

**For Customer in China**

根据中华人民共和国信息产业部第39号令《电子信息产品污染控制管理办法》及标准中要求的“有毒有害物质或元素名称及含量”等信息，本产品相关信息请参考以下链接：

<http://pro.sony.com.cn>

**SONY**<sup>®</sup>

REF 4-179-820-01 (1)



4179820010

# 3CCD Color Video Camera

出版日期：2010年1月

Printed on recycled paper.

<http://www.sony.net/>

Sony Corporation  
Printed in Japan

## Instructions for Use

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

DXC-C33P

**ExwaveHAD**<sup>™</sup>

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# Owner's Record

The model and serial numbers are located on the side. Record these numbers in the spaces provided below.

Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

## WARNING

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

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

**WARNING  
THIS APPARATUS MUST BE  
EARTHED.**



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



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

### For the customers in the U.S.A.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to

radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

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

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

### For the customers in Canada

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

### 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.

## 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.

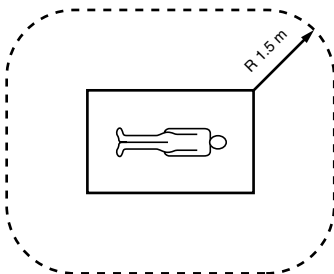
For any service or guarantee matters please refer to the addresses given in separate service or guarantee documents.

## 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.

This unit can not be used in the patient environment.

\* Patient Environment.



3. Do not touch the patient simultaneously while you are contacting with this 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. The leakage current could increase when connected to other equipment.
6. 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 CISPR 11, Class B, Group 1)

## Caution

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

## For the customers in Norway

This equipment can be connected to IT power distribution system.

## **Important EMC notices for use in the medical environments**

- The DXC-C33P 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 DXC-C33P.

### **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 DXC-C33P.

### Guidance and manufacturer's declaration-electromagnetic emissions

The DXC-C33P is intended for use in the electromagnetic environment specified below. The customer or the user of the DXC-C33P should assure that it is used in such an environment.

Emission test	Compliance	Electromagnetic environment-guidance
RF emissions CISPR 11	Group 1	The DXC-C33P 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 DXC-C33P 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 DXC-C33P 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 DXC-C33P is intended for use in the electromagnetic environment specified below. The customer or the user of the DXC-C33P 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 DXC-C33P requires continued operation during power mains interruptions, it is recommended that the DXC-C33P 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 DXC-C33P is intended for use in the electromagnetic environment specified below. The customer or the user of the DXC-C33P should assure that it is used in such as environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
<p>Conducted RF IEC 61000-4-6</p>	<p>3 Vrms 150 kHz to 80 MHz</p>	<p>3 Vrms</p>	<p>Portable and mobile RF communications equipment should be used no closer to any part of the DXC-C33P, including cables, than the recommended separation distance calculated from the equation appliance to the frequency of the transmitter.</p> <p><b>Recommended separation distance</b></p> <p><math>d = 1.2 \sqrt{P}</math></p> <p><math>d = 1.2 \sqrt{P}</math> 80 MHz to 800 MHz</p> <p><math>d = 2.3 \sqrt{P}</math> 800 MHz to 2.5 GHz</p>
<p>Radiated RF IEC 61000-4-3</p>	<p>3 V/m 80 MHz to 2.5 GHz</p>	<p>3 V/m</p>	<p>Where <math>P</math> is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and <math>d</math> is the recommended separation distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, <sup>a</sup> should be less than the compliance level in each frequency range. <sup>b</sup></p> <p>Interference may occur in the vicinity of equipment marked with following symbol:</p> <div style="text-align: center;">  </div>

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 DXC-C33P is used exceeds the applicable RF compliance level above, the DXC-C33P should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the DXC-C33P.

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 DXC-C33P**

The DXC-C33P is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the DXC-C33P can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (Transmitters) and the DXC-C33P 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.



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# Using the CD-ROM Manual

## Note

If you lose the CD-ROM disc or you cannot read it for some reason, you can purchase a new CD-ROM disc. Contact your nearest Sony dealer.

The supplied CD-ROM includes manuals for this imager (in English, French, German, Italian, Spanish, Dutch, Portuguese, Danish, Finnish, Norwegian, Swedish, Greek, Bulgarian, Czech, Hungarian, Polish, Romanian, Slovene, Slovak, Estonian, Latvian, and Lithuanian). The copies of these manuals are created in pdf (Portable Document Format).

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## Preparations

One of the following programs must be installed on your computer in order to use the operation manuals contained on the CD-ROM disc.

- 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.

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## Reading the CD-ROM Manual

To read the manual on the CD-ROM, proceed as follows.

- 1** Insert the CD-ROM disc in your CD-ROM drive.  
The manuals are saved in the Instructions For Use folder.
- 2** Select and click the manual that you want to read.

## 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.

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# Features

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## High-quality images

- The high density 1/3 type, three-chip Exwave HAD<sup>TM</sup>\* CCD<sup>\*\*</sup>, containing some 430,000 effective picture elements (pixels), offers superior picture quality: 850 TV lines of high horizontal resolution, high sensitivity of F8 at 2,000 lx, an excellent signal-to-noise ratio of 61 dB and a low smear level.

\* Exwave HAD<sup>TM</sup>: Exwave Hole-Accumulated Diode  
"Exwave HAD<sup>TM</sup>" is a trademark of Sony Corporation.

\*\*CCD: Charge-Coupled Device

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## Precise picture control functions by the adoption of LSI digital signal processing technology

- DynaLatitude processing enables you to adjust contrast finely according to the luminance signal level of each picture element.
- The DCC+ (Dynamic Contrast Control plus) function minimizes the phenomena whereby the whole screen turns white or a part of the image becomes colorless when shooting a very bright object.
- The Partial Enhance function enables you to adjust the sharpness and tint of only a specified color.

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## Compact and lightweight Remote Camera Head System

- The camera head is compact (38 × 32 × 40 mm (1 1/2 × 1 5/16 × 1 5/8 inches)) and very light (48 g (1.7 oz)), allowing easy mounting on a device which was difficult to be mounted.
- Versatile use of the camera is realized by connecting the camera head and the camera control unit with the optional camera cable, which enables you to extend the connecting distance up to 30 m (98 feet).

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## i.LINK (DV) digital interface equipped

Connecting a DVCAM format digital video cassette recorder to this camera allows you to make easy digital recording.

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## Freeze and long term exposure functions

By utilizing the built-in one frame memory (10 bits), freeze function and long term exposure function can be easily controlled.

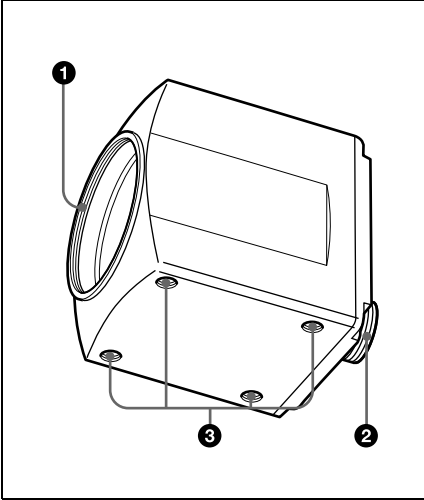
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## RS-232C interface

The camera can be controlled from a computer via the RS-232C interface. For details, contact your authorized Sony dealer.

# Location and Functions of Parts and Controls

## Camera Head



### ❶ Lens Mount

Attach a C-mount lens or microscope adaptor.

#### Note

Be sure to use a lens whose projected part from the lens mount surface is less than 4.3 mm (3/16 inches). Mounting the lens with a projected part greater than 4.3 mm (3/16 inches) may damage the internal mechanism of the camera.

### ❷ Camera cable connector (20-pin)

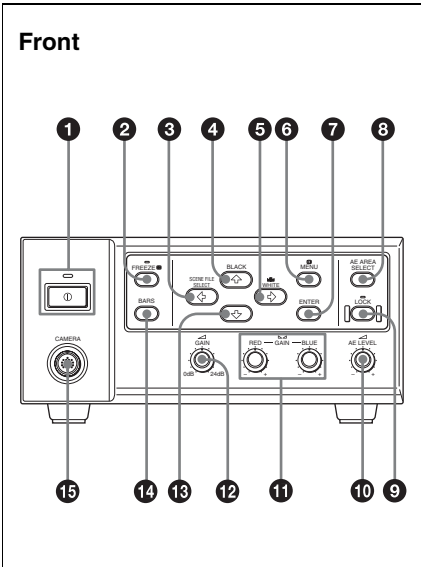
Connects to the CAMERA connector on the camera control unit with the optional CCMC-20P05/10/30 camera cable.

### ❸ Screw holes

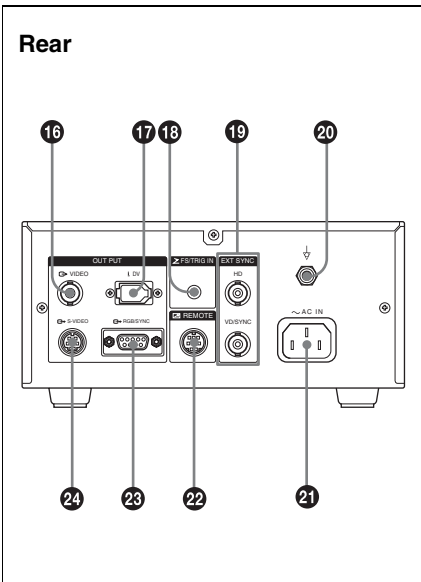
Use these holes (M3, depth: 3 mm (1/8 inches)) to attach the supplied tripod adaptor to the camera head for mounting the camera head on a wall, ceiling or tripod.

## Camera Control Unit

### Front



### Rear



#### 1 ① (power) switch and indicator

Press the switch down to turn on the power of the unit. The indicator lights in green. To turn off the power, press the switch again. The indicator turns off.

#### Note

Be sure to connect the camera head and camera control unit with the camera cable (not supplied) before you turn the camera on or off.

#### 2 FREEZE (❄️) button and indicator

Pressing this button stores an image in the built-in frame memory and outputs it as a freeze picture. When the freeze picture mode activates, the indicator lights. Pressing the button again turns off the indicator and cancels the freeze picture mode. The image currently shot is displayed on a monitor screen.

#### 3 ⬅️/FILE SELECT button

**While the menu is displayed:**

Decreases the setting value or changes the setting. Also use this button for an AE window setting, etc.

**While the normal screen is displayed:**

Switches the user preset file between A and B.

#### 4 ⬆️/BLACK (black balance) button

**While the menu is displayed:** Moves the menu cursor upward. Also use this button for an AE window setting, etc.

**While the normal screen is displayed:**

Activates the automatic black balance adjustment.

#### 5 ➡️/WHITE (white balance) button

**While the menu is displayed:** Increases the setting value or changes the setting. Also use this button for an AE window setting, etc.

**While the normal screen is displayed:**

Activates the automatic white balance adjustment when MODE is set to AWB in WHITE BALANCE menu.

**6**  **MENU button**

Displays the MAIN menu on a monitor screen. Press again to exit the menu. When a setting menu is displayed, press this button to return to the MAIN menu.

*For menu operations, see "Operation Through Menus" on page 17.*

**7** **ENTER button**

Selects a setting menu in the MAIN menu. Also use this button for an AE window setting, etc.

**8** **AE AREA SELECT button**

Selects the AE window set with the menu. Each press of the button selects the AE AREA 1 or AE AREA 2. The selected AE area is displayed on a monitor screen for about a second.

**Note**


The button functions only when GAIN is set to AGC or SHUTTER is set to CCD-IRIS.

**9** **LOCK button and indicator**

When you press this button to make the indicator light, no buttons on the camera control unit except for the ① (power) switch function. Pressing the button again turns off the indicator and cancels lock mode. You can use any button. The lock mode retains after the unit is turned off.

**10**  **AE LEVEL control**

Adjusts the auto exposure focusing point when the camera is set to AGC or CCD-IRIS mode. Turning the control clockwise increases the value, and turning it counterclockwise decreases the value.

