SONY

3-754-157-13 (2)

CCD Color Video Camera Module

XC-999/999P

Operating Instructions page 2

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

取扱説明書 33ページ

お買い上げいただき、ありがとうございます。
お使いになる前に、この取扱説明書をお読みください。
お読みになったあとは、後日お役に立つこともありますので、
必ず保存してください。

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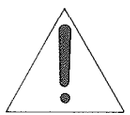
Owner's Record

The model and serial numbers are located on the body. Record the model and serial numbers in the spaces provided below.
Refer to them whenever you call upon your dealer regarding this product.

Model No. _____ Serial No. _____

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.



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

For customers in the U.S.A.

WARNING

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

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for computing device pursuant to Subpart J of Part 15 of FCC Rules.

For customers in Canada

This apparatus complies with the Class A limits for radio noise emissions set out in Radio Interference Regulations.

Pour les utillisateurs au Canada

Cet appareil est conforme aux normes Classe A pour bruits radioélectriques, spécifiés dans le Réglement sur le brouillage radioélectrique.

Bescheinigung des Herstellers

Hiermit wird bescheinigt, daß der CCD-Videokameramodul XC-999P in Übereinstimmung mit den Bestimmungen der Amtsblattverfügung Nr. 1046/1984 funkentstört ist. Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.
Sony Corporation

Hinweis

Gemäß dem Amtsblatt des Bundesministers für das Post- und Fernmeldewesen Nr. 163/1984 wird der Betreiber darauf aufmerksam gemacht, daß die von ihm mit diesem Gerät zusammengestellte Anlage auch den technischen Bestimmungen dieses Amtsblattes genügen muß.

English

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Features

The XC-999/999P is a ultra-small CCD color video camera module which uses a CCD (Charge Coupled Device), a solid stage image sensor.

Ultra-small size and lightweight
The camera is so small and light that you can install it anywhere: even in locations where conventional video cameras cannot be installed.

High resolution
The CCD used in the camera has either 768 x 494 (XC-999) or 752 x 582 (XC-999P) picture elements, ensuring a high resolution image.

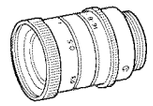
High Sensitivity
A HYPER HAD sensor provides the camera with high sensitivity and less smear, and it is possible to shoot under low light condition.

Four white balance adjustment mode
You can choose the white balance mode according to the lighting conditions by setting the WHITE BALANCE switches.

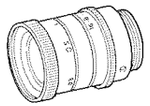
Electronic shutter with wide range of operating speeds
The camera's electronic shutter has four speeds: OFF (1/60 s (XC-999) or 1/50 s (XC-999P)), FLICKERLESS (1/100 s for XC-999 or 1/120 s for XC-999P) and 1/1000 s.
By setting the switches to the CCD IRIS position, the camera automatically adjusts the shutter speed according to amount of incident light, thus regulating the level of the video signal.

Special Accessories (not Supplied)

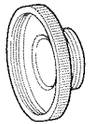
You can build a high performance system by using the following XC-999/999P accessories.



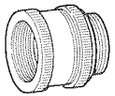
VCL-06S12XM
special MT lens (f=6mm)



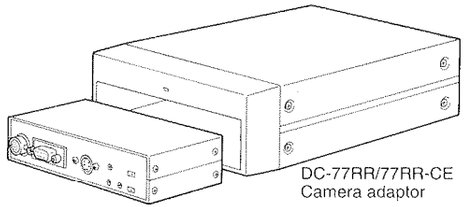
VCL-12S12XM
special MT lens (f=12mm)



LO-999CMT
C-mount adaptor

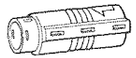


LO-999ERK
extension ring kit

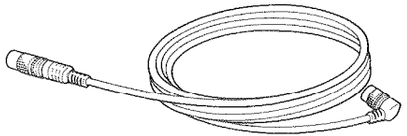


CMA-999/999P
RGB adaptor

DC-77RR/77RR-CE
Camera adaptor



PC-XC03 auto iris lens plug



CCXC-12P05S/D/R/U/L shielded type
connecting cable

This section briefly explains the functions of these accessories.

