SONY

3CCD Color Video Camera

Instructions for Use

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

DXC-990P

CE

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.

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

For the customers in the U.S.A.

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

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

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

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

For the customers in Canada

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

For the customers in Europe

This product with the CE marking complies with the EMC Directive issued by the Commission of the European Community. Compliance with this directive implies conformity to the following European standards:
• 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 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.
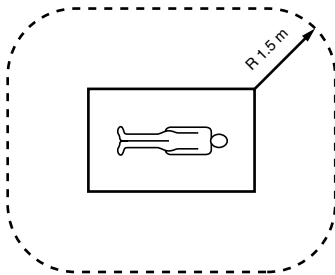
3. Do not touch the patient simultaneously while you are contacting with this equipment.

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 CISPR11, 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.

Important EMC notices for use in the medical environments

- The DXC-990P 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-990P.

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-990P.

Guidance and manufacturer's declaration-electromagnetic emissions		
The DXC-990P is intended for use in the electromagnetic environment specified below. The customer or the user of the DXC-990P should assure that it is used in such an environment.		
Emission test	Compliance	Electromagnetic environment-guidance
RF emissions CISPR 11	Group 1	The DXC-990P 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-990P 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-990P 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-990P is intended for use in the electromagnetic environment specified below. The customer or the user of the DXC-990P 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-990P requires continued operation during power mains interruptions, it is recommended that the DXC-990P 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.			

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Guidance and manufacturer's declaration - electromagnetic immunity			
The DXC-990P is intended for use in the electromagnetic environment specified below. The customer or the user of the DXC-990P 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 DXC-990P, 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: $((\cdot))$
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-990P is used exceeds the applicable RF compliance level above, the DXC-990P should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the DXC-990P.			
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-990P

The DXC-990P is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the DXC-990P can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (Transmitters) and the DXC-990P 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.

Table of Contents

Features

High-quality images

- The high density 1/2 type, three-chip Exwave HAD[TM]* CCD[**], containing some 430,000 effective picture elements (pixels), offers superior picture quality: 850 TV lines of high horizontal resolution, high sensitivity of F11 at 2,000 lx, an excellent signal-to-noise ratio of 62 dB and a low smear level.

  * Exwave HAD[TM]: Exwave Hole-Accumulated Diode
    "Exwave HAD[TM]" is a trademark of Sony Corporation.

  **CCD: Charge-Coupled Device

- The adoption of the LSI digital signal processing technology reproduces a finer, more detailed picture.
- 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.

Wide Range of Exposure Control

The AGC (Auto Gain Control) function and CCD IRIS[TM]* function automatically adjust a wide range of incoming light levels. When the lighting condition is poor, the AGC function automatically increases the gain up to 16 times. When incoming light is excessive, the CCD IRIS function automatically adjusts shutter speed to cut exposure to the equivalent of up to 10 aperture stops. When using the video camera in a fixed location or for a microscope system, the AGC, CCD IRIS and auto-iris controls automatically adjust a wide range of incoming light levels. The desired AE window can be set by using the AE AREA MANUAL function.

* "CCD IRIS[TM]" is a trademark of Sony Corporation.

Wide range of electronic shutter modes

The wide range of speeds for the electronic shutter minimizes blurring in fast-moving objects and produces acceptably bright still images of objects shot in poor light.

- Flickerless mode: This mode allows you to obtain flickerless images shot even under fluorescent light.
- Clear scan mode: This mode reduces horizontal bands appearing in computer displays when shooting the display with the conventional video camera.

Versatile use with external equipment

- The video camera is equipped with four types of outputs: composite, Y/C, RGB and component outputs. The camera offers a high-quality picture on a connected monitor or VCR.
- The camera can be remotely controlled with the RM-C950 remote control unit (not supplied).

RS-232C interface

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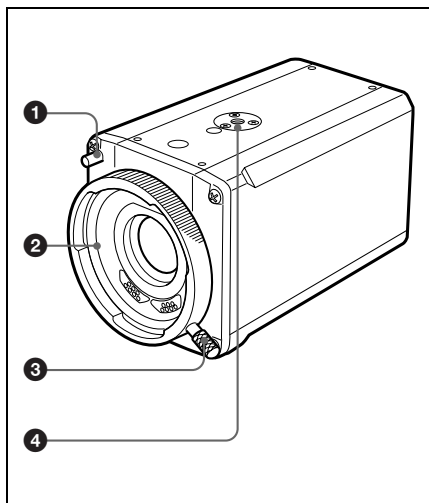
Compact and lightweight

The camera is compact ($70 \times 72 \times 123.5$ mm ($2\,^7/_8 \times 2\,^7/_8 \times 4\,^7/_8$ inches)) and very light (approx. 630 g (1 lb 6 oz)), allowing easy installation even where space is a problem.

Location and Functions of Parts and Controls

Front Panel/Top Panel

Rear Panel

a Boss

Attach the supplied lens mount stopper to prevent the lens from getting loose.

b Lens Mount

Attach a zoom lens or microscope adaptor.

c Mount lever

Fasten the lens by turning the mount lever clockwise after attaching the lens.

d Installation/tripod holes (top and bottom panels)

Use these holes when attaching the camera to a wall or ceiling, or a tripod. (screw: $^1/4''$, UNC20)

e TRIG IN connector (BNC type)

Connects to a commercially available slave unit by converting to BNC type in strobe mode.

f RGB/SYNC ⋯→ connector (D-sub 9-pin)

Outputs RGB signals and their respective sync signals.
Use the CCXC-9DBS/CCXC-9DD/CCMC-9DS connecting cable for the connection with the CMA-D2CE[*]/D2MDCE camera adaptor.
For connection with the CMA-D3CE[*] camera adaptor, use the CCMC-3MZ[*] connecting cable.

* CMA-D2CE/D3CE/CCMC-3MZ are intended for general purpose use. They are not intended for medical use.
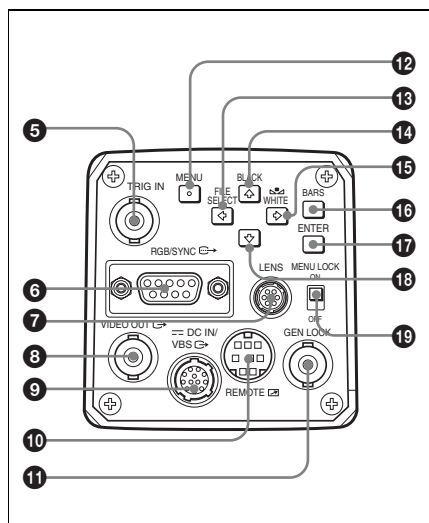
g LENS connector (6-pin)

Connects to a lens cable when attaching the zoom lens.

h VIDEO OUT ⊡→ connector (BNC type)

Outputs a composite video signal.

Location and Functions of Parts and Controls 11

❾ ⎓ **DC IN/VBS** ⊝→ **(DC input/ video signal output) connector (12-pin)**

Connects to the CMA-D2CE*/ D2MDCE/D3CE* camera adaptor. Inputs the DC power and outputs the VBS signal.

* CMA-D2CE/D3CE are intended for general purpose use. They are not intended for medical use.

❿ REMOTE ⊅ **connector (mini DIN 8-pin)**

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

⓫ GEN LOCK (reference sync signal input) connector (BNC type)

Inputs reference sync signals synchronized with camera operation.

⓬ 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 14.

⓭ ◄/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.

⓮ ▲/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.

⓯ ►/ ⊾●⊿ **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.

⓰ 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.

⓱ ENTER button

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

⓲ ▼ button

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

⓳ MENU LOCK ON/OFF switch

When this switch is set to ON, the menu is not displayed on the screen even if you press the MENU button.

About On-screen Menus

Camera operational settings can be changed through simple adjustment of the settings on the on-screen menus.
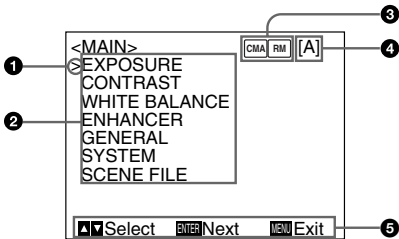This section explains how to read the on-screen menu before starting menu operation.

For the menu configuration of the camera, see page 46.

Note

Before starting menu operation, make sure that the MENU LOCK ON/OFF switch on the rear panel is set to OFF. When it is set to ON, the menu will not be displayed even if you press the MENU button.

MAIN Menu

❶ Cursor

Selects a setting menu or setting item. Move the cursor up or down using the ♠ or ♦ button.