When SHUTTER is set to KNOB, the shutter speed and video gain can be adjusted with this control. Turning it counterclockwise adjusts the shutter speed. Turning it clockwise adjusts the video gain. In KNOB setting, the  GAIN control does not function.

**11**  **GAIN RED/BLUE controls**

Use these controls for fine adjustment of white balance when AWB or ATW mode is selected. Also use them to adjust the red and blue gain when adjusting the white balance manually. Turning the control clockwise sets to the positive levels. Turning it counterclockwise sets to the negative levels.

**12**  **GAIN control**

Adjusts the gain level. Turning the control adjusts the level in the range from 0 to 24 dB.

**13**  **button**

Moves the menu cursor downward. Also use this button for an AE window setting, etc.

**14** **BARS (color bars output) button**

Outputs the color bar signal. Press again to revert to video signal output.

*For monitor adjustment, contact your authorized Sony dealer.*


**15** **CAMERA connector (20-pin)**


Connects to the camera cable connector on the camera head using the CCMC-20P05/10/30 camera cable (not supplied).


**16**  **VIDEO OUTPUT connector (BNC type)**

Outputs a composite video signal.

**17**  **DV connector (6-pin)**

The connector is especially designed to output signals in DV format that complies with i.LINK. Used to connect the video equipment equipped with the  DV connector.

\*  is a trademark of Sony Corporation and indicates that this product is in agreement with IEEE1394-1995 specifications and their revisions.

**18**  **FS/TRIG IN (Foot Switch/ Trigger input) connector (stereo minijack)**

Connects the optional foot switch.  
When the camera is in strobe mode, connects a commercially available slave unit.

**Note**

The foot switch must comply with Standard UL2601-1/EN60601-1.

*For details on the foot switch, consult with an authorized Sony dealer.*

**19** **EXT SYNC (external sync) (HD, VD/SYNC) connectors (BNC type)**

Inputs reference sync signals for synchronizing the camera operation.  
When using the internal sync signals, outputs the HD/VD or composite sync signals.

**20**  **Equipotential ground terminal**

Used to connect with the equipotential plug to bring the various parts of a system to the same potential.

*Refer to “Important safeguards/notices for use in the medical environments” on page 3.*

**21**  **AC IN socket**

Connects the supplied AC power cord.

**22**  **REMOTEconnector (mini DIN 8-pin)**

Connects to the RM-C950 remote control unit (not supplied).

**23**  **RGB/SYNC connector (D-sub 9-pin)**

Outputs RGB signals and their respective sync signals.

**24**  **S VIDEO OUTPUT connector (mini DIN 4-pin)**

Outputs an S video (Y/C video) signal.

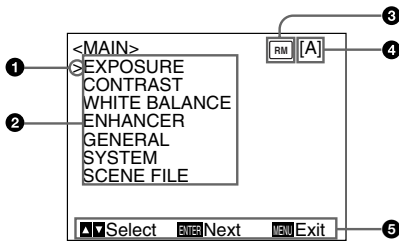
# About On-screen Menus

Camera operational settings can be changed through simple adjustment of the settings on the on-screen menus.

This section explains how to read the on-screen menu before starting menu operation.

*For the menu configuration of the camera, see page 52.*

## MAIN Menu



### 1 Cursor

Selects a setting menu or setting item. Move the cursor up or down using the  $\uparrow$  or  $\downarrow$  button.

### 2 Setting menu items

When you select the desired item with the  $\uparrow$  or  $\downarrow$  button and press the ENTER button, the setting menu for adjustment and setting is displayed.

### 3 Remote control unit indicator

Indicates when the RM-C950 remote control unit is connected to the  REMOTE connector on the rear of the camera control unit.

### 4 User preset file

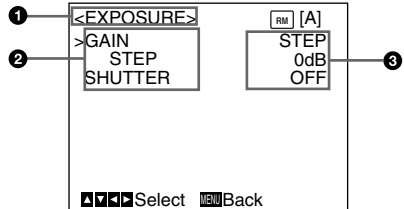
You can store two types of preset adjustments into files A and B. Indicates the currently selected preset file (A or B).

*For details, see “SCENE FILE Menu” on page 28.*

### 5 Operational message

Indicates how to operate the currently displayed menu.

## Setting Menu



### 1 Setting menu

Indicates the currently selected setting menu.

### 2 Setting items

Indicates the items that can be adjusted in each setting menu.

Select the item by moving the cursor beside it with the  $\uparrow$  or  $\downarrow$  button.

### 3 Set values

The currently set values are displayed. Change the values using the  $\leftarrow$  or  $\rightarrow$  button.

*For the initial set value on each item, see “Menu Configuration” on page 52.*




# Operation Through Menus

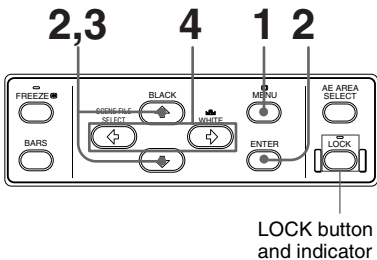
To change the settings on the menu, proceed as follows.


Some of the settings, however, cannot be adjusted on the menu. Use the controls on the front of the camera control unit to adjust them.

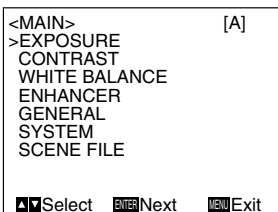
For details, see page 18.



## Note

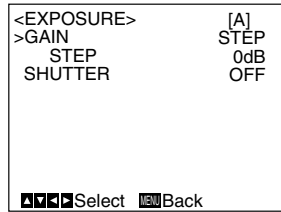
Before starting menu operation, make sure that the LOCK indicator on the front of the camera control unit is not lit. When it is lit, the menu will not be displayed even if you press the  MENU button. If the LOCK indicator lights, press the LOCK button to turn the indicator off, then operate the menu.





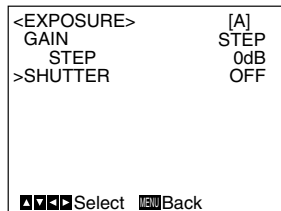
- 1 Press the  MENU button.  
The MAIN menu appears.





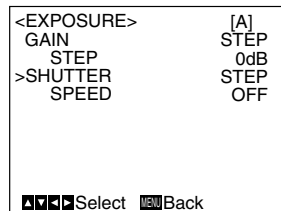
- 2 Move the cursor to the menu item to be set by pressing the  or  button, then press the ENTER button.  
The setting menu is displayed.





- 3 Move the cursor to the item to be adjusted by pressing the  or  button.



- 4 Change the value by pressing the  or  button.  
Holding down the button changes the value quickly.





## To reset to the initial set value

Select the item to be reset, then press the  and  buttons simultaneously.

For the initial set value on each item, see “Menu Configuration” on page 52.

## To return to the normal screen

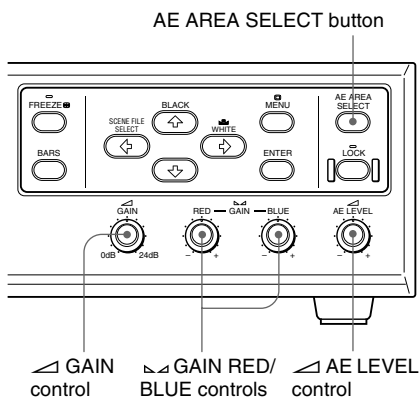
Press the  MENU button while the MAIN menu is displayed.

While each setting menu is displayed, press the  MENU button to return to the MAIN menu, then press it again to return to the normal screen.

## Adjusting the Setting Items With the Controls on the Front of the Camera Control Unit

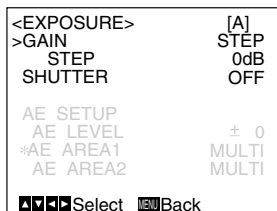
Use the controls on the front of the camera control unit to adjust some of the setting items such as gain and white balance.

For details on setting individual items, see the relevant menu pages.



## EXPOSURE Menu

The EXPOSURE menu is used to adjust the items relating to exposure, such as gain and shutter mode.



### GAIN

Adjusts the video gain.

### STEP

Select to set the video gain to the desired level.

### STEP

Adjust the gain level by turning the ∟ GAIN control on the camera unit control. The set value for STEP in the menu changes to the adjusted level. The adjustable level is within the range from 0 to 24 dB. You cannot adjust it using the menu.

### AGC

Automatically adjusts the gain according to the brightness of the object to be shot (Automatic gain control).

### LIMIT

Selects the maximum gain level to be adjusted to 6, 12, 18 or 24 dB.

### HYPER

Increases the video gain to about 30 dB.

## SHUTTER

Selects the electronic shutter modes.

---

### OFF

Any electronic shutter mode does not function.

---

### STEP

Select to set the shutter speed to any of 4 steps in long-exposure mode and 15 steps in high-speed mode.

---

### SPEED

Sets the shutter speed.

#### To set the shutter speed

- 1 Select SPEED by pressing the  $\uparrow$  or  $\downarrow$  button.
- 2 Display OFF by pressing the  $\leftarrow$  and  $\rightarrow$  buttons simultaneously.
- 3 Press the  $\leftarrow$  button to set the speed for long-exposure mode, or press the  $\rightarrow$  button to set it for high-speed mode.
- 4 Each press changes the shutter speed.

---

### VARIABLE

Use for fine adjustment of the video output level in units of 1 frame (long exposure mode) or in units of 1H (horizontal scanning time: 64.00  $\mu$ s) (clear scan mode).

In long exposure mode, for example, if you set to 10 frames (about 0.33 seconds), the video signal produced during this set time is output in the form of one complete frame at intervals of about 0.33 seconds. These pictures, which contain 10 frames of video information, are much brighter than normal one-frame images. This mode is useful for shooting a poorly illuminated object in a dark place.

The clear scan mode can be used for shooting computer displays with reduced horizontal bands appearing across the display screen. Adjust the value while observing the noise on the monitor screen so that you can obtain the image with minimum noise.

---

### SPEED

Sets the shutter speed.

#### To set the shutter speed

- 1 Select SPEED by pressing the  $\uparrow$  or  $\downarrow$  button.
- 2 Display OFF by pressing the  $\leftarrow$  and  $\rightarrow$  buttons simultaneously.
- 3 Press the  $\leftarrow$  button to set the speed for long-exposure mode, or press the  $\rightarrow$  button to set it for clear scan mode.
- 4 Each press changes the shutter speed.

#### To convert the value into the shutter speed

##### Long-exposure mode

Example: When the value is set to 5 frames  
 $5 \times 1/25 = 0.2000$  seconds

##### Clear scan mode

Example: When the value is set to 250H  
 $250 \times 64.00 \mu\text{s} (1\text{H}) + 35.0 \mu\text{s} (\text{constant})$   
 $= 16035.0 \mu\text{s} = \text{Approx. } 0.016$  seconds.

#### Note

Do not use AGC, CCD-IRIS, ATW, AWB DCC+ and DYNALATITUDE functions in long exposure mode.  
Set the gain level to 0 dB.

---

### CCD-IRIS

Automatically adjusts the luminance level for optimum output level. When incoming light is excessive, this function automatically adjusts the shutter speed to cut exposure equivalent to up to 10 aperture stops.

#### LIMIT

Sets the maximum shutter speed to be adjusted to 1/250, 1/500, 1/1,000, 1/2,000, 1/4,000, 1/10,000, 1/20,000, 1/40,000 or 1/100,000.

## KNOB

You can adjust the shutter speed and video gain with the  $\sphericalangle$  AE LEVEL control on the front of the camera control unit. With this setting, GAIN is locked to STEP and the  $\sphericalangle$  GAIN control does not function.

When the RM-C950 remote control unit is connected, you can use the IRIS control on the remote control unit to adjust the shutter speed and video gain.

## AE SETUP

Adjusts the auto exposure focusing point and selects the AE (Auto Exposure) window when the camera is set to AGC or CCD IRIS mode.

### Note

The setting items for AE SETUP are displayed only when GAIN is set to AGC or SHUTTER is set to CCD-IRIS.

## AE LEVEL

Adjust the auto exposure focusing point by turning the  $\sphericalangle$  AE LEVEL control on the camera control unit. The set value for AE LEVEL in the menu changes to the adjusted level. The adjustable level is within the range from -127 to +127. You cannot adjust it with the menu.