CMA-999/999P RGB adaptor
The RGB adaptor provides the following functions.
- RGB output function (D-SUB 9-pin) and Y (luminance)/C (chrominance) output (Y/C separated output connector) function
- Genlock function
- Exposure time control function

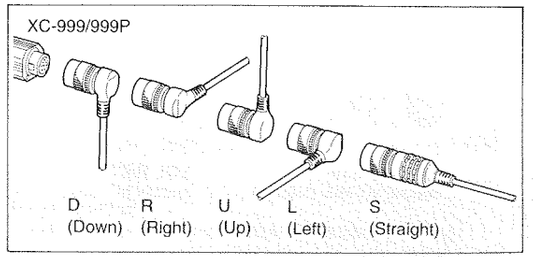
You can use this adaptor together with either of the DC-77RR/77RR-CE or the JB-77.

VCL-12S12XM special MT lens (f=12mm)
VCL-06S12XM special MT lens (f=6mm)
Manual iris lens specially designed for use with the XC-999/999P.

LO-999CMT C-mount adaptor
Lens mount adaptor designed for mounting conventional C mount lens onto the XC-999/999P.

LO-999 ERK extension ring kit
Extension ring kit designed for the XC-999/999P Color video camera module.

CCXC-12P05S/D/R/U/L connecting cables
The cable end of the camera side connector have different angles as illustrated. Note that you can not change the connector end angle.



PC-XC03 auto iris lens plug
Plug for auto iris lens

XCM-999 service manual

This manual also explains the functions of the above accessories, and how to install them, in addition to those of the XC-999/999P CCD color video camera module.

The listed precautions cover the color video camera module and accessories.

Safety

Operate the camera system only with the power source specified in the "Specifications".

Operation and storage

Avoid operating or storing the camera under the following conditions.
- Extremely hot or cold place (operating temperature 0°C to +40°C) (0°F to 104°F).
- Locations exposed to direct sunlight, or close to central heating units
- Dusty places
- Locations subject to strong vibration
- Near a TV or radio station that radiates high-powered radio frequencies.

Do not subject the camera to strong impacts

Be careful not to drop the unit, or subject it to other shocks, which could cause it to fail.

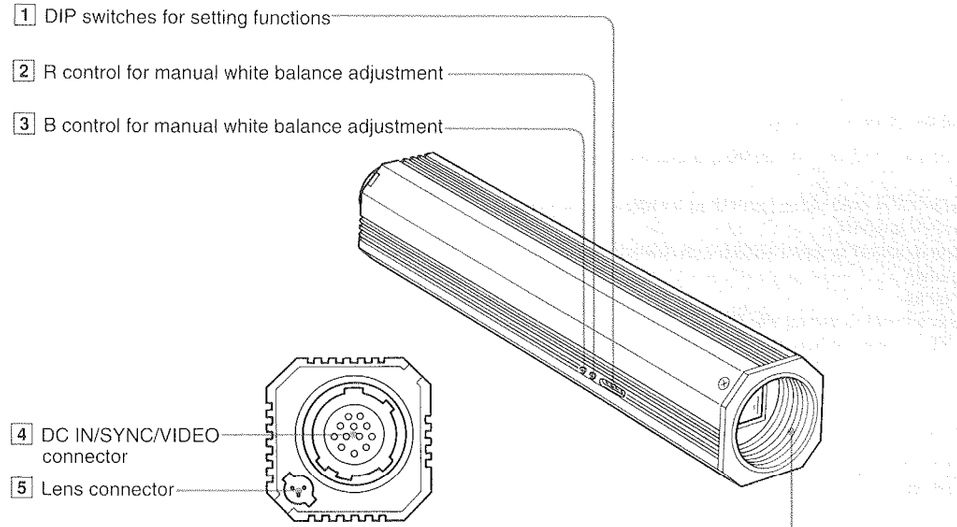
Transportation

Save the original carton and associated packing materials. They will be useful when you transport or ship the camera.