❷ Setting menu items

When you select the desired item with the ♠ or ♦ button and press the ENTER button, the setting menu for adjustment and setting is displayed.

❸ Connecting conditions

The indicator changes according to the equipment which is connected to the REMOTE connector on the camera.
RM :when the RM-C950 remote control unit is connected

CMA :when the CMA-D3CE* camera adaptor is connected via the CCMC-3MZ* connecting cable
CMA RM :when the CMA-D3CE* camera adaptor is connected to the REMOTE connector on the camera via the CCMC-3MZ* connecting cable, and the RM-C950 remote control unit is connected to the REMOTE connector on the CMA-D3CE*
* CMA-D3CE/CCMC-3MZ are intended for general purpose use. They are not intended for medical use.
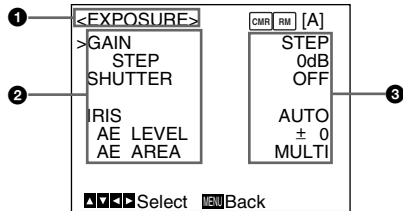
❹ User preset file

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 26.

❺ Operational message

Indicates how to operate the currently displayed menu.

Setting Menu

❶ Setting menu

Indicates the currently selected setting menu.

❷ Setting items

Indicates the items that can be adjusted in each setting menu.
Select the item by moving the cursor beside it with the ♠ or ♦ button.

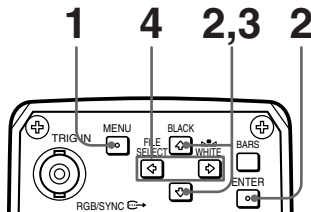Adjusting and Setting with Menus

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❸ **Set values**

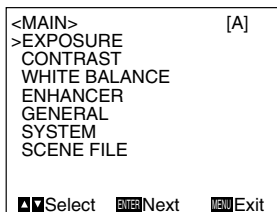The currently set values are displayed. Change the values using the ← or → button.

For the initial set value on each item, see "Menu Configuration" on page 46.

Operation through Menus

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

1 4 2,3 2

1 Press the MENU button.
The MAIN menu appears.

```
<MAIN>                    [A]
>EXPOSURE
 CONTRAST
 WHITE BALANCE
 ENHANCER
 GENERAL
 SYSTEM
 SCENE FILE


▲▼Select  ENTERNext   MENUExit
```

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.

```
<EXPOSURE>                [A]
>GAIN                     STEP
   STEP                    0dB
 SHUTTER                   OFF

 IRIS                     AUTO
  AE  LEVEL                ± 0
  AE  AREA                MULTI


▲▼◀▶Select  MENUBack
```
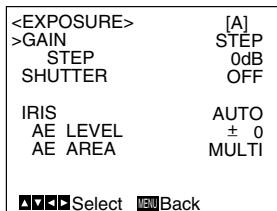
3 Move the cursor to the item to be adjusted by pressing the ▲ or ▼ button.

```
<EXPOSURE>          [A]
 GAIN             STEP
    STEP           0dB
>SHUTTER           OFF

 IRIS             AUTO
  AE  LEVEL        ± 0
  AE  AREA        MULTI

 ▲▼◄►Select  MENUBack
```

4 Change the value by pressing the ◄ or ► button.

Holding down the button changes the value quickly.

```
<EXPOSURE>          [A]
 GAIN             STEP
    STEP           0dB
>SHUTTER          STEP
    SPEED          OFF
 IRIS             AUTO
  AE  LEVEL        ± 0
  AE  AREA        MULTI

 ▲▼◄►Select  MENUBack
```

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 46.

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.

EXPOSURE Menu

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

```
<EXPOSURE>          [A]
>GAIN             STEP
    STEP           0dB
 SHUTTER           OFF

 IRIS             AUTO
  AE  LEVEL        ± 0
  AE  AREA        MULTI

 ▲▼◄►Select  MENUBack
```

GAIN

Adjusts the video gain.

STEP

Select to set the video gain to the desired level.

STEP

Sets the gain level in the range from 0 to 24 dB.

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 11 steps in high-speed mode.

SPEED

Sets the shutter speed.

To set the shutter speed
1 Select SPEED by pressing the ♠ or ♣ button.
2 Display OFF by pressing the ♠ and ♠ buttons simultaneously.
3 Press the ♠ button to set the speed for long-exposure mode, or press the ♠ 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 μs (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 ♠ or ♣ button.
2 Display OFF by pressing the ♠ and ♠ buttons simultaneously.
3 Press the ♠ button to set the speed for long-exposure mode, or press the ♠ 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
250×64.00 μs (1H) + 35.0 μs (constant)
= 16035.0 μs = 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, 1/1000, 1/2000, 1/4000, 1/10000, 1/20000, 1/40000 or 1/100000.

IRIS

Selects the iris mode.

AUTO

Adjusts the iris automatically.
You can set the auto exposure focusing point and the AE (Auto Exposure) window.

AE LEVEL

Adjusts the auto exposure focusing point in the range from –127 to +127.

AE AREA

Selects the AE (Auto Exposure) window when the camera is set to AGC, CCD IRIS or auto-iris control mode.

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.


- LARGE
- MID
- SLIT
- SPOT
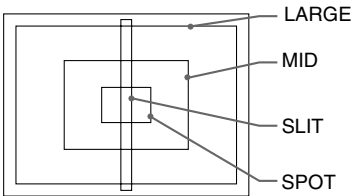
**MANUAL:** Sets the AE window manually with the desired size and position on the screen. Follow the steps below.

1 Select MANUAL and press the ENTER button.

Cross cursor

Set Top-Left Point
▲▼◄►Move Cross Cursor
MENU Cancel ENTER Next
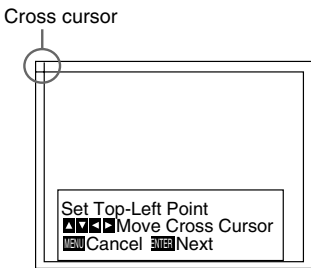
2 Move the cross cursor appearing at the left top corner with the ◄, ►, ▲ or ▼ button to set the upper and left side size, then press the ENTER button.

Set Bottom-Right Point
▲▼◄►Move Cross Cursor
MENU Cancel ENTER Next BARS Back
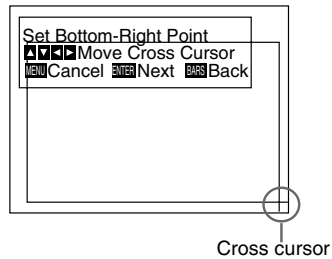
Cross cursor

3 Move the cross cursor appearing at the right bottom corner with the ◄, ►, ▲ or ▼ button to set the lower and right side size, then press the ENTER button.

Move Window
▲▼◄►Move Cross Cursor
MENU Cancel ENTER Fix BARS Back
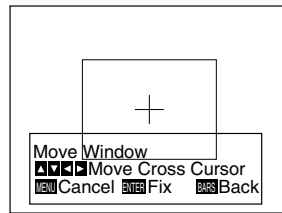
4 Move the AE window to the desired position with the ◄, ►, ▲ or ▼ button, then press the ENTER button.

Note

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

AE SPEED

Appears when you select an option other than MULTI in AE AREA.
Sets auto exposure focusing speed in AGC, CCD IRIS or auto-iris control 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 select an option other than MULTI in AE AREA.
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.

MANUAL

Adjusts the iris with the IRIS control on the RM-C950 remote control unit.
In this option, you can also set the auto exposure focusing point and the AE (auto exposure) window. Setting procedure is the same as that in AUTO.

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  MENUBack
```

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+

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.
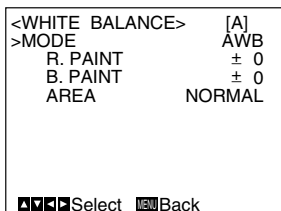The whole screen becomes whiter when you adjust the level in the direction of +.
The whole screen becomes blacker when you adjust the level in the direction of –.
Normally set to ±0.

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.

```
<WHITE  BALANCE>      [A]
>MODE                 AWB
   R. PAINT          ± 0
   B. PAINT          ± 0
   AREA              NORMAL



  ▲▼◄►Select  MENU Back
```

MODE

Selects the white balance modes.

AWB

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

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

Use these items for fine adjustment. Finely adjusts the red or blue in the range from –100 to +100. Adjust them while watching the monitor screen.

For details, see "Adjusting the White Balance" on page 28.

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 ◄, ►, ▲ or ▼ button to set the upper and left side size, and press the ENTER button.
3 Move the right bottom cross cursor with the ◄, ►, ▲ or ▼ 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 these items for fine adjustment. Finely adjust the red or blue in the range from –10 to +10. Adjust them while watching the monitor screen.
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

Finely adjusts the red or blue gain in the range from –127 to +127.
Adjust them while watching the monitor screen.

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).