## AE AREA1/AE AREA2

Selects the AE window when the camera is set to AGC or CCD IRIS mode.

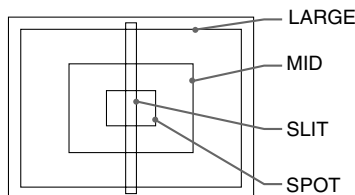
When a different AE window is set to each of AE AREA 1 and 2, you can select either by pressing the AE AREA SELECT button on the camera control unit. The \* mark appears beside the selected AE AREA in the menu. When the button is pressed while the menu is not displayed, the selected AE window is displayed on the monitor screen for about a second.

**MULTI:** Divides the screen into 9 sections and adjusts auto exposure according to the luminance level in each section. Normally set to this position.

### LARGE, MID, SPOT and SLIT:

Displays the following AE windows and adjusts auto exposure according to the

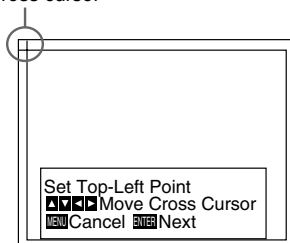
luminance level in each area. If the object you are shooting is very small, you can see it brighter with this setting to SPOT.



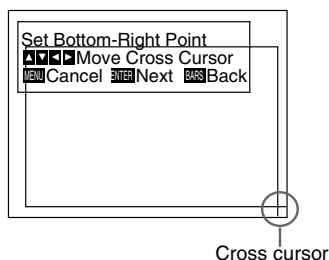
**MANUAL:** Sets the AE window manually with the desired size and position on the screen. Follow the steps below.

- 1 Select MANUAL and press the ENTER button.

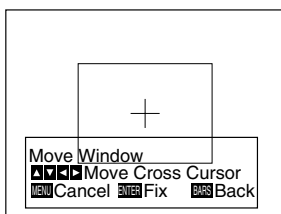
Cross cursor



- 2 Move the cross cursor appearing at the left top corner with the  $\leftarrow$ ,  $\rightarrow$ ,  $\uparrow$  or  $\downarrow$  button to set the upper and left side size, then press the ENTER button.



- 3 Move the cross cursor appearing at the right bottom corner with the  $\leftarrow$ ,  $\rightarrow$ ,  $\uparrow$  or  $\downarrow$  button to set the lower and right side size, then press the ENTER button.



- 4 Move the AE window to the desired position with the  $\leftarrow$ ,  $\rightarrow$ ,  $\uparrow$  or  $\downarrow$  button, then press the ENTER button.

#### Note

To cancel the setting before completing the procedure, press the MENU button.

### AE SPEED

Appears when you set AE AREA1 or 2 to an option other than MULTI.

Sets auto exposure focusing speed in AGC or CCD IRIS mode. Selects from **MID** (normal speed), **FAST** (fast speed) and **SLOW** (slow speed).

#### Note

If lens hunting occurs, adjust with AE SPEED.

### AE DETECT

Appears when you set AE AREA1 or 2 to an option other than MULTI.

Selects the detection method of the luminance level of the selected AE window.

**AVERAGE:** Selects to detect the average luminance level of the whole AE window.

**PEAK:** Selects to detect the part with the highest luminance level.

## CONTRAST Menu

The CONTRAST menu is used to adjust the contrast of the image.

<CONTRAST>	[A]
>EFFECT	MANUAL
KNEE POINT	MID
BLACK STRETCH	± 0
GAMMA	ON
LEVEL	± 0
MASTER PEDESTAL	± 0
R. PEDESTAL	± 0
B. PEDESTAL	± 0
[SELECT] Select	[MENU] Back

### EFFECT

Selects the setting suitable for the incident luminance levels.

### MANUAL

Selects KNEE POINT setting or BLACK STRETCH.

### KNEE POINT

Sets the knee point according to the incoming light levels.

**OFF:** Knee processing does not function.

**HIGH:** Sets the knee point to the highest level.

**MID:** Normally, select this position.

**LOW:** Sets the knee point to the lowest level.

### BLACK STRETCH

Adjusts the luminance of the dark portion of the screen.

You can set the value within the range from -10 to +10. The higher the setting, the brighter the screen.

### DCC+ (Dynamic Contrast Control +)

When shooting a very bright object, the whole screen may white out or a part of the image may be colorless. This setting minimizes these phenomena.

---

## DYNALATITUDE

Adjusts the contrast according to the luminance level of each picture element. The setting is useful for shooting scenes mixed with bright and dark parts.

You can set the level within the range from -10 to +10.

## GAMMA

Activates gamma compensation.

---

## OFF

Outputs the video signal linearly without gamma compensation. Use this setting when you want to produce images for image processing or image analysis.

---

## ON

Compensates the reproduction characteristics of a cathode-ray tube of a monitor to produce natural-tone image.

---

## LEVEL

Adjusts gamma so that you can obtain natural-tone image. Adjustable range is from -10 to +10.

## MASTER PEDESTAL

The pedestal levels of the G, B and R output signals can be adjusted simultaneously.

Adjusts the darkness level of the black part of the image. Use this function to bring out details in heavily shaded areas. Use of a waveform monitor allows easier adjustment. The adjustable range is from -127 to +127. The whole screen becomes whiter when you adjust the level in the direction of +.

The whole screen becomes blacker when you adjust the level in the direction of -. Normally set to  $\pm 0$ .

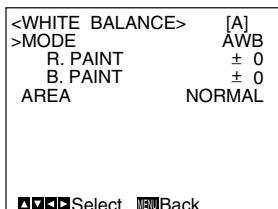
## R. (red) PEDESTAL, B. (blue) PEDESTAL

Use these items to finely adjust the pedestal level of each color. Adjust them while watching the monitor screen. The items can be finely adjusted within the range from -127 to +127.

---

# WHITE BALANCE Menu

The WHITE BALANCE menu is used to adjust the white balance.



## MODE

Selects the white balance modes.

---

## AWB

Select to adjust the white balance automatically (auto white balance).

## R. (red) PAINT, B. (blue) PAINT

Use the  $\swarrow$  GAIN RED or BLUE control on the camera control unit to make fine adjustments. Finely adjusts the red or blue in the range from -100 to +100. Adjust them while watching the monitor screen. When adjusted, the set values change to the adjusted levels.

*For details, see "Adjusting the White Balance" on page 31.*

## AREA

A detecting window appears on the monitor screen. Normally set to **NORMAL**. If you want to display the desired window, set to **MANUAL** and follow the steps below.


- 1 Press the ENTER button.
- 2 Move the left top cross cursor with the  $\leftarrow$ ,  $\rightarrow$ ,  $\uparrow$  or  $\downarrow$  button to set the upper and left side size, and press the ENTER button.
- 3 Move the right bottom cross cursor with the  $\leftarrow$ ,  $\rightarrow$ ,  $\uparrow$  or  $\downarrow$  button to set the lower and right side size, and press the ENTER button.

- 4 Move the window to the desired position on the screen with the ◀, ▶, ▲ or ▼ button, and press the ENTER button.

## ATW NORMAL/ATW WIDE

Activates auto-tracing white balance. The white balance is automatically adjusted as the color temperature changes. These modes are suitable for shooting when the light source changes. Normally, set to ATW NORMAL. The ATW WIDE setting can cope with a wider range of color temperature changes.

### R. PAINT, B. PAINT

Use the  GAIN RED or BLUE controls on the camera control unit to make fine adjustments. Finely adjust the red or blue in the range from -10 to +10. Adjust them while watching the monitor screen. When adjusted, the set values change to the adjusted levels.

The adjusted values are stored in memory separately from AWB values.

### AREA

A detecting window appears on the monitor screen. The setting procedure is the same as that in AWB.

With NORMAL option, a detecting window is displayed on the whole screen.

### SPEED


Sets the focusing speed. You can select **SLOW** (slow speed), **MID** (normal speed) or **FAST** (fast speed).

---

## MANUAL

Use for manual adjustment of white balance.

### R. GAIN, B. GAIN

Use the  GAIN RED or BLUE controls on the camera control unit to adjust the red or blue gain. The adjustable level is within the range from -127 to +127. Adjust them while watching the monitor screen. When adjusted, the set values change to the adjusted levels.

---

### 3200K

Selects for indoor shooting. (Color temperature: 3200K)

---

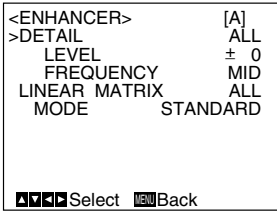
### 5600K

Selects for outdoor shooting. (Color temperature: 5600K)

---

# ENHANCER Menu

The ENHANCER menu is used to adjust the sharpness of the image outline and the color tone (hue).



## DETAIL

Enables or disables adjustment of the sharpness of the image outline.

---

### ALL

Enables adjustment of the sharpness of the image outline.

### LEVEL

Adjusts the level in the range from -127 to +127.

The lower level decreases the sharpness of the image outline and makes the image softer.

The higher level increases the sharpness of the image outline and makes the image sharper.

When the RM-C950 remote control unit is connected, this item is not adjusted with the menu. Adjust it using the control on the RM-C950.

### FREQUENCY

Selects the frequency level with which the image outline is adjusted from **LOW** (lower frequency level), **MID** (middle frequency level) or **HIGH** (higher frequency level). Higher setting provides a sharper outline of detailed images.

---

### TARGET

Adjusts the image outline for a specific color.

When you set **DETAIL** to **TARGET**, **TARGET COLOR** appears. Specify the colors you want to adjust.

---

### OFF

Disables adjustment of the sharpness of the image outline.

## LINEAR MATRIX

Processes an image with a color matrix to change the chroma saturation and hue in order to reproduce natural color.

---

### ALL

Corrects the color to reproduce natural color.

### MODE

Adjusts the color suitable for the subject.

**STANDARD:** Normally, select this setting.

**R ENHANCE:** Enhances the red.

**B ENHANCE:** Enhances the blue.

**G ENHANCE:** Enhances the green.

**MANUAL:** Adjusts each color finely. The following options appear.

**R. PAINT:** Finely adjusts the red in the range from -30 to +30.

**G. PAINT:** Finely adjusts the green in the range from -30 to +30.

**B. PAINT:** Finely adjusts the blue in the range from -30 to +30.

---

### TARGET

Corrects the color for a specific color.

When you set **LINEAR MATRIX** to **TARGET**, **TARGET COLOR** appears. Specify the colors you want to adjust.

---

### OFF

Color correction does not function. Use when you want to process the image.



## TARGET COLOR

Select when adjusting DETAIL or LINEAR MATRIX for a specific color. This item is displayed only when you set either DETAIL or LINEAR MATRIX to TARGET.

### ALL

Adjusts DETAIL or LINEAR MATRIX for the whole image. Normally, set to this position.

### IN

Adjusts DETAIL or LINEAR MATRIX for a specific color.

### RANGE

Finely adjusts the area in the range from -10 to +10.

#### To specify a color

- 1 Press the ENTER button.
- 2 Move the cross cursor (⊕) appearing in the center of the screen to the desired color with the ←, →, ↑ or ↓ button so that the cross cursor square covers the desired color.  
You can adjust the color indicated by the cross cursor (⊕).
- 3 Press the ENTER button.  
The screen returns to the menu display. To cancel the setting before completing the procedure, press the MENU button.

### OUT

Adjusts DETAIL or LINEAR MATRIX for colors other than a specified color.

### RANGE

Finely adjusts the area in the range from -10 to +10.

When you select OUT, then set the color with the procedure in “To specify a color,” you can adjust DETAIL or LINEAR MATRIX for colors other than that indicated by the cross cursor (⊕).

# GENERAL Menu

The GENERAL menu is used to set the general items.

<GENERAL>	[A]
>CCD MODE	FIELD
SHADING COMP.	OFF
FS/TRIG IN	OFF
NEGA	OFF
FLICKER CANCELLER	OFF
[F4] Select [F5] Back	

## CCD MODE

Selects the CCD read-out mode.

## FIELD

Accumulates charges in field units. Use to shoot a moving object.