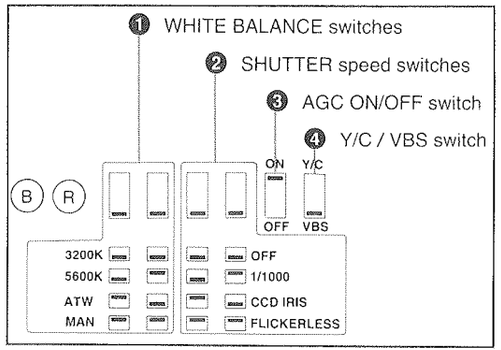
Cleaning

Clean the lens and filter with a blower. Clean the body,panel and controls with a dry soft cloth or soft cloth lightly moistened with a mild detergent solution. Do not use any organic solvents, such as alcohol or benzine, which might damage the finish.

XC-999/999P CCD Color Video Camera Module



1 DIP switches for setting functions



1 WHITE BALANCE switches

Select the white balance setting according to the lighting conditions.

3200K (fixed): For indoor shooting under incandescent light. (factory setting)

5600K (fixed): For outdoor shooting on sunny days.

ATW (auto tracing white balance): The white balance is adjusted according to the color temperature transition of the subject. This mode is suitable for shooting with variable lighting.

MAN (manual): Select this position when you want to adjust the red color with the R control and the blue color with the B control.

2 SHUTTER speed switches

Set the SHUTTER speed switches to select the desired shutter speed. Set the switches to the CCD IRIS position to use the CCD iris function.

OFF: 1/60 s (XC-999) or 1/50 s (XC-999P) (factory setting)

1/1000: 1/1000 s

FLICKERLESS: 1/100 s (XC-999) or 1/120 s (XC-999P)

CCD IRIS: Selects CCD IRIS mode. Select this position when using the exposure time control functions of the RGB adaptor. By setting the switches to this CCD IRIS position, the camera automatically adjusts the shutter speed according to the incident light.

Note

When shooting under the light of fluorescent lamps on a 50 Hz (XC-999) and 60 Hz (XC-999P) power supply, particularly at 1/1000 speed or in the CCD IRIS mode, the picture may flicker. If that is the case, set the shutter speed to the FLICKERLESS position.

3 AGC (auto gain control) ON/OFF switch

ON: Auto gain control (factory setting)

OFF: 0 dB

4 Y/C / VBS switch

Y/C: Select this position to output the Y/C separated signal from the DC IN/SYNC/VIDEO connector.

VBS: Select this position to output the VBS signal from the DC IN/SYNC/VIDEO connector. (factory setting)

2 R control for manual white balance adjustment
This control is effective when the WHITE BALANCE switches are set to MAN. Adjust the red color by turning the control with the supplied screw driver.

3 B control for manual white balance adjustment
This control is effective when the WHITE BALANCE switches are set to MAN. Adjust the blue color by turning the control with the supplied screw driver.

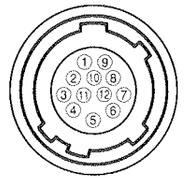
4 DC IN/SYNC/VIDEO connector (Multi 12-pin)
This connector inputs DC 12 V power and outputs the video signal when the CCXC-12P05S/D/R/U/L camera cable is connected. The camera is synchronized with the external sync signal when receiving an external sync signal (VS, HD/VD) by connecting the signal generator.

5 Lens connector (3-pin)
Connect the auto iris lens plug.

6 LENS mount (special mount)
Usable lenses are as follows.
Special lens (not supplied)
- VCL-12S12XM special MT lens (f=12mm)
- VCL-06S12XM special MT lens (f=6mm)

C mount lens (not supplied)
The LO-999CMT C-mount adaptor is needed to attach the C mount lens.

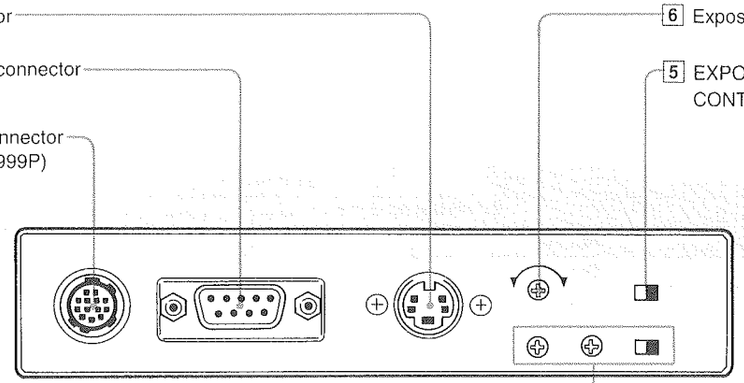
Pin assignment of DC IN/SYNC/VIDEO connector