```
<ENHANCER>              [A]
>DETAIL               ALL
    LEVEL            ±  0
    FREQUENCY         MID
 LINEAR  MATRIX       ALL
    MODE        STANDARD



 ▲▼◄►Select  MENUBack
```

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.

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, then press the ENTER button.
You can adjust the color indicated by the cross cursor (⊞).

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

 TRIGGER              OFF

 NEGA                 OFF
 FLICKER CANCELLER    OFF


 ▲▼◄►Select  MENUBack
```

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.

TRIGGER

Sets when you use a slave unit connected to the TRIG IN connector and synchronize the camera with a stroboscope.

OFF

Select when you do not connect a slave unit.

ON

Select when you connect a slave unit.

POLARITY

Sets to the same polarity as the input pulse signal.

⅃ : Falling edge

Γ : Rising edge

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 OUT          R/G/B
 D-SUB VIDEO          VBS
 D-SUB SYNC       C.SYNC

 RGB  SYNC             G
 12P  CONNECTOR        IN


 ▲▼◀▶Select  MENUBack
```

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.

Note

When the CMA-D3CE[*] is connected to the camera using the CCMC-3MZ[*] connecting cable, "CMA-D3" will appear and you cannot select the baud rate.
* CMA-D3CE/CCMC-3MZ are intended for general purpose use. They are not intended for medical use.

D-SUB OUT

Selects the RGB (**R/G/B**) or component (**Y/CR/CB**) signal output from the RGB/SYNC ⋯→ connector (D-sub 9-pin).

D-SUB VIDEO

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

Note

When the CMA-D3CE[*] is connected to the camera with the CCMC-3MZ[*] connecting cable, the item does not function.
* CMA-D3CE/CCMC-3MZ are intended for general purpose use. They are not intended for medical use.

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 (WEN 1-3)

Outputs the WEN signal. When connecting peripheral equipment, the signal is used as trigger pulse output to the equipment.
Switching WEN 1 to 3 provides a different pulse signal phase.

For the timing chart of the WEN pulse signal for each setting, see page 43.

Note

When TRIGGER in the GENERAL menu is set to OFF, D-SUB SYNC is always set to WEN and you cannot select a different phase.

POLARITY

Selects the polarity of the pulse signal.
  ⅂Ⅎ : Negative
  ꓕꓕ : Positive

Note

When the CMA-D3CE[*] is connected to the camera with the CCMC-3MZ[*] connecting cable, you cannot select C. SYNC.
* CMA-D3CE/CCMC-3MZ are intended for general purpose use. They are not intended for medical use.

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.

12P CONNECTOR

Switches the input and output of the ⎓ DC IN/VBS ⬚→ connector (12-pin) and selects the output signal.

IN

Functions as the input connector.

OUT

Functions as the output connector.

SIGNAL

Selects the output signal from the ⎓ DC IN/VBS ⬚→ connector.
 HD/VD: Outputs the HD/VD signal.
 C. SYNC: Outputs the composite sync signal.

Note

When the CMA-D3CE[*] is connected to the camera with the CCMC-3MZ[*] connecting cable, you cannot set this item. Switch between input and output with the IN/OUT switch on the CMA-D3CE[*] camera adaptor.

For details, refer to the operating instructions of the CMA-D3CE[*].

* CMA-D3CE/CCMC-3MZ are intended for general purpose use. They are not intended for medical use.

When an External Sync Signal (VBS Signal) Is Input (VBS Lock)

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 (HD/VD Lock)

The following item appears.
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.

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.

```
<SCENE FILE>          [A]
>FILE SELECT           A
 LOAD




 ▲▼◄►Select  MENUBack
```
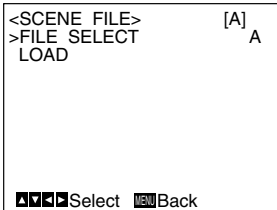
FILE SELECT

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
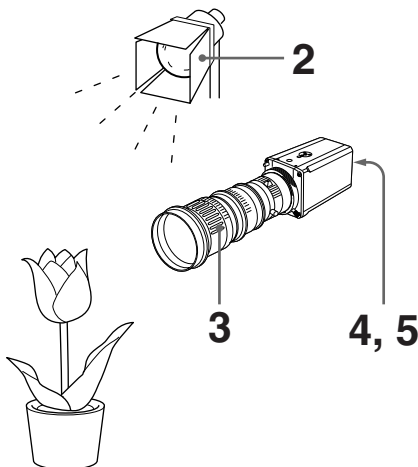

1 Turn on the power of the camera and all connected devices.

2 Illuminate an object with proper lighting.

3 Aim the camera to the object and adjust the iris, focus and zoom.

4 Adjust the white balance.

For details, see "Adjusting the White Balance" on page 28.

5 Adjust the settings as required.

For details, see "Adjusting and Setting with Menus" on page 13.

6 Start shooting.

Adjusting the Black Balance

Adjust the black balance first, after turning on the power of your camera.
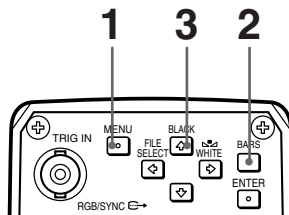
1 If any menu is displayed on the screen, press the MENU button to remove it.

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

3 Press the BLACK button.

The lens iris control is automatically closed, and the black balance is adjusted. If you use a manual-iris lens, close the iris then press the BLACK button. 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 42.

Operation

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.
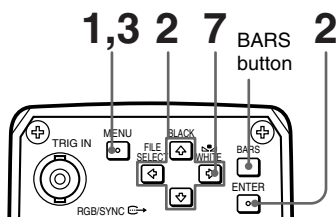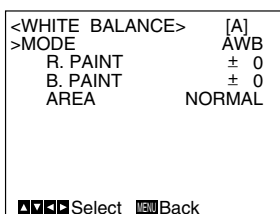
2 Select the WHITE BALANCE menu, and set MODE to AWB.

```
<WHITE BALANCE>      [A]
>MODE               AWB
   R. PAINT          ± 0
   B. PAINT          ± 0
   AREA            NORMAL



 ▲▼◀▶Select  ▥Back
```

For menu operation, see "Operation through Menus" on page 14.

3 Select AREA with the ♠ or ♥ button and then set it to NORMAL with the ◀ or ▶ button.
A detecting window appears.

```
<WHITE BALANCE>      [A]
 MODE               AWB
   R. PAINT          ± 0
   B. PAINT          ± 0
 >AREA            NORMAL