## FRAME

Accumulates charges in frame units. Provides the image with the highest possible vertical resolution. Use to shoot a still object.

## SHADING COMP. (Shading Compensation)

Eliminates green or magenta color which may appear at the top or bottom of the screen, when the camera is used with an optical instrument.

## OFF

Color elimination does not function.

## ON

If green or magenta color appears at the top or bottom of the screen when the camera is attached to a microscope, etc., select this setting.

## LEVEL

Adjusts the level within the range from -127 to +127. Adjust while watching the screen so that the color is eliminated.

- + : Green at the top and magenta at the bottom will be eliminated.
- : Magenta at the top and green at the bottom will be eliminated.

## FS/TRIG IN (Foot Switch/Target Input)

Selects the input signal from the  $\geq$  FS/TRIG IN connector.

### OFF

Select when neither a slave unit nor foot switch is connected.

### FS

Select when an optional foot switch is connected. Turning on or off the foot switch outputs a freeze picture and an image currently shot, alternately.

## TRIGGER

Select when a slave unit is connected to synchronize the camera with a stroboscope. Each time a trigger pulse is input, the freeze picture changes.

When TRIGGER is selected, you cannot output an image as a freeze picture with the FREEZE (ⓧ) button on the camera control unit.

## POLARITY

Selects the same polarity as that of the pulse signal input.

- $\downarrow$  : Falling edge
- $\uparrow$  : Rising edge

### Note

When FS/TRIG IN is set to TRIGGER or FS, AGC, CCD IRIS, ATW, AWB, DCC+ and DYNALATITUDE modes do not function.

## NEGA

Reverses the output image to negative/positive.

### OFF

Outputs the image normally.

### ON

Outputs the image reversed to negative/positive.

## FLICKER CANCELLER

When using the camera in a 60 Hz lighting area, you can obtain images with less flicker under fluorescent light even when SHUTTER is set to CCD IRIS or OFF. Set this item to OFF when you want to set NEGA to ON.

### OFF

Disables the FLICKER CANCELLER function.

### ON

Reduces flicker under fluorescent light.

# SYSTEM Menu

The SYSTEM menu is used to set the items relating to the system of the camera and selection of output signals.

<SYSTEM>	[A]
>BAUD RATE	9600
D-SUB VIDEO	VBS
D-SUB SYNC	C.SYNC
RGB SYNC	G
EXT SYNC	IN
[Left Arrow] [Right Arrow] Select [Enter] Back	


## BAUD RATE

Switches the baud rate of the  REMOTE connector.


Sets to any of **19200, 9600, 4800, 2400** and **1200**.

Set to 9600 when the RM-C950 remote control unit is connected.

## D-SUB VIDEO

Selects the **VBS** or **Y/C** signal output from the  RGB/SYNC connector (D-sub 9-pin).

## D-SUB SYNC

Selects the sync signal output from the  RGB/SYNC connector (D-sub 9-pin).

## C. SYNC

Outputs the composite sync signal.


## WEN-ODD/WEN-EVEN/WEN-NORM

Outputs the WEN signal. When connecting peripheral equipment, the signal is used as trigger pulse output to the equipment. Switching WEN-ODD or WEN-EVEN provides a different pulse signal phase.

For the timing chart of the WEN pulse signal for each setting, see page 48.


## POLARITY

Selects the polarity of the pulse signal.

 : Negative

 : Positive


## RGB SYNC

Adds a sync signal to the G signal or R, G and B signals output from the  RGB/SYNC connector.


## OFF

No sync signal is added to an output signal.

## G

Adds a sync signal to the G signal output from the  RGB/SYNC connector.

## RGB

Adds sync signals to the G, B and R signals output from the  RGB/SYNC connector.

## EXT SYNC

Switches the input and output of the EXT SYNC (HD, VD/SYNC) jacks (BNC type) and selects the output signal.

## IN

Functions as the input jack.

When an external sync signal (VBS signal) is input, the following items appear: Adjusts the horizontal phase and SC (subcarrier) phase to synchronize the camera operation with the reference signal.

## H. PHASE

Adjusts the horizontal phase within the range from  $-20$  to  $+127$ .

## SC. PHASE ROUGH

Roughly adjusts the subcarrier phase by setting to 0° or 180°.

## SC. PHASE FINE

Finely adjusts the subcarrier phase within the range from -127 to +127.

When an external sync signal (HD/VD signal) is input, the following items appear: Adjusts the horizontal phase to synchronize the camera operation with the reference signal.

## H. PHASE

Adjust the level within the range from -20 to +127.

### Note

Turn on the external sync signal generator after all equipment is switched on.

---

## OUT

Functions as the output jack.

## SIGNAL

Selects the output signal from the EXT SYNC jacks.

**HD/VD:** Outputs the HD/VD signal.

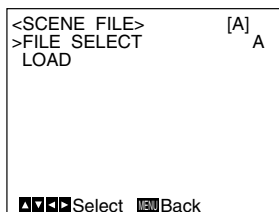
**C. SYNC:** Outputs the composite sync signal.

---

# SCENE FILE Menu

The SCENE FILE is used to set the preset menu settings.

The camera has two memory files (A or B) for storing the menu settings. You can store a different type of setting into each file, and switch to the file most suitable for the shooting conditions quickly. The currently selected memory file is shown in the upper right corner of the on-screen menu.



## FILE SELECT

Selects the file A or B.

## LOAD

Selects the setting to be stored into the file you select with FILE SELECT, and stores the setting.

**STANDARD:** Suitable for a camera used as a permanent fixture.

**MICROSCOPE:** Suitable for a camera for a microscope.

**FULL AUTO:** Automatically adjusts settings.

**STROBE:** Suitable for stroboscopic shooting.

**FILE B (or A):** When copying the settings between two files.



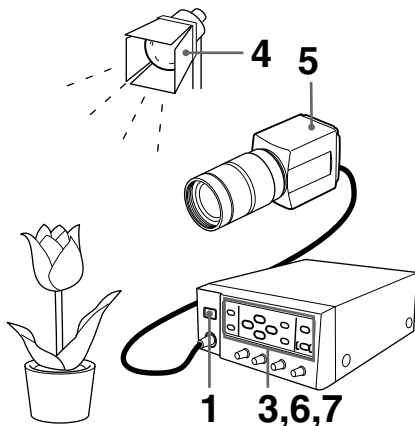
---


## To store the setting

- 1 Select A or B into which the setting is stored in the FILE SELECT setting.
- 2 Press the **▲** or **▼** button to select LOAD.
- 3 Press the **◀** or **▶** button to select the desired setting to be stored, and press the ENTER button.  
“Overwrite OK?” appears.
- 4 Press the ENTER button.  
If you do not want to store the setting, press the MENU button.

# Shooting

## Basic Shooting Procedure

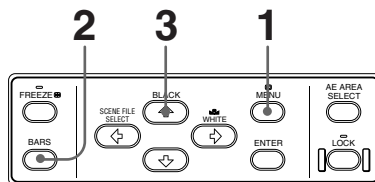



- 1** Press down the  (power) switch on the camera control unit to turn on the power.  
The power indicator lights in green.
- 2** Turn on the powers of the connected devices.
- 3** Adjust the black balance.  
*For details, see “Adjusting the Black Balance” on the right column.*
- 4** Illuminate an object with proper lighting.
- 5** Aim the camera to the object and adjust the iris, focus and zoom.
- 6** Adjust the white balance.  
*For details, see “Adjusting the White Balance” on page 31.*
- 7** Adjust the settings as required.  
*For details, see “Adjusting and Setting With Menus” on page 16.*

- 8** Start shooting.

## Adjusting the Black Balance

Adjust the black balance first, after turning on the power of your camera.



- 1** If any menu is displayed on the screen, press the  MENU button to remove it.
- 2** If a color bar signal is displayed on the screen, press the BARS button to remove it.
- 3** Press the BLACK button.  
Close the iris before pressing the button. The black balance is automatically adjusted. While adjusting, the bars are displayed. When the adjustment is completed, the message “BLACK: OK” appears on the screen.

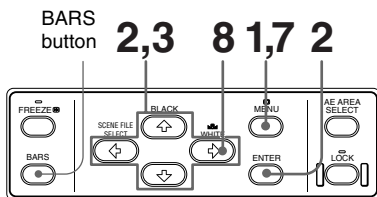
### Black balance adjustment errors

If the black balance adjustment is not successful, the message “BLACK: NG” appears on the screen. If this happens, take the necessary measures and perform steps 1 through 3 again.

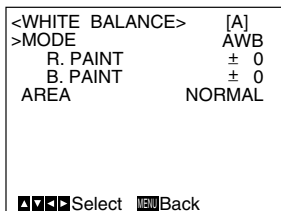
*For details, see “List of Messages” on page 47.*

## Adjusting the White Balance

Each time the lighting condition changes, be sure to adjust the white balance so that optimum color reproduction is obtained.

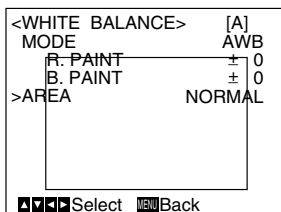


- 1 Press the MENU button to display the MAIN menu.
- 2 Select the WHITE BALANCE menu, and set MODE to AWB.



For menu operation, see “Operation Through Menus” on page 17.

- 3 Select AREA with the or button and then set it to NORMAL with the or button.  
A detecting window appears.



For more details, refer to “WHITE BALANCE Menu” on page 22.

- 4 Display the camera image on the monitor screen.

### Note

If a color bar signal is displayed on the screen, press the BARS button to turn it off.

- 5 Set the lens iris control to the appropriate opening value.
- 6 Place a white object (white pattern, white cloth, etc.) under the same light condition as that falling on the object to be shot, then zoom in on the white object to fill the detecting window on the screen.

### Notes

- Do not include highly reflective objects in the picture.
- Always shoot the image under suitable lighting conditions.

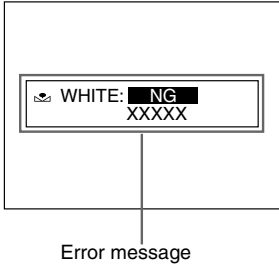
- 7 Press the MENU button twice to remove the menu.

- 8 Press the WHITE button.  
During adjustment the bars appear. The message “WHITE: OK” appears on the screen when the adjustment is done. The adjusted white level is automatically stored in memory and remains even if the power of the camera is turned off.  
To shoot under the same conditions, the stored white balance is recalled by setting MODE to AWB in the WHITE BALANCE menu.

## White balance adjustment errors

If the auto white balance adjustment is not successful, an error message appears on the screen. If this happens, take the necessary measures and perform steps 1 through 8 again.

*For more details, see “List of Messages” on page 47.*



## Adjusting the Picture Tone in a Multi-Camera System

When configuring a multi-camera system, adjust all cameras to prevent camera-to-camera variations in picture tone. Before making the adjustments outlined below, input the same sync signal to all cameras.

*For connections, see “Connecting Two or More Cameras — Multi-Camera System” on page 40.*

---

## Connecting the cameras to video equipment with phase indication capability

When connecting to a special-effects generator, a chroma-key unit, or other video equipment with phase indication capability, the basic adjustment procedure is as follows:

- 1 Turn on the phase indication capability of the connected video equipment.
- 2 Select H. PHASE from EXT SYNC in the SYSTEM menu, and adjust the horizontal phase.

*For more details, see “SYSTEM Menu” on page 27.*

- 3 Select SC. PHASE from EXT SYNC in the SYSTEM menu, and adjust the subcarrier phase.

First adjust the subcarrier phase roughly with SC. PHASE ROUGH set to 0° and 180°, then adjust it finely using SC. PHASE FINE.

*For more details, refer to the instruction manual of the connected video equipment with phase indication capability.*

---

## Connecting the cameras to video equipment without phase indication capability

Use one of the cameras as a reference camera and adjust the other cameras to the reference camera one by one.