Signal / Pin. No.	Sync Signals		
	External sync signal		Internal sync signal
	HD, VD	VS	
1	Ground	Ground	Ground
2	+12 V	+12 V	+12 V
3	VBS/Y output (ground)	VBS/Y output (ground)	VBS/Y output (ground)
4	VBS/Y output (signal)	VBS/Y output (signal)	VBS/Y output (signal)
5	HD input (ground)	—	—
6	HD input (signal)	—	—
7	VD input (signal)	VS input (signal)	—
8	–/C output (ground)	–/C output (ground)	–/C output (ground)
9	–/C output (signal)	–/C output (signal)	–/C output (signal)
10	Ground	Ground	Ground
11	+12 V	+12 V	+12 V
12	VD input (ground)	VS input (ground)	—

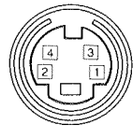
CMA-999/999P RGB Adaptor

Front



1 Y/C connector (4-pin)
Use the YC-15EV connecting cable (not supplied) for connection.

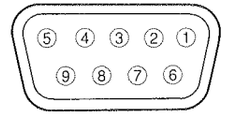
Pin assignment of Y/C connector



Pin no.	Output signal
1	GND
2	GND
3	Y output
4	C output

2 RGB/SYNC connector (D-SUB 9-pin)
This connector outputs the RGB signal. Use the CCXC-9DB/CCXC-9DD connecting cables (not supplied) for connection.

Pin assignment of RGB/SYNC connector



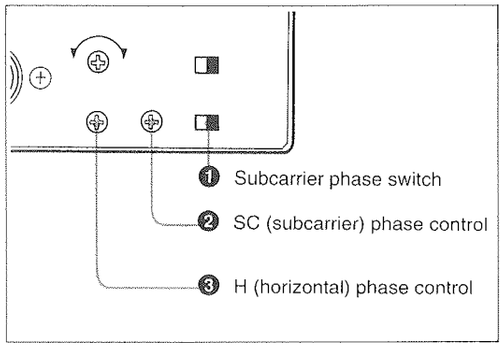
Pin no.	Signal
1	Ground
2	Ground
3	RED output
4	GREEN output
5	BLUE output
6	VBS(Y) output
7	SYNC(HD) output
8	NC(HD input)
9	NC(VD input/output, C output)

For input/output signal settings in ( ) in the above table, read the service manual (not supplied).

3 CAMERA connector (12 pin)
Connect to the XC-999/999P CCD color video camera module.

4 SC phase control, H phase control and subcarrier phase switch

These controls and switch are used for adjusting the picture tone when two or more cameras are connected.



❶ Subcarrier phase switch

Set this switch so that the subcarrier phase difference between the genlock input and video output signals is 0° or 180°.

❷ SC (subcarrier) phase control

Use this control for fine adjustment of the subcarrier phase after making a rough adjustment with the subcarrier phase switch.

❸ H (horizontal) phase control

Use this control to adjust the H phase difference between the genlock input and video output signals.

Adjust the subcarrier phase and horizontal phase by following the procedure below.

Subcarrier phase adjustment

Adjust the subcarrier phase roughly by setting the subcarrier phase switch to 0° or 180° so that the phase difference between the genlock input and video output signals is 0° or 180°. Then, make the fine adjustment by using the SC control. Using a vectorscope will allow you to make more accurate adjustment.

Horizontal phase adjustment

Adjust the horizontal phase with the H control. A waveform monitor or an oscilloscope will allow you to make the adjustment more easily.

5 EXPOSURE TIME CONTROL switch

CCD IRIS: Select this position so that the camera automatically adjusts the exposure time.

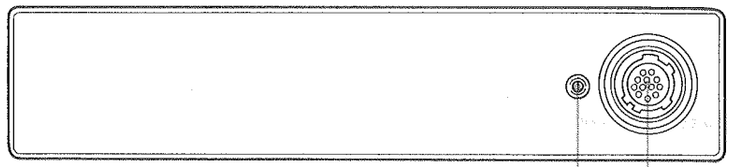
MAN: Select this position to adjust the exposure time with the exposure time control.