 ▲▼◀▶Select  ▥Back
```
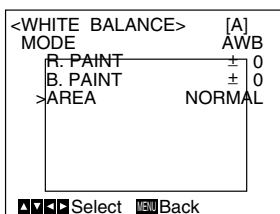
For more details, refer to "WHITE BALANCE Menu" on page 20.

4 Display the camera image on the monitor screen.

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

5 Set the lens iris control as follows:
When using an auto-iris lens: Set to auto-iris control.
When using a manual-iris lens: Set to an appropriate iris 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 42.

Error message
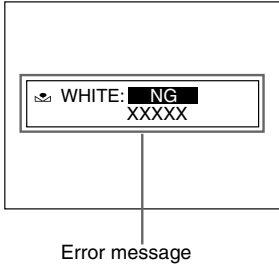
Adjusting the Picture Tone in a Multi-Camera System

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 35.

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 the SYSTEM menu, and adjust the horizontal phase.

For more details, see "SYSTEM Menu" on page 24.

3 Select SC. PHASE from 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 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 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.

Operation

Installation

Mounting the Lens

Only 1/2-inch bayonet-mount lenses can be attached to the camera.

Note

After mounting the lens, be sure to attach the supplied lens mount stopper to prevent the lens from getting loose.

1 Turn the mount lever counterclockwise as far as it goes.
(If the lens mount cap is in place, remove it.)
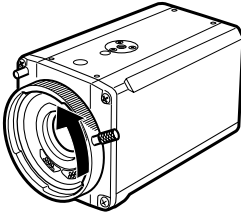
2 Align the positioning pin on the lens with the matching hole in the lens mount and attach the lens (not supplied).
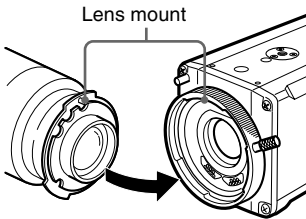
Lens mount

3 Turn the mount lever clockwise as far as it goes to lock the lens in the lens mount.
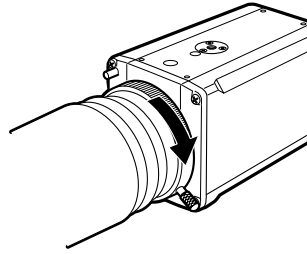
4 Attach the supplied lens mount stopper to the boss on the camera.

Lens mount stopper
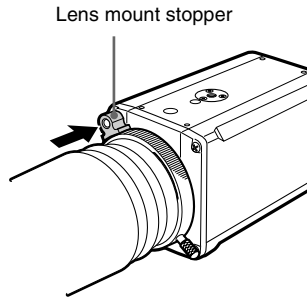
5 Connect the lens cable to the LENS connector on the camera.
(When attaching a lens with a built-in cable)
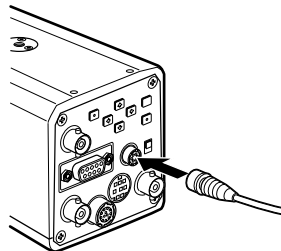
Use the optional lens hold bracket

If the lens mount becomes loose, the lens may come out and fall, causing serious injury to persons or damage to articles. When you install the camera high up for a long period of time, take preventive measures or safety precautions against falling.
The following optional lens hold brackets are available as service parts.

For use with DXC-990P

Part Number: A-8279-913-A
Lens hold bracket (990/990P) assy.

To purchase the product, contact your nearest Sony dealer.

Avoid installing the camera in a location subject to strong vibration or shock

If a camera or lens is subject to strong vibration or shock, the lens mount may become loose and fall, causing injury to persons or damage to articles.

Check the lens mount

Check the lens mount at least once a year to ensure it has not become loose.

Mounting a Microscope Adaptor

To attach the camera to a microscope or an 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 an adaptor to be used.

Mounting on a Tripod

To mount the camera on a tripod, use the screw hole on the bottom or top panel of the camera.
Use the following screw.

U1/4″, 20 UNC
ℓ = 4.5 mm ± 0.2 mm
(ISO standard)
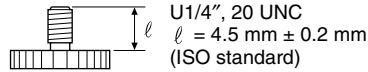
Attaching to a Wall or Ceiling

To attach the camera on a wall or ceiling, use the appropriate bracket and mounting screws (U1/4″, 20 UNC).

Connections