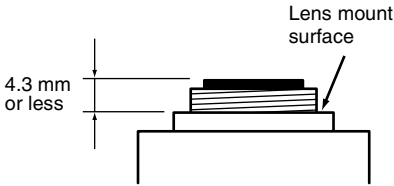
- 1 Adjust the horizontal phase. Select H. PHASE from EXT SYNC in the SYSTEM menu, and adjust so that the reference video signal and the output signal have the same horizontal sync phase. Use a waveform monitor or an oscilloscope to check the phase.
- 2 Adjust the subcarrier phase. Select SC. PHASE from EXT SYNC in the SYSTEM menu. First adjust the subcarrier phase roughly with SC. PHASE ROUGH set to 0° and 180°, then adjust it finely using SC. PHASE FINE so that the reference video signal and the output video signal have the same subcarrier phase. Use a vectorscope or the wiping function of a special-effects generator to display the images of both the reference camera and the camera to be adjusted simultaneously on the screen.



# Installation

## Applicable Lens

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

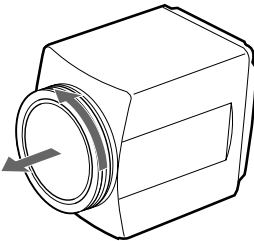


### Note

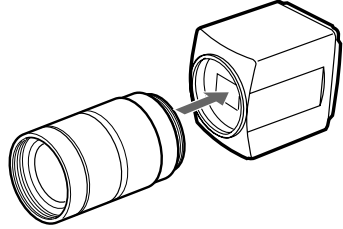
Be sure to use a lens whose projected part from the lens mount surface is less than 4.3 mm. Mounting the lens with a projected part greater than 4.3 mm may damage the internal mechanism of the camera head.

## Mounting the Lens

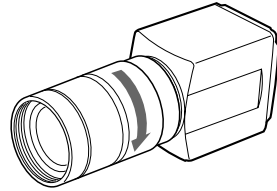
- 1 Remove the lens mount cap of the camera head.



- 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.



## Mounting a Microscope Adaptor

To attach the camera to a microscope or a surgical microscope, it is necessary to attach an appropriate adaptor. The mounting procedure is the same as that of the lenses.

*For details, refer to the instruction manual for the adaptor to be used.*

## Mounting on a Tripod

Attach the supplied tripod adaptor to the camera head, then mount the adaptor on a tripod using the following mounting screw:

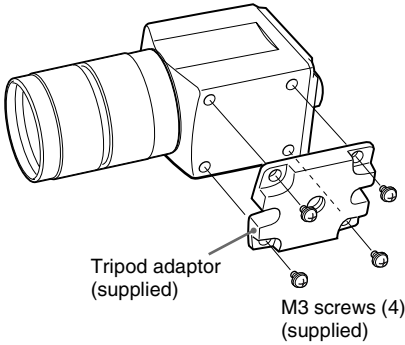


U1/4", 20 UNC  
 $\ell = 4.5 - 5.5$  mm  
(ISO standard)

---

## To attach the supplied tripod adaptor

Attach the supplied tripod to the four M3 screw holes on the bottom of the camera head with the supplied four M3 screws.



## Attaching to a Wall or Ceiling

To mount the camera head on a wall or ceiling, attach the camera head with the tripod adaptor to the mounting bracket or suspension bracket using the appropriate screw (U1/4", 20 UNC) that fits the tripod hole of the adaptor.

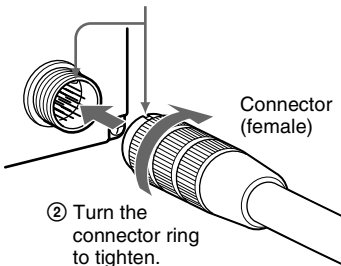
# Connections

## Connecting Between the Camera Head and Camera Control Unit

Connect the camera cable connector on the camera head with the CAMERA connector on the camera control unit using the CCMC-20P05/10/30 camera cable (not supplied).

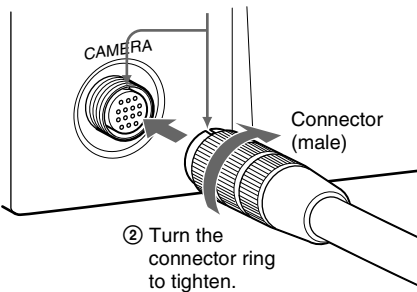
### To connect the camera cable to the camera head

- ① Align the projection of the camera cable connector with the notch on the connector of the camera cable to insert.



### To connect the camera cable to the camera control unit

- ① Align the projection of the CAMERA connector with the notch on the connector of the camera cable to insert.



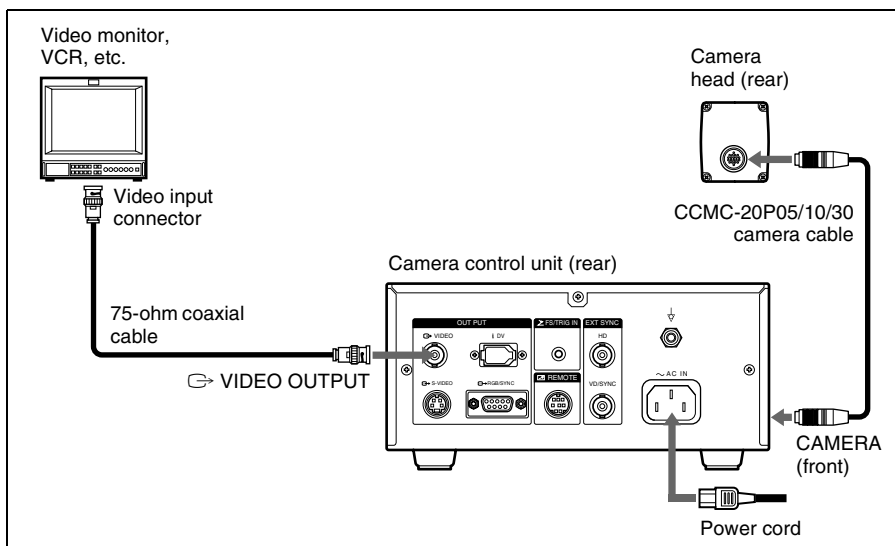
### Notes on connection between the camera head and camera control unit

- Turn off the power supply for all equipment before making any connection. Be sure to turn off the camera when you connect or disconnect the camera cable. Connecting/disconnecting a cable while the power is on may damage the camera.
- Be sure to connect the camera head and camera control unit with the camera cable before you turn on/off the power of the camera.
- Make correct connection with the male and female sides of the connectors on the camera cable. Incorrect connection may cause damage to the camera.
- 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.
- The camera control unit is designed to be used with this camera head. Use both together for optimum picture quality.

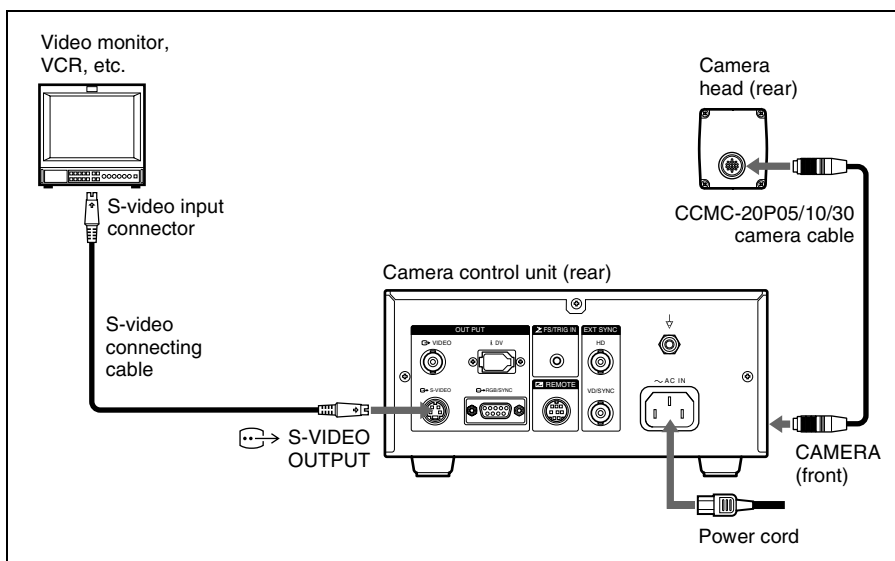
## Connecting the AC Power Cord

Connect the supplied AC power cord to the  $\sim$  AC IN socket on the camera control unit.

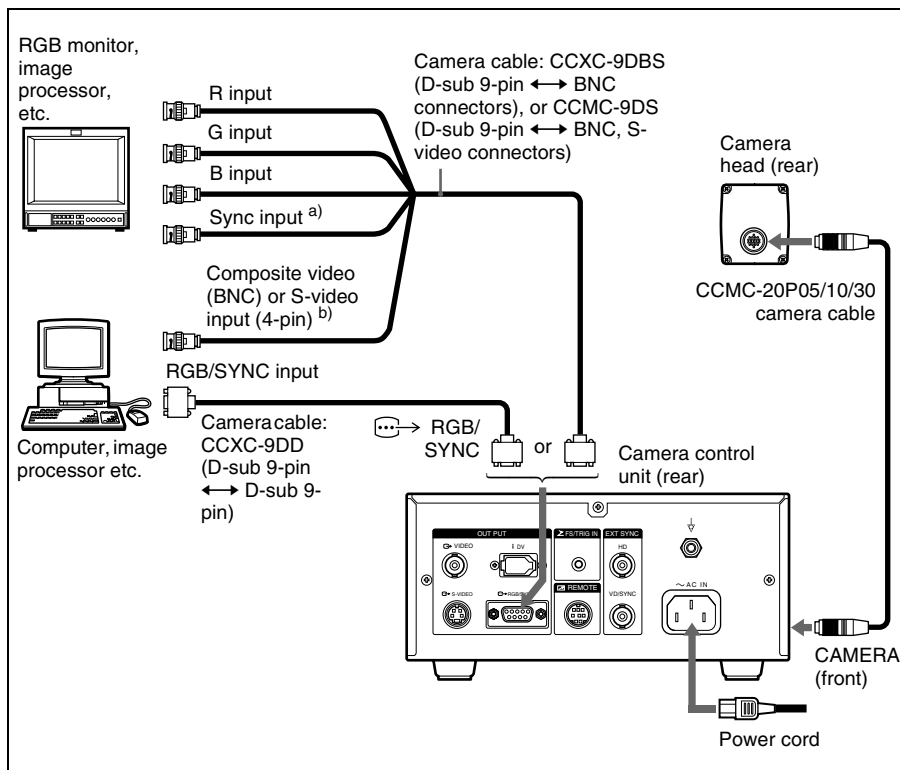
## Connecting to Video Equipment With Composite Video Input Connectors



## Connecting to Video Equipment With S-Video Input Connector



## Connecting to Video Equipment With RGB Inputs



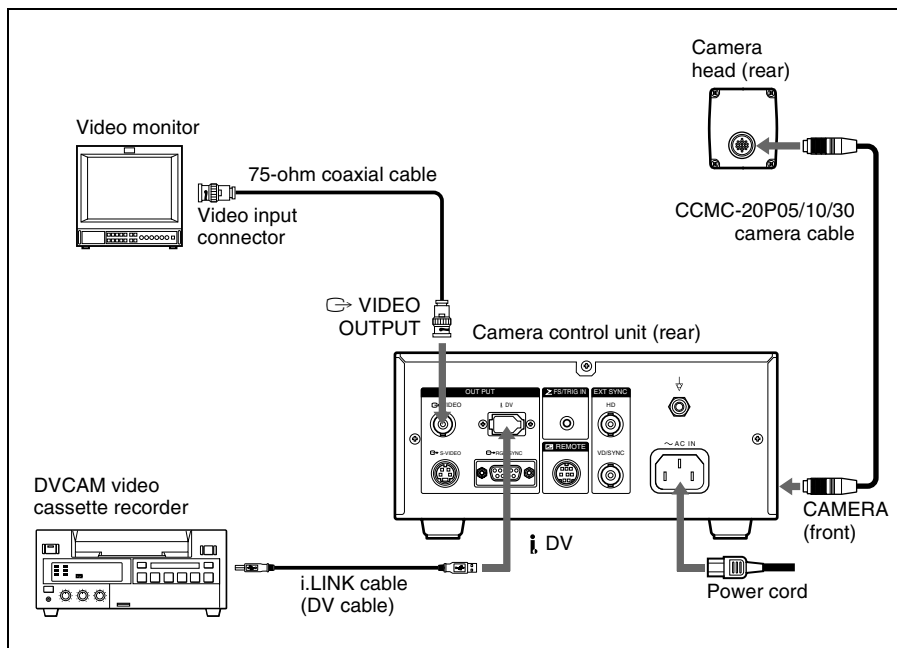
- a) When using a video monitor without a sync signal input connector, the camera can be set to output a sync signal with the G signal or RGB signals.

