page 12).

Camera head

Pickup device
$^{1}/_{2}$-inch type, CMOS image sensor
Effective picture elements:
1920 (H) × 1080 (V)

Format
3-chip RGB

Optical system
F2.2 or more (prism system)

Lens mount
C-mount

Sensitivity
F10 (Typical) (With 1080/60i, 89.9% reflection, 2000 lx)

Minimum illumination
0.14 lx (F1.9, +18 dB, 64-frame accumulation)

Video S/N
54 dB (Y) (Typical)

Horizontal resolution
1000TV lines or more (with HD SDI, HQ 1080 output)

Modulation
45% (27.5 MHz)

Black level
3±1% (when “Black” in the Picture Profile menu is set to±0)

Registration
0.02%

Gain 0 to 21 dB, AGC

Shutter speed
$^{1}/_{60}$ to $^{1}/_{16000}$ sec (when “Country” is set to “PAL”) or $^{1}/_{20000}$ sec (when “Country” is set to “NTSC”).

Slow shutter
2 to 8 frames
EX Slow Shutter: 16, 32, 64 frames

Camera cable connector
20-pin, round

Audio block

Sampling frequency
48 kHz

Quantization
16 bits

Headroom
20 dB

Frequency response
150 Hz to15 kHz (within ±3 dB)

Distortion
0.1% or less (with input level –40 dBu)

Media

Card slot type
Express Card34

Number of slots
2

Connector
Conforming to PCMCIA Express Card

Recording rate
50 Mbps or more

Loading rate
50 Mbps or more

Inputs/outputs (camera control unit)

Input connectors

MIC Stereo mini jack
Format: Supports stereo/monaural electret condenser microphones
Power: Supports both plug-in power types and battery/plug-in power types
Rated sensitivity: –58 dB (0 dB = 1 V/Pa, 1 kHz)
Rated impedance: 2 kΩ to 3 kΩ

EXT SYNC IN
BNC

Output connectors

VIDEO OUT
BNC, 1.0 Vp-p, 75 Ω, unbalanced

S-VIDEO OUT
mini-DIN 4-pin
Y: 1.0 Vp-p, 75 Ω, unbalanced, sync negative
C: 0.286 Vp-p (NTSC)/0.3 Vp-p (PAL). 75 Ω, unbalanced

Y,PB,PR OUT
D-sub 15-pin
Y: 1.0 Vp-p, 75 Ω
PB / PR: 0.7 Vp-p, 75 Ω

HD SDI OUT 1, 2
BNC, conforming to SMPTE292M standards

DVI-D OUT
DVI 19-pin

Input/output connectors

CAMERA
36-pin

FS/TRIG
Stereo mini jack

REMOTE
D-sub 9-pin, conforming to RS-232C

Other connector

⏚ Equipotential ground terminal

Optional accessories

CCMC-T05/T10/T15/T20 Camera Cable
FS-24 Foot Switch

Design and specifications are subject to change without notice.

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

Notes

- Always make a test recording, and verify that it was recorded successfully.
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- 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.

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