When you set the switch to either of the above positions, set the SHUTTER speed switches of the XC-999/999P color camera module to CCD IRIS.

6 Exposure time control

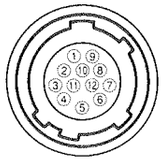
This switch works only when the EXPOSURE TIME CONTROL switch is set to MAN. The shutter speed can be adjusted by adjusting the exposure time.

Rear



1 DC IN/SYNC/VIDEO connector
Connect to the camera adaptor when you use the RGB adaptor with the DC-77RR/77RR-CE camera adaptor or the JB-77 junction box.

Pin assignment of DC IN/SYNC/VIDEO connector



Signal / Pin. No.	Sync signals		
	External sync signal		Internal sync signal
	HD, VD	VBS/VS	
1	Ground	Ground	Ground
2	+12 V	+12 V	+12 V
3	VBS output (ground)	VBS output (ground)	VBS output (ground)
4	VBS output (signal)	VBS output (signal)	VBS output (signal)
5	HD input (ground)	—	—
6	HD input (signal)	—	—
7	VD input (signal)	VBS/VS input (signal)	—
8	—	—	—
9	—	—	—
10	Ground	Ground	Ground
11	+12 V	+12 V	+12 V
12	VD input (ground)	VBS/VS input (ground)	—

2 75 Ω termination switch
Use this switch to terminate the external sync signal (HD/VD, VBS and VS).

ON :

Set this switch to ON when using the camera with the JB-77 junction box.

OFF :

(factory setting)

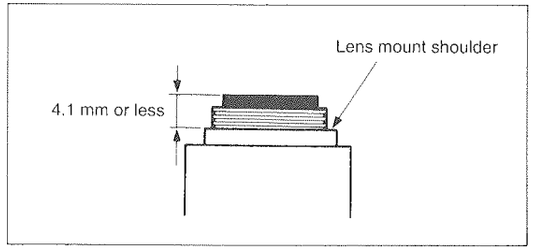
Set this switch to OFF to terminate at the DC-77RR/77RR-CE side when using the RGB adaptor with the DC-77RR/77RR-CE camera adaptor

Usable lens

You can use the following lenses with the camera.

Special lens (not supplied)

- VCL-12S12XM special MT lens (f=12mm)
- VCL-06S12XM special MT lens (f=6mm)



C mount lens

By using the LO-999CMT C-mount lens adaptor, you can mount any 1/2-inch C-mount lens that does not project more than 4.1mm .

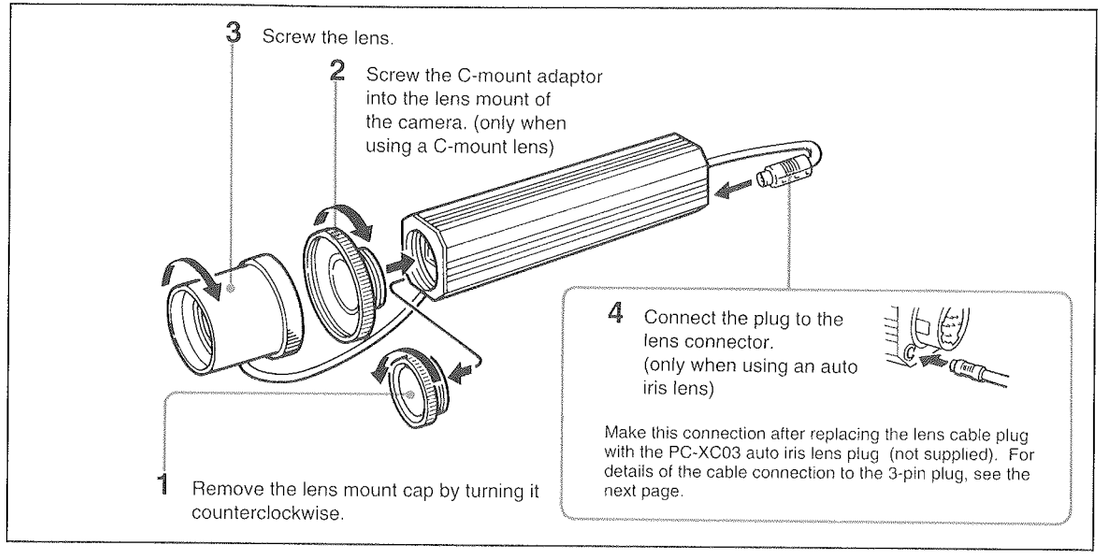
Note

This camera uses a 1/2-inch CCD, so the lens should be intended for use with this size of CCD. In particular, if used with a lens intended for a 2/3-inch CCD, the angle of view will be different.