For details, see “SYSTEM Menu” on page 27.

- b) This setup is for connecting to a composite video (VBS) connector. To output separated Y/C signals to the S-video input of video equipment, use a CCMC-9DS camera cable.

For details on switching camera output between VBS (composite video) and Y/C, see “SYSTEM Menu” on page 27.

## Connecting to Video Equipment With DV Input Connector



### Note

- i.LINK for the camera is especially designed to output signals in DV format. Do not connect to the output connector on the connected equipment.
- The camera cannot control the DVCAM video cassette recorder connected via i.LINK cable, such as for recording, playing and stop operations. Use the relevant buttons on the DVCAM video cassette recorder for the operations.

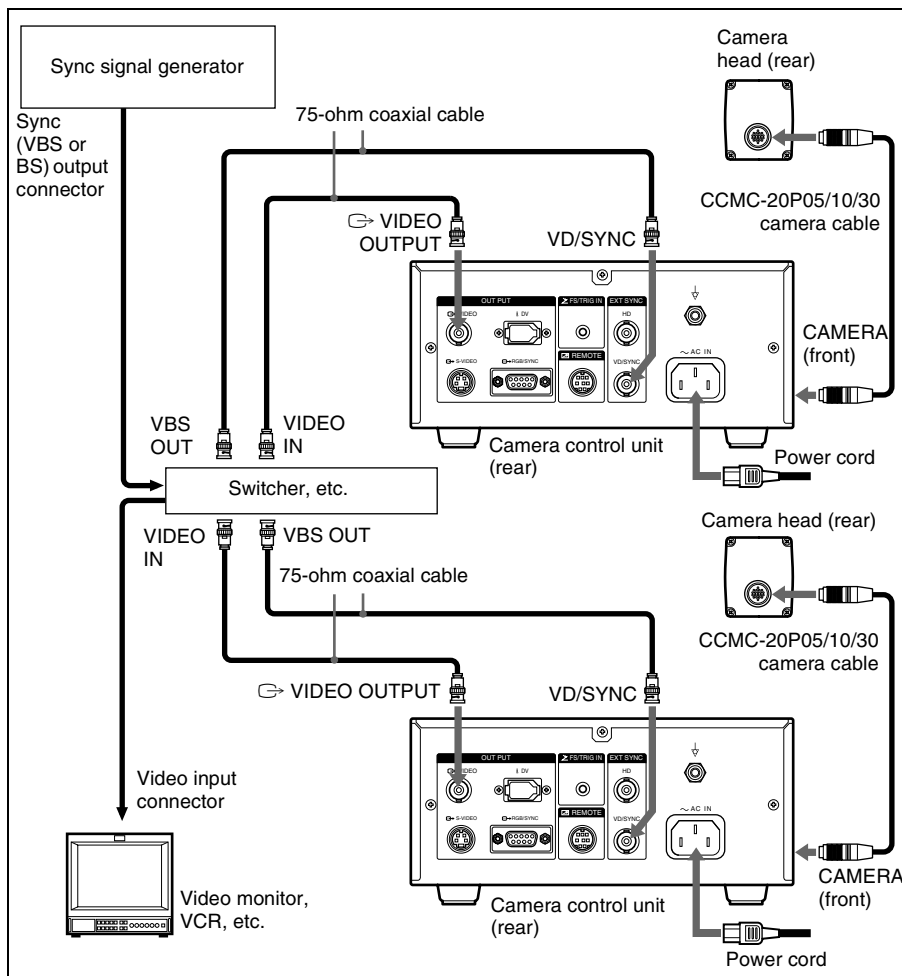
### Notes about i.LINK connections

- 1) Check that connectors are oriented properly before connecting an i.LINK cable to your computer or to this unit. Trying to force an improperly oriented connector may damage the connector or this unit.
- 2) Connect the i.LINK cable to your computer before connecting it to this unit. This unit may be damaged by static electricity if you connect the cable to this unit first.
- 3) Before connecting or disconnecting an i.LINK cable between this unit and other equipment with an i.LINK connector, always power both this unit and the connected equipment off and disconnect all power plugs from their power outlets. Inserting or removing an i.LINK connector with the power plugs still connected may cause a damaging surge of high-voltage power to flow from the equipment's i.LINK connector into this unit.

- 4) A damaging surge of high-voltage power can still flow into this unit from the i.LINK connector of connected equipment even when a separate i.LINK cable is connected to another i.LINK connector on the equipment, for example when connecting a hard disk to a computer with an i.LINK interface card that provides multiple connectors. Always power all equipment off and disconnect all power plugs from their power outlets, both on this unit and on the connected computer and its peripherals, before connecting an i.LINK cable.



## Connecting Two or More Cameras — Multi-Camera System



### Notes

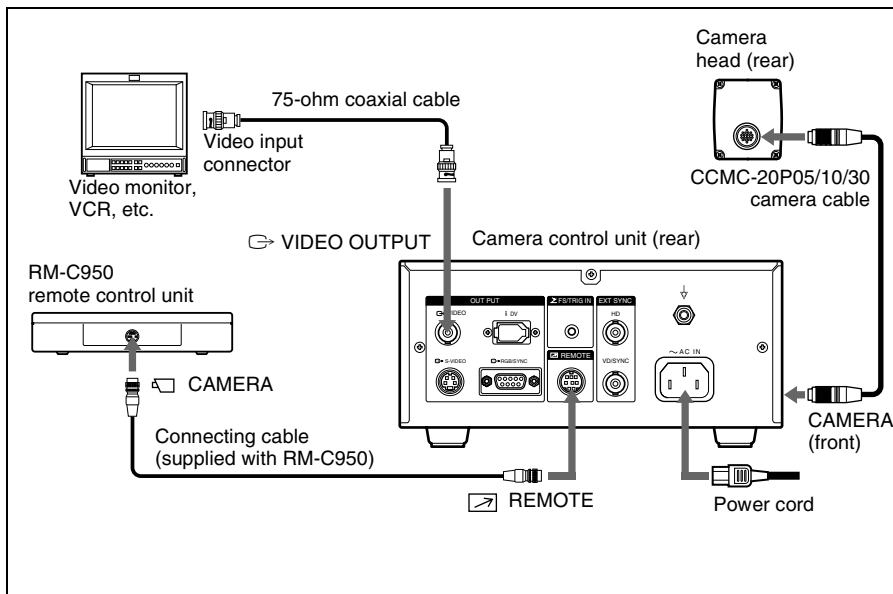
- Perform the following to synchronize the picture tone of the cameras when switching between two or more cameras connected to a video switcher:
  - Supply the same sync signal to the VD/SYNC connectors on the camera control unit.
  - Adjust the subcarrier and horizontal synchronization phases for all cameras.

*For more details, see "Adjusting the Picture Tone in a Multi-Camera System" on page 32.*

- Turn on the power of the sync signal generator after all other equipment is switched on.










## Connecting to a Remote Control Unit



## Operating the camera with the RM-C950 remote control unit

The functions of the following buttons and controls on the remote control unit change as follows, in accordance with the functions of the camera.

Buttons/ control on the RM-C950	Button/control names when used with the camera	Function
PRINT 	ENTER	Use when displaying the setting menu selected in the MAIN menu, or use to set the AE window, etc. manually in the menus.
FLASH 	FILE SELECT	Use to switch a preset file between A and B.
LONG EXPOSURE 	AE AREA SELECT	Used to switch the AE window set in the menu, AE AREA1 or AE AREA2, when AGC or CCD-IRIS is selected.
LONG EXPOSURE 	FREEZE	Used to store an image in a built-in frame memory. Pressing the button again outputs an image currently shot.
IRIS	AE LEVEL	Used to adjust the auto exposure focusing point when the camera is set to AGC or CCD-IRIS mode. When SHUTTER is set to KNOB, this control can be used to adjust the shutter speed and video gain. Turning the control counterclockwise adjusts the shutter speed. Turning it clockwise adjusts the gain level. In KNOB setting, the  GAIN control does not function.
GAIN 	GAIN	Use to change the variable range of gain levels.
FUNCTION 	BLACK	Use to start the auto black balance adjustment.

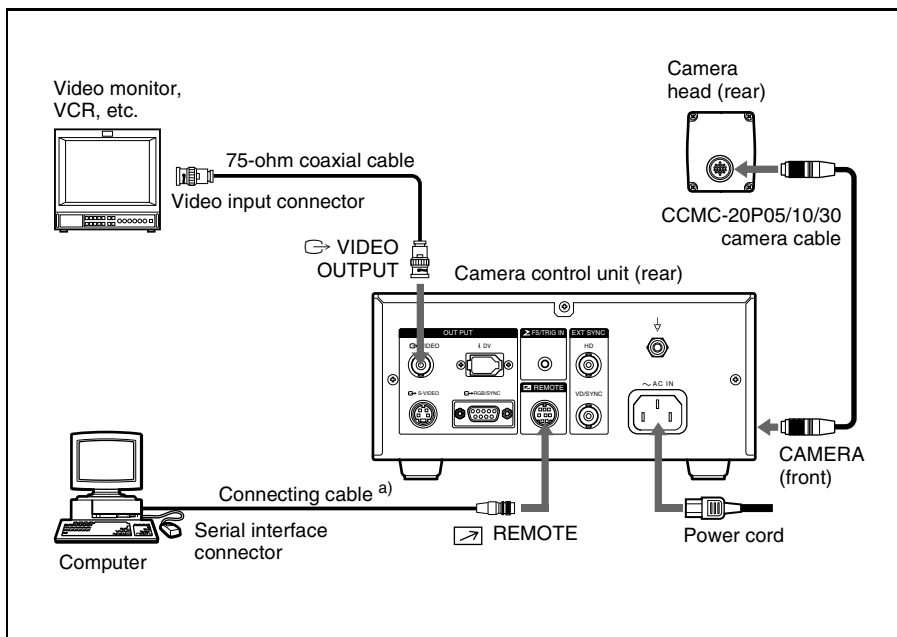
### Note

The FOCUS and ZOOM controls on the RM-C950 do not function for the camera.

The sheet for the button names when the camera is used with the remote control unit is supplied with the camera. Attach the name sheet to the control panel of the RM-C950.

## Connecting to a Computer

This section explains the system for controlling the camera with a computer using an RS-232C command.

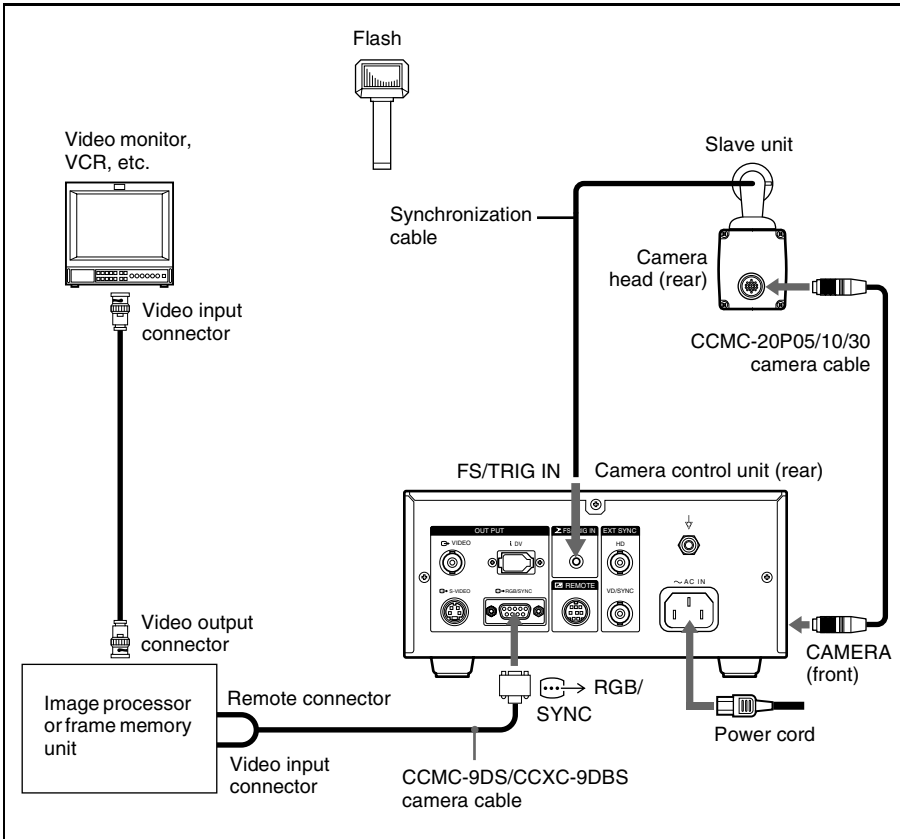


a) Use the shielded connecting cable for connecting to a computer.