To supply power to the camera, use the CMA-D2CE*/D2MDCE/D3CE* camera adaptor (not supplied).

Note

Be sure to turn off the power supply for all equipment before making any connection.

* CMA-D2CE/D3CE are intended for general purpose use. They are not intended for medical use.

Using the CMA-D2CE*/D2MDCE camera adaptor

There are two methods for connecting the camera and the camera adaptor.

Using the CCDC cable

This connection only supplies power to the camera.

For connecting method, see "Connecting using the CCDC cable (for supplying power only)" on page 33.

Using the CCXC cable

This connection supplies power to the camera and transmits video signals to the camera adaptor.

For connecting method, see "Connecting using the CCXC cable (for supplying power to camera and video signals to the camera adapter)" on page 33.

Note

Be sure to use one camera adaptor for each DXC-990P unit.

Although the CMA-D2CE*/D2MDCE camera adaptor has two CAMERA connectors (4-pin and 12-pin), the power consumption of the camera is such that two camera units cannot be connected at the same time.

* CMA-D2CE is intended for general purpose use. It is not intended for medical use.

Using the CMA-D3CE* camera adaptor

The connections using the CMA-D3CE* camera adaptor supply power to the camera and transmit video signals to the camera adaptor.

For connecting method, see "Connecting to the CMA-D3CE Camera Adaptor" on page 36.*

* CMA-D3CE is intended for general purpose use. It is not intended for medical use.

Connecting to Video Equipment With Composite Video Input Connectors

Connecting using the CCDC cable (for supplying power only)
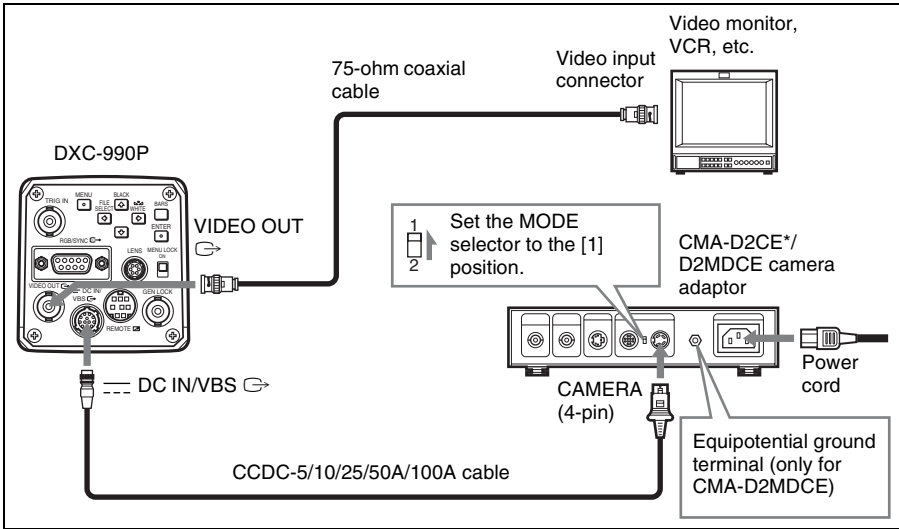
* CMA-D2CE is intended for general purpose use. It is not intended for medical use.

Connecting using the CCXC cable (for supplying power to camera and video signals to the camera adapter)
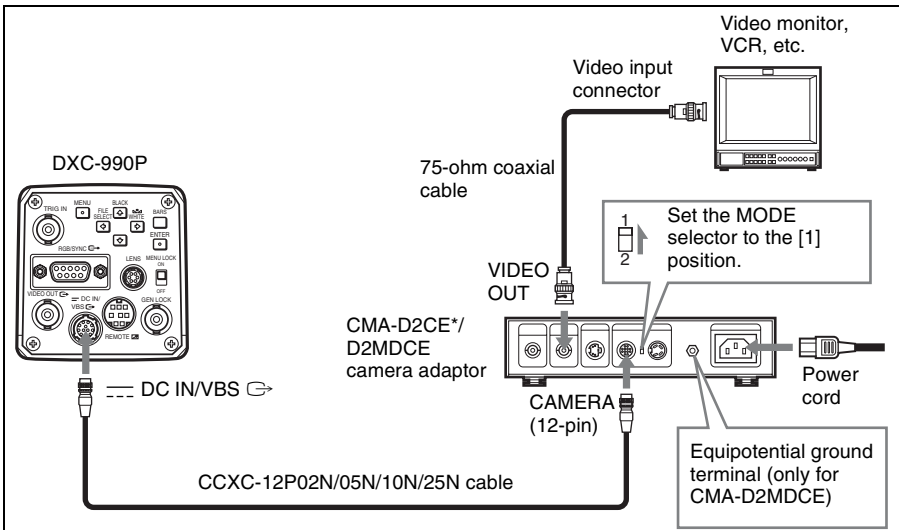
* CMA-D2CE is intended for general purpose use. It is not intended for medical use.

Connecting to Video Equipment With RGB or S-Video Inputs
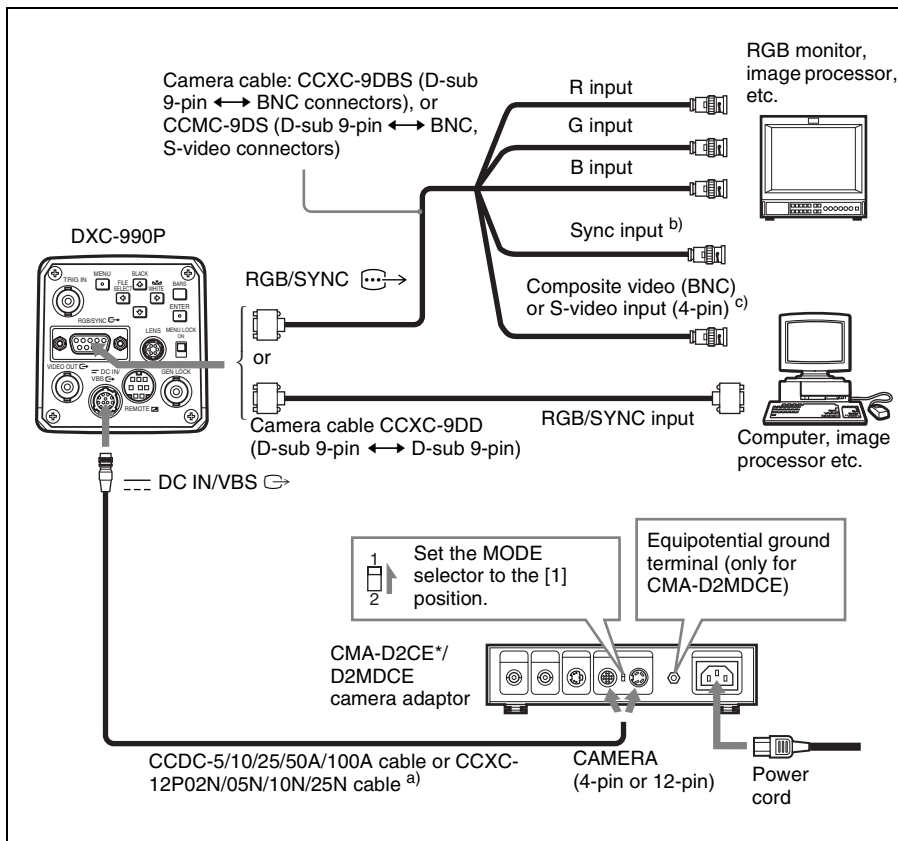
a) If a CCXC cable is used, the S-video signal is also output from the S-video output of the CMA-D2CE*/D2MDCE.

b) 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 24.

c) 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 24.

* CMA-D2CE is intended for general purpose use. It is not intended for medical use.

Connecting Two or More Cameras — Multi-Camera System
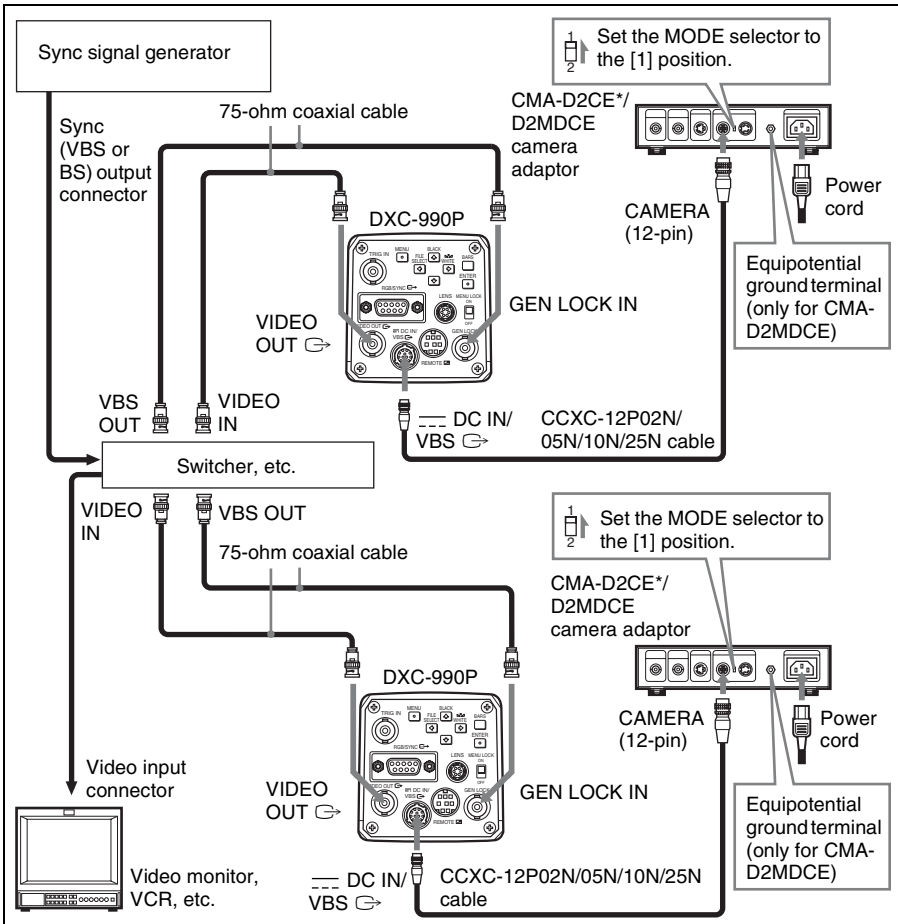
Notes

- 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 GEN LOCK IN connectors on the cameras.
  - 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 29.

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

* CMA-D2CE is intended for general purpose use. It is not intended for medical use.

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Connecting to the CMA-D3CE* Camera Adaptor
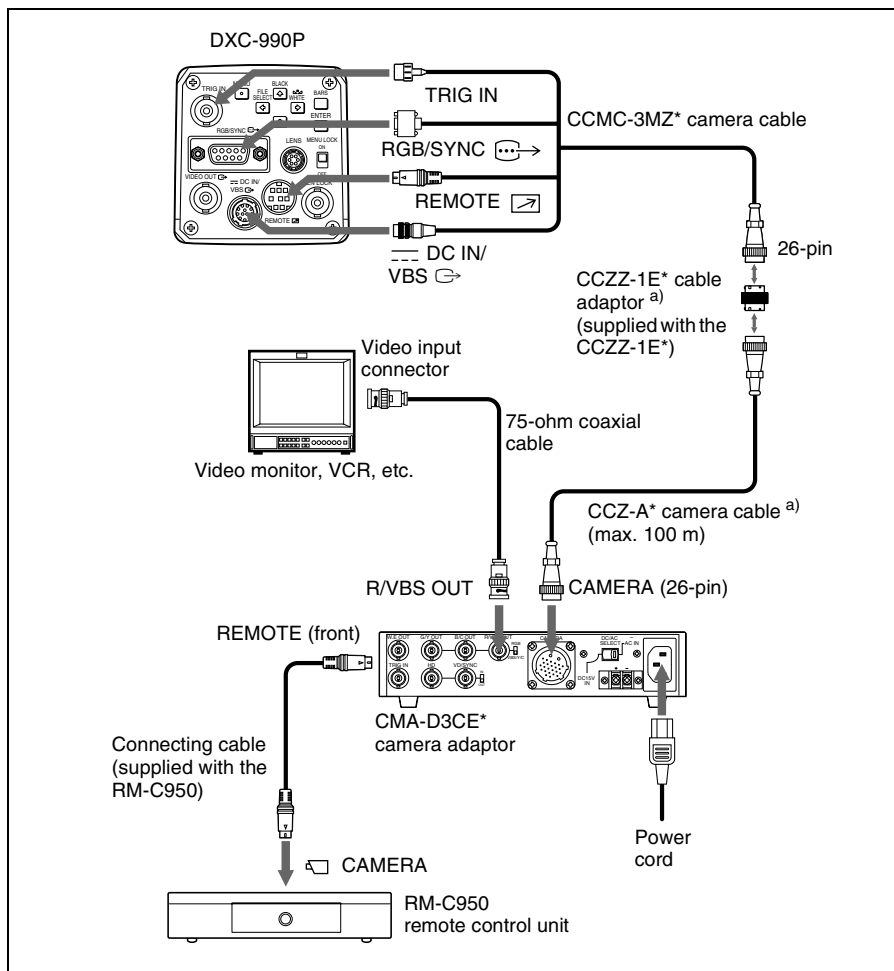
a) To extend the cable, connect the CCMC-3MZ* camera cable to the CCZ-A* camera cable using the cable adaptor supplied with the CCMC-3MZ*.

* CMA-D3CE/CCMC-3MZ/CCZZ-1E/CCZ-A are intended for general purpose use. They are not intended for medical use.

Connecting to a Remote Control Unit
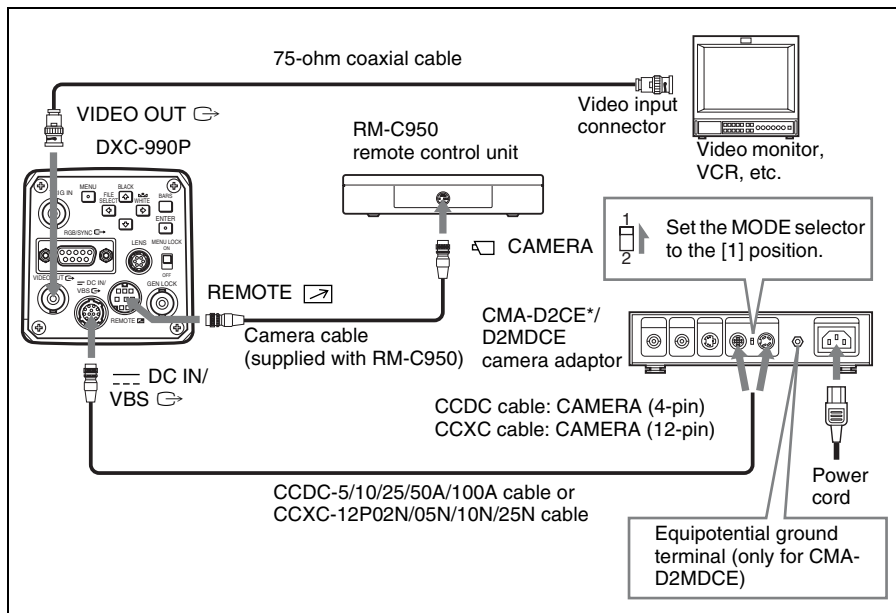