Attaching the Lens

Notes

- The plug is very small and fragile. Take special care when handling it.
- Do not pull the lens cord connected to the lens adaptor. If so, the plug or camera lens connector may be damaged.

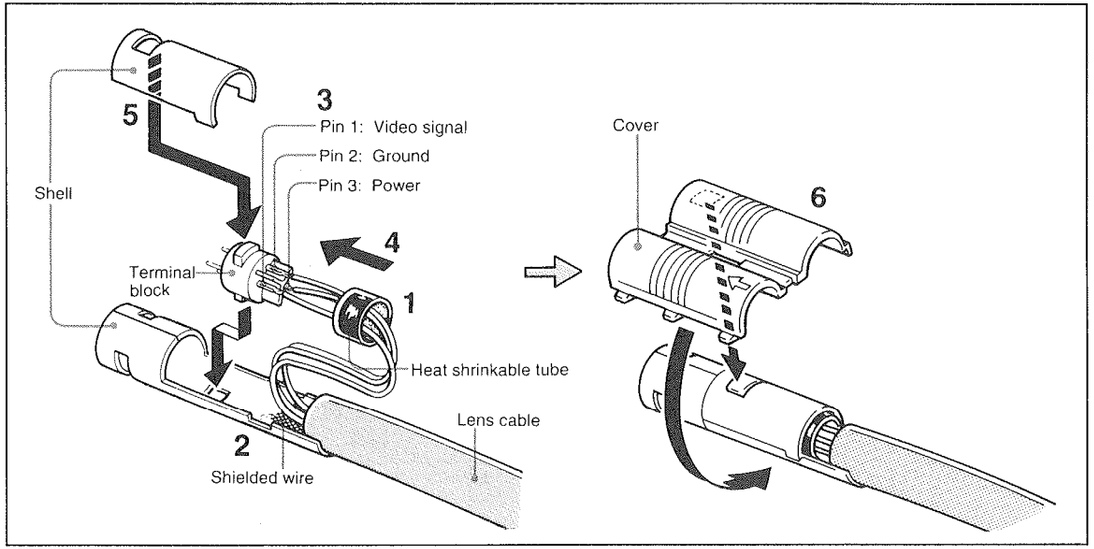


Replacing the lens cable plug with the PC-XC03 auto iris lens plug (not supplied)

To use an auto iris lens, replace the cable end plug with the PC-XC03 auto iris lens plug (not supplied) as shown below.

Notes

- When handling or soldering, treat the plug very carefully.
- When soldering the wires to the plug pins, solder them with a soldering iron temperature of less than 280°C (540°F). Perform the soldering quickly within three seconds.



1 Remove the plug from the lens cable. Place the heat shurinkable tube over the lens cable.

2 Solder the shielded wire onto the inside of the shell as illustrated.

3 Solder the cable wires to the pins of the plug. (To identify the cable wires, refer to the manual for your lens.)

Note

Solder them with a soldering iron temperature of less than 280°C. Perform the soldering within three seconds.

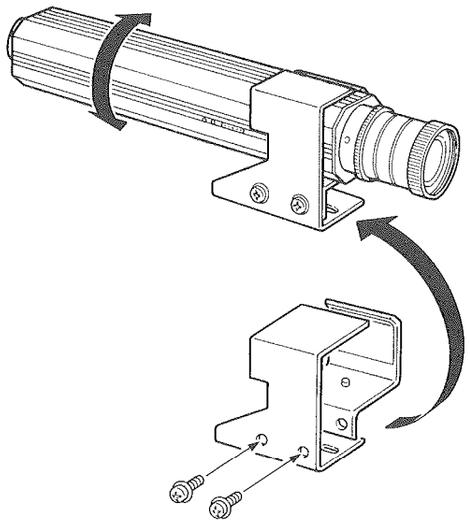
4 After soldering, slide the heat shrinkable tube up agaist the terminal block. Secure the wires by heating the heat shrinkable tube with a soldering iron or dryer.