*For more details on RS-232C protocols and cables for connection to a computer, contact your authorized Sony dealer.*

## Connections for Shooting Using a Flash

This section explains how to connect a slave unit for synchronizing with a strobe.

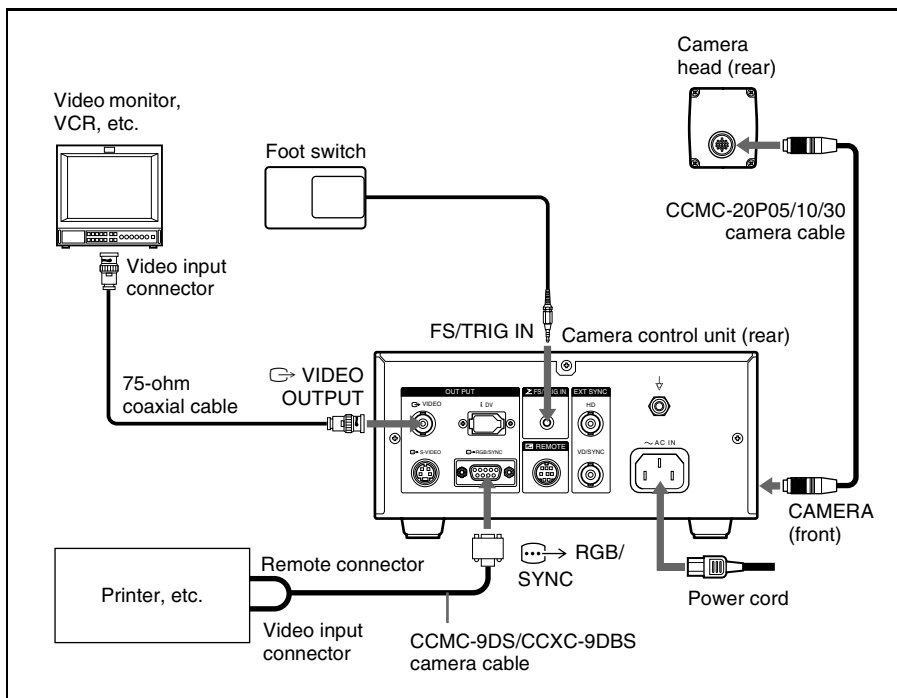


### Note

When connecting a flash unit, set FS/TRIG IN to TRIGGER in the GENERAL menu (page 26) and D-SUB SYNC to WEN-ODD or WEN-EVEN in the SYSTEM menu (page 27).

## Connections for Displaying a Freeze Picture Using a Foot Switch

This section explains how to connect an optional foot switch to store an image in the frame memory of this camera and to output the freeze picture to a printer, etc.



### Note

- The foot switch must comply with Standard UL2601-1/EN60601-1.
- When connecting a foot switch, set FS/TRIG IN to FS in the GENERAL menu (page 26).
- When you output a freeze picture to a printer, etc., set D-SUB SYNC to WEN-ODD or WEN-EVEN in the SYSTEM menu (page 27).

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## Precautions

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### Operating or storage location

Operating or storing the camera in the following locations may cause damage to the camera:

- Extremely hot or cold places (operating temperature:  $-5^{\circ}\text{C}$  to  $+45^{\circ}\text{C}$  [ $23^{\circ}\text{F}$  to  $113^{\circ}\text{F}$ ]). For details, see “General” of “Specifications” on page 49.
- Exposed in direct sunlight for a long time, or close to heating equipment (e.g., near heaters)
- Close to sources of strong magnetism
- Close to sources of powerful electromagnetic radiation, such as radios or TV transmitters
- Locations subject to strong vibration or shock

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### Ventilation

To prevent heat buildup, do not block air circulation around the camera.

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### Transportation

When transporting the camera, repack it as originally packed at the factory or in materials equal in quality.

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### Cleaning

- Use a blower to remove dust from the lens or optical filter.
- Use a soft, dry cloth to clean the external surfaces of the camera. Stubborn stains can be removed using a soft cloth dampened with a small quantity of detergent solution, then wipe dry.
- Do not use volatile solvents such as alcohol, benzene or thinners as they may damage the surface finishes.

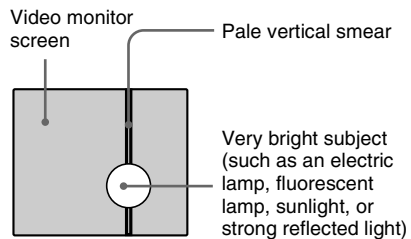
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## Typical CCD Phenomena

The following phenomena may appear on the monitor screen while you are using the DXC-C33P color video camera. These phenomena stem from the high sensitivity of the CCD image sensors, and do not indicate a fault within the camera.

### Vertical smear

A “smear” may appear to extend vertically from very bright subjects, as shown below.



This phenomenon is common to CCD imaging elements using an interline transfer system, and is caused when electric charge induced by infrared radiation deep within the photo sensor is transferred to the resistors.

### Aliasing

When shooting fine stripes, straight lines or similar patterns, the lines may become slightly jagged.

### Blemishes

A CCD image sensor consists of an array of individual picture elements (pixels). A malfunctioning sensor element will show up as a single pixel blemish in the image. This is generally not a problem.



### White speckles

When you shoot a poorly illuminated object at a high temperature, small white dots may appear all over the entire screen image.

# List of Messages

The following messages may appear on the screen. Take the necessary measures shown below.


## Messages while adjusting the white balance automatically

Message	Meaning/remedies
WHITE: OK	Automatic white balance adjustment has succeeded.
WHITE: NG LEVEL LOW	The video level of the image is too low. <ul style="list-style-type: none"> <li>• Increase the illumination.</li> <li>• Widen the iris opening.</li> <li>• Increase the video gain.</li> </ul> Take the measures above, then press the  WHITE button.
WHITE: NG LEVEL HIGH	The video level of the image is too high. <ul style="list-style-type: none"> <li>• Remove any brightly illuminated objects.</li> <li>• Decrease the illumination.</li> <li>• Close the iris opening.</li> <li>• Decrease the video gain.</li> </ul> Take the measures above, then press the  WHITE button.
WHITE: NG TEMP LOW	Color temperature is too low. Change the color temperature of the object to the appropriate level.
WHITE: NG TEMP HIGH	Color temperature is too high. Change the color temperature of the object to the appropriate level.
WHITE: NG TRY AGAIN	The camera has failed to adjust the white balance. Add white part to the object shot. Take the measures above, then try again. If the message appears even if you repeat adjustment, the camera needs to be checked. Consult your authorized Sony dealer.

## Messages while adjusting the black balance automatically

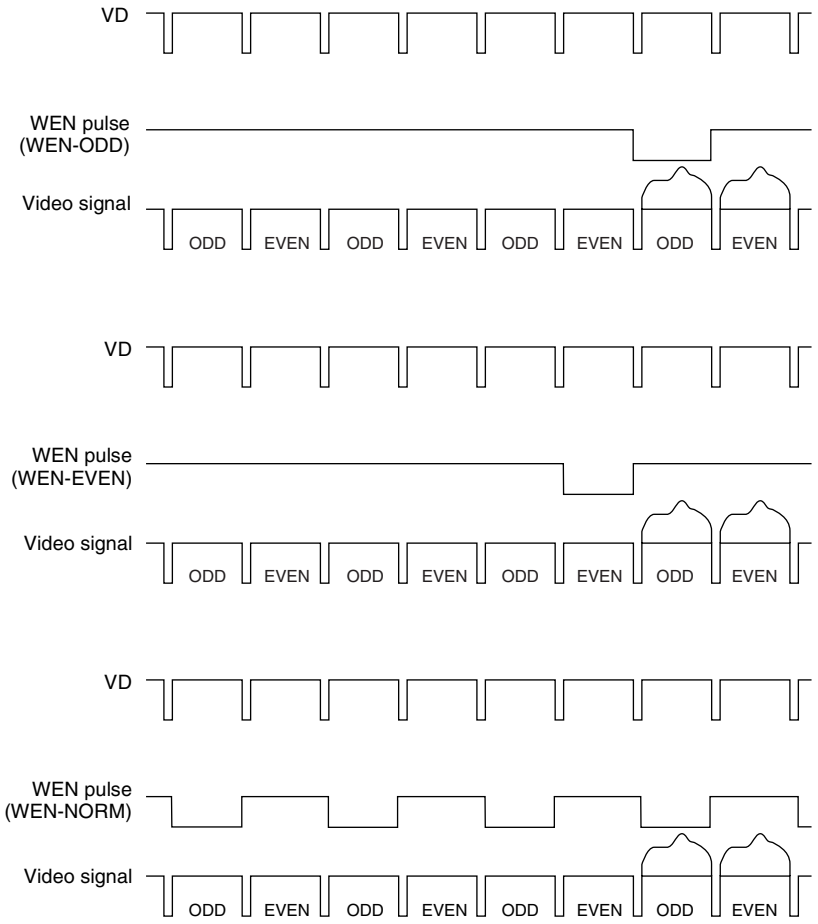
Message	Meaning/remedies
BLACK: OK	Automatic black balance adjustment has succeeded.
BLACK: NG IRIS close?	The camera has failed to adjust the black balance. Close the iris opening, then press the BLACK button.
BLACK: NG	The camera has failed to adjust the black balance. Check the camera, then press the BLACK button. If the message appears even if you repeat adjustment, the inside of the camera needs to be checked. Consult your authorized Sony dealer.

## Messages while adjusting the white balance or black balance automatically

Message	Meaning
Now Freeze MODE	The camera is in freeze mode. You cannot make automatic white balance and black balance adjustments.
Now SHUTTER Long Term MODE	The camera is set to long exposure mode. You cannot make automatic white balance and black balance adjustments.
Now TRIGGER MODE	<ul style="list-style-type: none"> <li>• The camera is set to trigger mode. You cannot make automatic white balance and black balance adjustments.</li> <li>• You cannot store an image in the built-in frame memory using the FREEZE  button.</li> </ul>

# WEN Pulse Timing Chart

The following is the timing charts of a WEN pulse when D-SUB SYNC is set to WEN-ODD, WEN-EVEN or WEN-NORM, and POLARITY is set to  $\bar{\square}$  (negative) in the SYSTEM menu.