* CMA-D2CE is intended for general purpose use. It is not intended for medical use.

Operating the Camera with the RM-C950 Remote Control Unit

The functions of the following buttons and control 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 ⇧ ⇩	SHUTTER SPEED	Use to set the shutter speed without displaying the menu when SHUTTER is set to STEP or VARIABLE in the menu.
GAIN ◿	GAIN	Use to change the variable range of gain levels.
FUNCTION ⇧	BLACK	Use to start the auto black balance adjustment.

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.

Installation and Connections

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Connecting to a Computer

This section explains the system for controlling the camera with a computer using an RS-232C command.
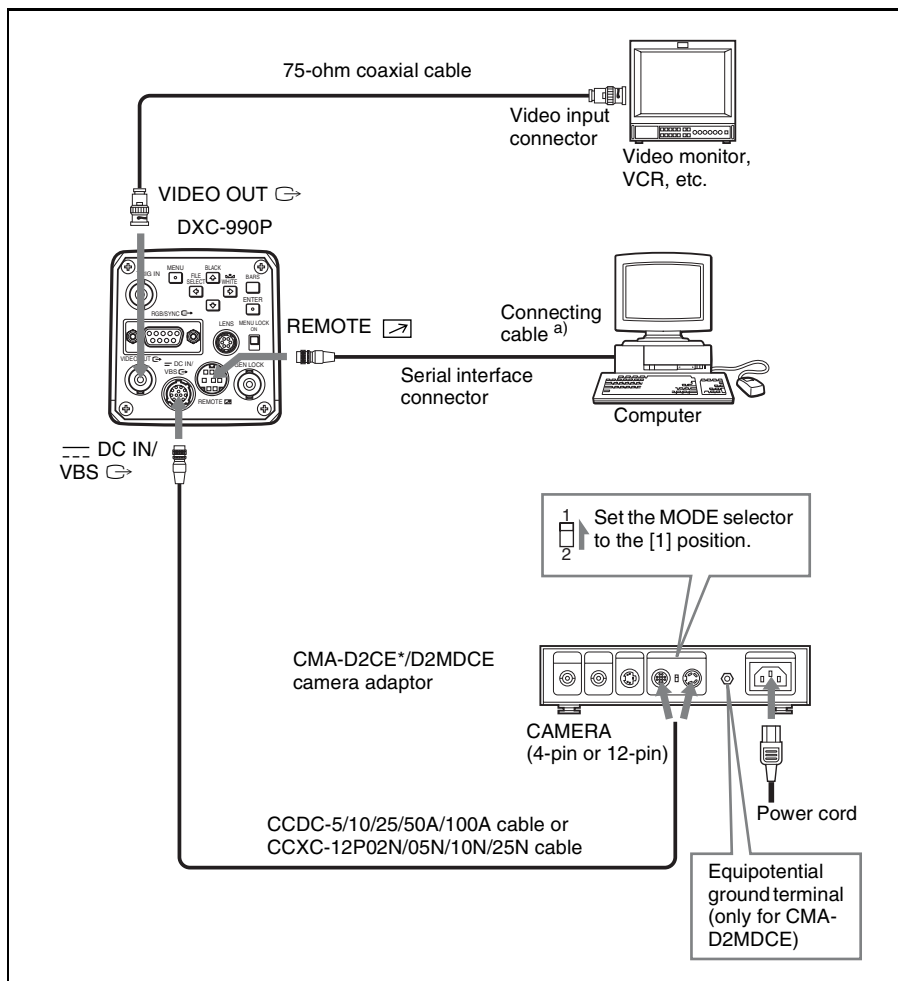
a) Use the shielded connecting cable for connecting to a computer.

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

* CMA-D2CE is intended for general purpose use. It is not intended for medical use.

Connections for Long Exposure Shooting

This section explains the system for shooting using long exposure in STEP or VARIABLE mode for electronic shutter.
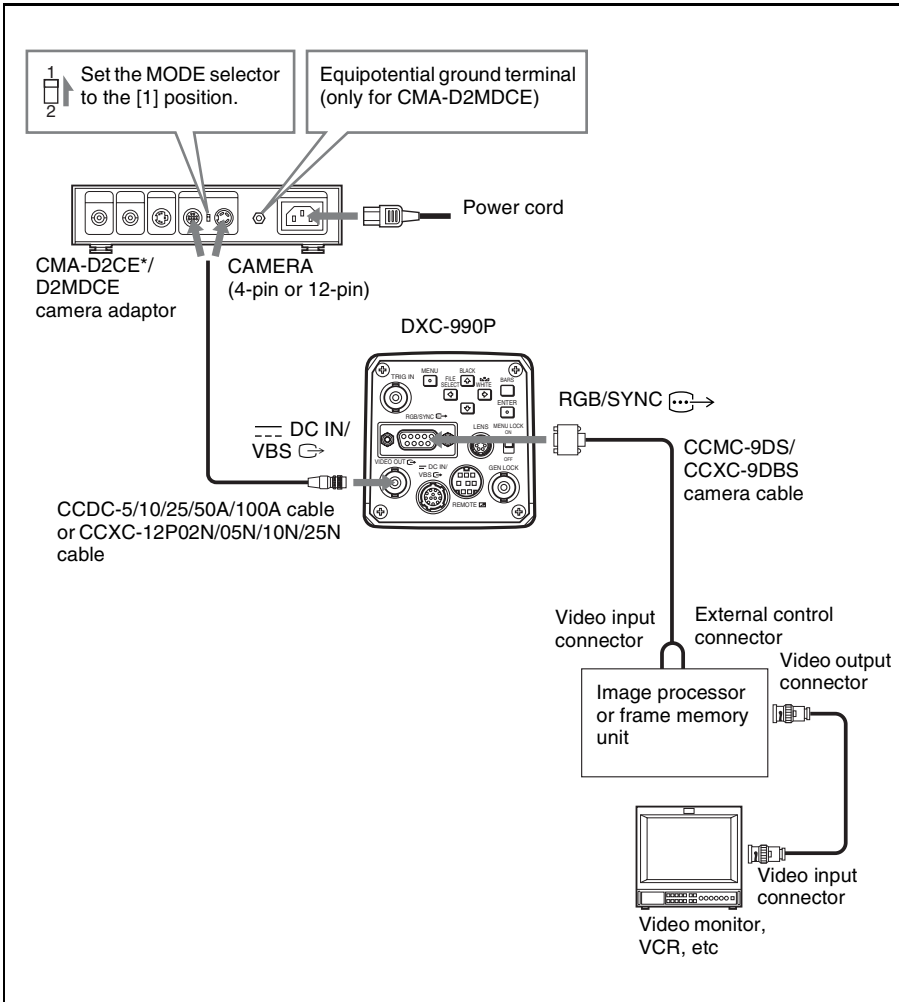
Note

When shooting with long exposure, set D-SUB SYNC to WEN1-3 (page 24) and RGB SYNC to G (when using RGB) (page 24) in the SYSTEM menu.

* CMA-D2CE is intended for general purpose use. It is not intended for medical use.

Connections for Shooting Using a Flash

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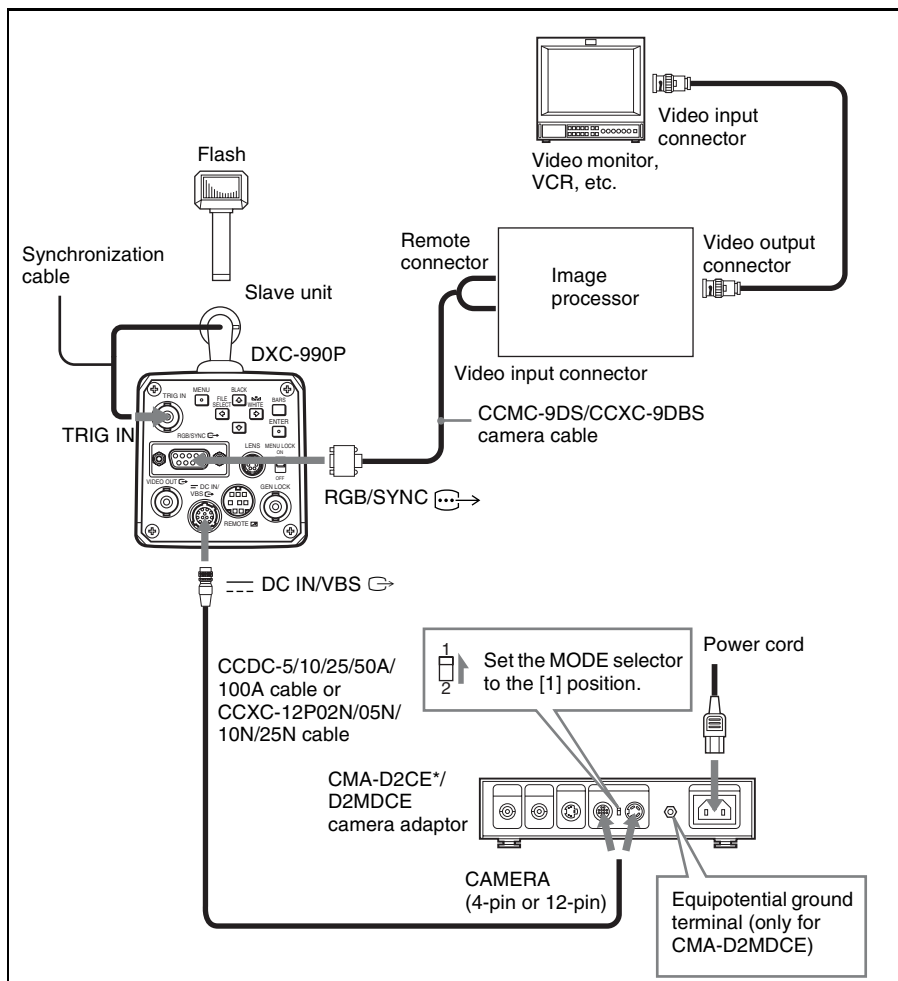
Note

When connecting a flash unit, set TRIGGER to ON in the GENERAL menu (page 23) and D-SUB SYNC to WEN1-3 in the SYSTEM menu (page 24).

* CMA-D2CE is intended for general purpose use. It is not intended for medical use.

Precautions

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 $^{\circ}$C to +45 $^{\circ}$C [23 $^{\circ}$F to 113 $^{\circ}$F]). For details, see "General" of "Specifications" on page 44.
- 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

Ventilation

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

Transportation

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

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.

Typical CCD Phenomena

The following phenomena may appear on the monitor screen while you are using the DXC-990P 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.
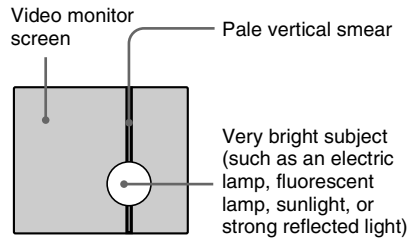
This phenomenon is common to CCD imaging elements using an interline transfer system, and is caused when electric charge induced by infrared radiation deep within the photo sensor is transferred to the resistors.

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. • Increase the illumination. • Widen the iris opening. • Increase the video gain. Take the measures above, then press the ◣●◢ WHITE button.
WHITE: NG LEVEL HIGH	The video level of the image is too high. • Remove any brightly illuminated objects. • Decrease the illumination. • Close the iris opening. • Decrease the video gain. 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.

WEN Pulse Timing Chart

The following is the timing charts of a WEN pulse when D-SUB SYNC is set to WEN 1, 2 or 3 in the SYSTEM menu.
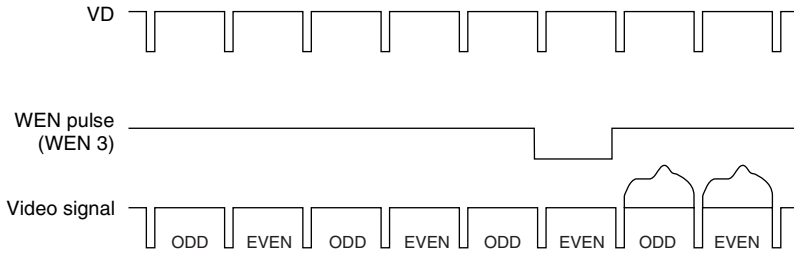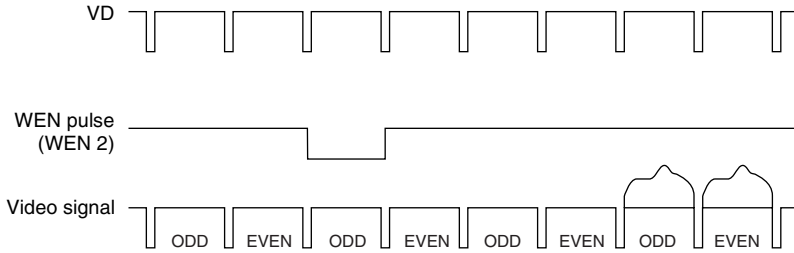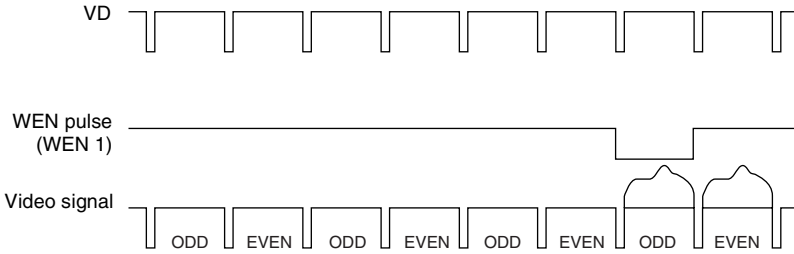
Specifications

Image system/optical system

Image device 1/2 type CCD, interline transfer
              type
Effective picture elements
              752 (horizontal) × 582 (vertical)
Lens mount   1/2-inch bayonet type

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   2000 lux (F11, 3,200K)
Signal-to-noise ratio
              62 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 0.5 sec.
              (adjustable with CCD IRIS)
Linear matrix ON/OFF switchable
Gamma compensation
              ON/OFF switchable
Charge accumulation mode
              Switchable between field and
              frame mode

Inputs/outputs

Video input/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/R-Y/B-Y: 1.0 Vp-p/0.525 Vp-p/
              0.525 Vp-p
              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 OUT: BNC, 75 ohms,
              unbalanced
              DC IN/VBS: 12-pin
              REMOTE: mini DIN 8-pin
              TRIG IN: BNC, TTL
              RGB/SYNC: D-sub 9-pin
              LENS: 6-pin connector for the 2/3-
              inch lenses

General

Power supply 12 V DC
Power consumption
              Approx. 7.6 W
Rated current 0.66 A
Operating temperature
              –5 °C to +45 °C
              (23 °F to +113 °F)
Storage and transport temperature
              –20 °C to +60 °C
              (–4 °F to +140 °F)
Operating humidity
              20% to 80% (free of condensation)
Storage and transport humidity
              20% to 90% (free of condensation)
Operating pressure
              700 hPa to 1,060 hPa
Storage and transport pressure
              700 hPa to 1,060 hPa
Dimensions   70 × 72 × 123.5 mm (2 $^7/_8$ × 2 $^7/_8$
              × 4 $^7/_8$ inches) (w/h/d) (not
              including the projecting parts)
Mass   Approx. 630 g (1 lb 6 oz)
Supplied accessories
              Lens mount cap (1)
              Lens mount stopper (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)

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

Optional Accessories

Camera adaptor

CMA-D2CE[*] camera adaptor (for PAL format)
CMA-D2MDCE camera adaptor (for PAL format)
CMA-D3CE[*] camera adaptor (for PAL format)

Remote control unit

RM-C950 remote control unit (connecting cable supplied)

Power supply cable (Camera cable)

CCDC series (length: 5 m [16 ft], 10 m [32 ft], or 25 m [82 ft])
CCDC-A series (length: 50 m [164 ft], or 100 m [328 ft])
CCXC series (length: 2 m [7 ft], 5 m [16 ft], 10 m [32 ft], or 25 m [82 ft])
CCMC-3MZ[*] (length: 3 m [10 ft])
CCZ-A[*] series (length: 2 m [7 ft], 5 m [16 ft], 10 m [32 ft], 25 m [82 ft], 50 m [164 ft] or 100 m [330 ft])

Camera cable

CCXC-9DBS (D-sub ⟷ BNC × 5)
CCXC-9DD (D-sub ⟷ D-sub)
CCMC-9DS (D-sub ⟷ BNC × 4, S-video connector)

* CMA-D2CE/CMA-D3CE/CCMC-3MZ/CCZ-A are intended for general purpose use. They are not intended for medical use.

Dimensions

Front
70 (2 $^7/_8$)
72 (2 $^7/_8$)

Side
10.5 ($^7/_{16}$)
123.5 (4 $^7/_8$)
12.7 ($^1/_2$)

Unit: mm (inches)
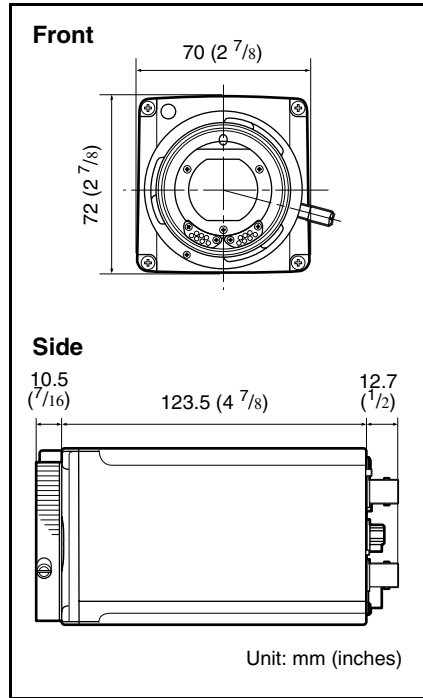
Design and specifications are subject to change without notice.

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.

Appendix

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.