# Specifications

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## Image system/optical system

Image device 1/3 type CCD, interline transfer type  
 Effective picture elements 752 (horizontal) × 582 (vertical)  
 Lens mount C-mount

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## Video system

Synchronization Internal/external synchronization (VBS, HD/VD), switched automatically  
 Signal format PAL standard format (CCIR standard)  
 Scanning 625 lines, 2:1 interlace  
 Scanning frequency 15.625 kHz (horizontal), 50.00 Hz (vertical)

---

## Functions/performance

Horizontal resolution 850 TV lines  
 Sensitivity 2,000 lux (F8, 3,200K)  
 Signal-to-noise ratio 61 dB  
 Gain control AGC: Automatic Gain Control  
 STEP: 0-24 dB (in units of 1 dB)  
 HYPER  
 White balance AWB: R. PAINT, B. PAINT  
 MANUAL: R. GAIN, B. GAIN  
 ATW: R. PAINT, B. PAINT  
 3200K  
 5600K  
 Electronic shutter speed Adjustable in the range from 1/100,000 to about 8.0 sec. (adjustable with CCD IRIS)  
 Linear matrix ON/OFF switchable  
 Gamma compensation ON/OFF switchable  
 Charge accumulation mode Switchable between field and frame mode

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## Inputs/outputs

Video output signals  
 Composite video: 1 Vp-p (75 ohms)  
 R/G/B: 1.0 Vp-p (75 ohms at R/G/B on Sync)

Y: 1 Vp-p (75 ohms)  
 Y/C: 1 Vp-p, same level as VBS chroma (75 ohms)  
 SYNC: 2 Vp-p (75 ohms)

External sync input  
 VBS/BS, HD/VD (VBS 1 Vp-p or Burst 0.3 Vp-p, SYNC 0.3 Vp-p or HD/VD 4.0 Vp-p, 75 ohms)  
 Input/output connectors  
 VIDEO OUTPUT: BNC, 75 ohms, unbalanced  
 HD: BNC, 75 ohms, unbalanced  
 VD/SYNC: BNC, 75 ohms, unbalanced  
 S-VIDEO OUTPUT: mini DIN 4-pin, 75 ohms  
 DV OUTPUT: 6 pin  
 REMOTE: mini DIN 8-pin  
 FS/TRIG IN: Stereo minijack  
 RGB/SYNC: D-sub 9-pin

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## General

Power supply 100-240 V AC, 50/60 Hz  
 Current consumption 0.35-0.2 A  
 Power consumption Max. 18 W  
 Operating temperature -5°C to +45°C (23°F to +113°F)  
 Operating humidity 20% to 80% (free of condensation)  
 Operating pressure 700 hPa to 1,060 hPa  
 Storage and transport temperature -20°C to +60°C (-4°F to +140°F)  
 Storage and transport humidity 20% to 90% (free of condensation)  
 Storage and transport pressure 700 hPa to 1,060 hPa  
 Dimensions Camera head: 32 × 38 × 40 mm (1 <sup>3</sup>/<sub>16</sub> × 1 <sup>1</sup>/<sub>2</sub> × 1 <sup>5</sup>/<sub>8</sub> inches) (w/h/d) (not including the projecting part)  
 Camera control unit: 200 × 88 × 242 mm (7 <sup>7</sup>/<sub>8</sub> × 3 <sup>1</sup>/<sub>2</sub> × 9 <sup>5</sup>/<sub>8</sub> inches) (w/h/d) (not including the projecting part)  
 Mass Camera head: Approx. 48 g (1.7 oz)  
 Camera control unit: 2.5 kg (5 lb 10 oz)  
 Supplied accessories  
 Lens mount cap (1)  
 Tripod adaptor (1)  
 M3 screws (4)  
 AC power cord (1)

Name sheet for the buttons on the  
RM-C950 (1)  
Instructions for Use (1)  
Before Using This Unit (1)  
CD-ROM (Manuals for 3CCD  
Color Video Camera) (1)  
Service Contact List (1)

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### 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

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### Optional Accessories

#### Remote control unit

RM-C950 remote control unit (connecting cable  
supplied)

#### Camera cable

CCMC-20P05 (5 m (16 feet))

CCMC-20P10 (10 m (32 feet))

CCMC-20P30 (30 m (98 feet))

#### D-sub connector cable (Camera cable)

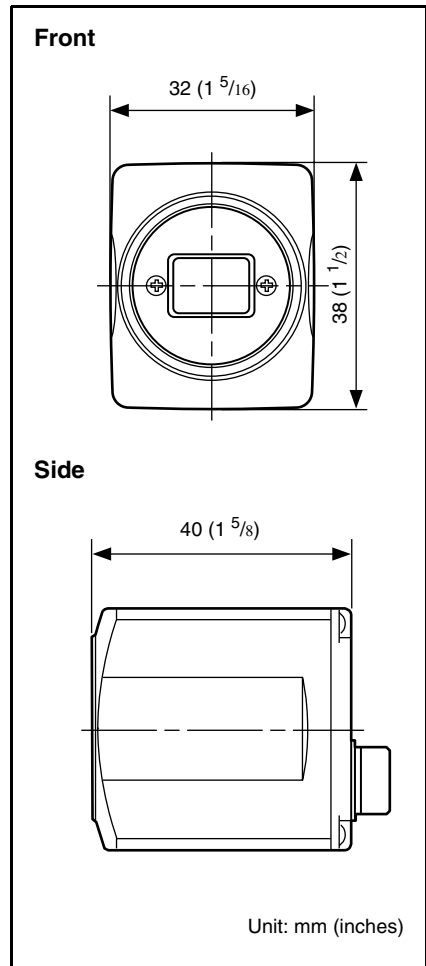
CCXC-9DBS (D-sub ↔ BNC × 5)

CCXC-9DD (D-sub ↔ D-sub)

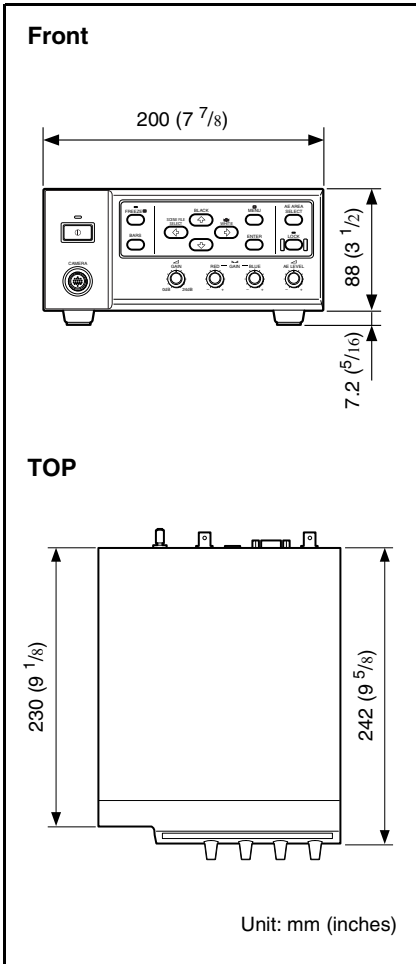
CCMC-9DS (D-sub ↔ BNC × 4, S-video  
connector)

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### Dimensions — Camera head



## Dimensions — Camera control unit



Design and specifications are subject to change without notice.

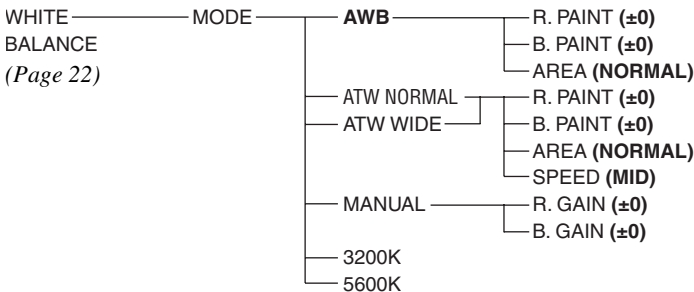
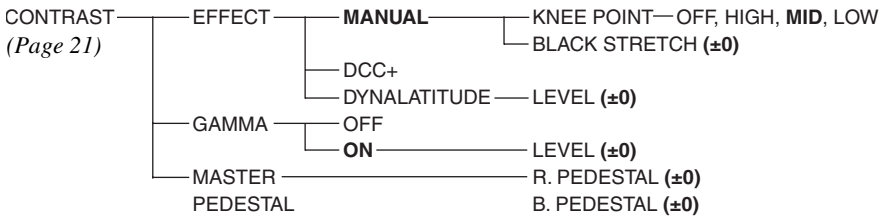
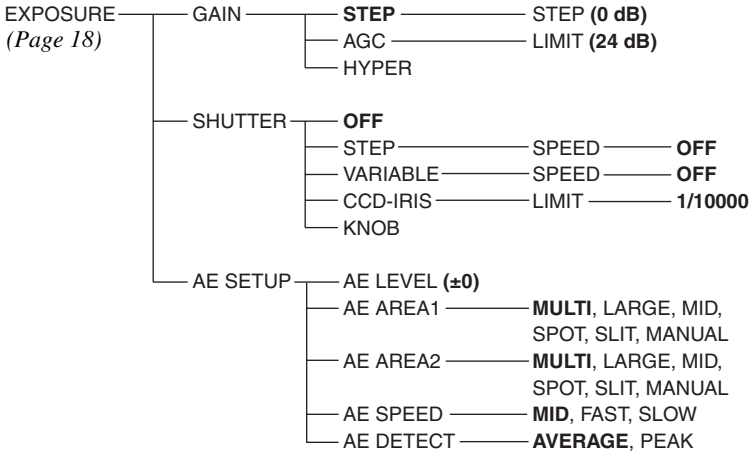
### Note

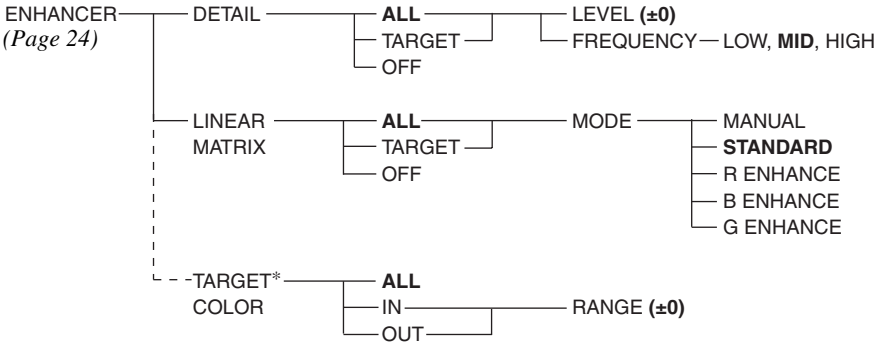
Always verify that the unit is operating properly before use. SONY WILL NOT BE LIABLE FOR DAMAGES OF ANY KIND INCLUDING, BUT NOT LIMITED TO, COMPENSATION OR REIMBURSEMENT ON ACCOUNT OF THE LOSS OF PRESENT OR PROSPECTIVE PROFITS DUE TO FAILURE OF THIS UNIT, EITHER DURING THE WARRANTY PERIOD OR AFTER EXPIRATION OF THE WARRANTY, OR FOR ANY OTHER REASON WHATSOEVER.

# Menu Configuration

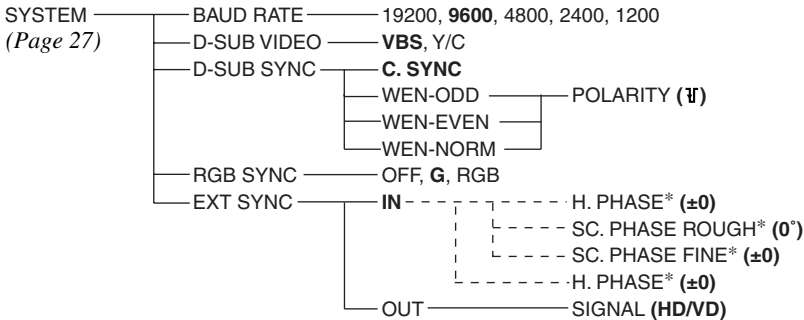
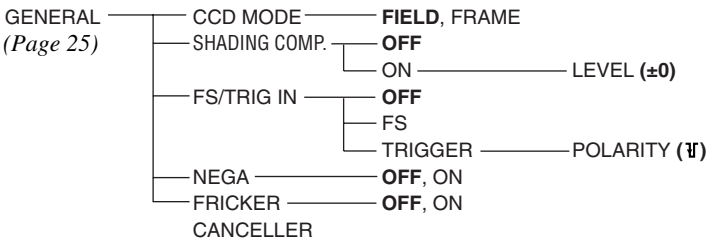
The menus of the camera are configured as described below.

For detailed information, see pages in parentheses. The initial settings of each item are **bolded**.





\* Displayed only when DETAIL or LINEAR MATRIX is set to TARGET.



\* Displayed only when an external sync signal is input.