```
EXPOSURE ──── GAIN ──── STEP ──────────── STEP (0 dB)
(Page 15)             ├ ACG ───────────── LIMIT (24 dB)
                      └ HYPER

             ── SHUTTER ┬ OFF
                        ├ STEP ────────── SPEED ──── OFF
                        ├ VARIABLE ────── SPEED ──── OFF
                        └ CCD-IRIS ────── LIMIT ──── 1/10000

             ── IRIS ──── AUTO ──┬── AE LEVEL (±0)
                        └ MANUAL ┘├ AE AREA ──── MULTI, LARGE, MID,
                                  │              SPOT, SLIT, MANUAL
                                  ├ AE SPEED ──── MID, FAST, SLOW
                                  └ AE DETECT ──── AVERAGE, PEAK
```

```
CONTRAST ──── EFFECT ──── MANUAL ────────── KNEE POINT ── OFF, HIGH, MID, LOW
(Page 18)             │                    └ BLACK STRETCH (±0)
                      ├ DCC+
                      └ DYNALATITUDE ──── LEVEL (±0)
             ── GAMMA ──── OFF
                        └ ON ──────────── LEVEL (±0)
             ── MASTER ──────────────── R. PEDESTAL (±0)
                PEDESTAL               B. PEDESTAL (±0)
```

```
WHITE ──────── MODE ──── AWB ──────────── R. PAINT (±0)
BALANCE              │                   ├ B. PAINT (±0)
(Page 20)            │                   └ AREA (NORMAL)
                     │
                     ├ ATW NORMAL ──┬── R. PAINT
                     ├ ATW WIDE ────┤├ B. PAINT
                     │              ├ AREA
                     │              └ SPEED
                     │
                     ├ MANUAL ──────┬── R. GAIN (±0)
                     │              └ B. GAIN (±0)
                     │
                     ├ 3200K
                     └ 5600K
```

```
ENHANCER ────── DETAIL ──────── ALL ────────── LEVEL (±0)
(Page 21)                    ┌ TARGET ┘      └ FREQUENCY ─ LOW, MID, HIGH
                            └ OFF

         └─── LINEAR ──────── ALL ──────── MODE ──────── MANUAL
              MATRIX        ┌ TARGET ┘                 ─ STANDARD
                           └ OFF                       ─ R ENHANCE
                                                       ─ B ENHANCE
                                                       └ G ENHANCE

         └ ─ ─TARGET* ──────── ALL
              COLOR          ─ IN ─────────── RANGE (±0)
                            └ OUT
```

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

```
GENERAL ────── CCD MODE ─────── FIELD, FRAME
(Page 22)    ─ SHADING COMP. ─┬ OFF
                             └ ON ──────────── LEVEL (±0)
        ─── TRIGGER ────────┬ OFF
                           └ ON ───────── POLARITY (ʊ)
        ─ NEGA ─────────── OFF, ON
        └ FRICKER ──────── OFF, ON
          CANCELLER
```

```
SYSTEM ─────── BAUD RATE ─────── 19200, 9600, 4800, 2400, 1200
(Page 24)    ─ D-SUB OUT ─────── R/G/B, Y/CR/CB
        ─── D-SUB VIDEO ────── VBS, Y/C
        ─── D-SUB SYNC ──────┬ C.SYNC
                            ─ WEN (WEN 1) ── POLARITY (ʊ)
                            ─ WEN 2* ─ ─ ─ ─ ─
                            └ WEN 3* ─ ─ ─ ─ ─
        ─── RGB SYNC ──────── OFF, G, RGB
        ─── 12P CONNECTOR ──┬ IN
                           └ OUT ────────── SIGNAL (HD/VD)
        ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ H. PHASE** (±0)
                          └ ─ SC. PHASE ROUGH** (0˚)
                          └ ─ SC. PHASE FINE** (±0)
        └ ─ ─ ─ ─ ─ ─ ─ ─ ─ H. PHASE** (±0)
```
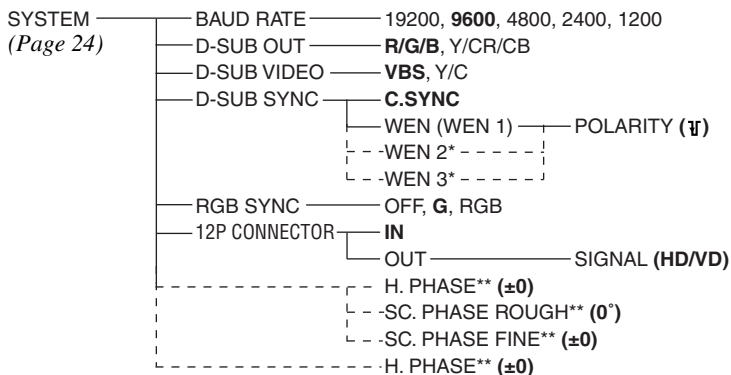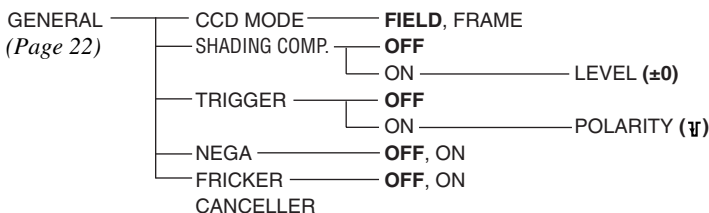
* Selectable only when TRIGGER is set to ON in the GENERAL menu.
** Displayed only when an external sync signal is input.

```
SCENE ──────── FILE SELECT ─────── A, B
FILE        └ LOAD ─────────────── STANDARD, MICROSCOPE, FULL AUTO, STOROBE,
(Page 26)                          FILE B
```
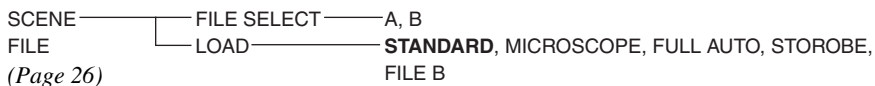
For Customer in China

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

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http://www.sony.net/

Sony Corporation