5 Place the terminal block to one half of the shell, then fit the other half of the sell.

6 Fit the plastic cover over the shell.

Installing the Camera

When using the camera mounted on a tripod, screw the camera to the tripod adaptor (supplied) as shown. You can install the color video camera module on the tripod adaptor in any of four directions.



Decide the direction and fix the camera using two screws

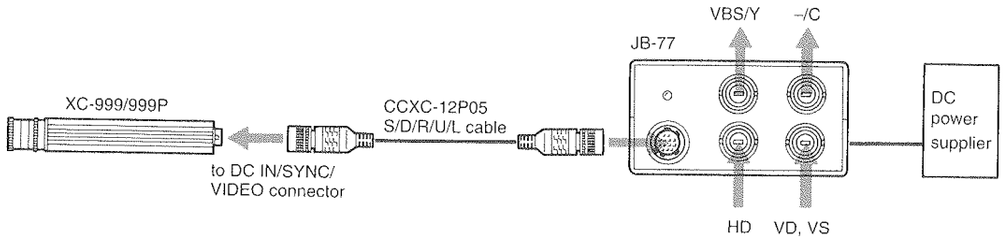
This section explains the following three connections.

- Using the camera with the JB-77 junction box
- Using the camera with the CMA-999/999P RGB adaptor
- Using the camera with the DC-77RR/77RR-CE camera adaptor

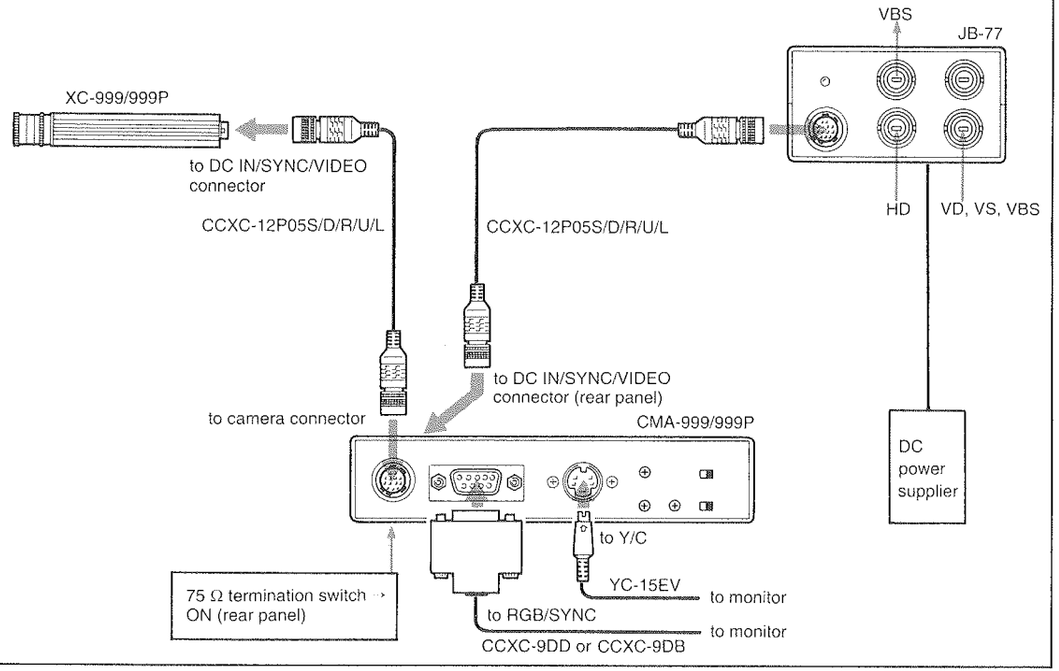
Notes

- Turn off the units to be connected, or the components of the units may be damaged.
- To disconnect the cord, pull it out by the plug. Never pull the cord itself.
- Connect the power cord after completing all other connections.

When Using the Camera with the JB-77 Junction Box



When Using the Camera with the CMA-999/999P RGB Adaptor



When Using the Camera with the DC-77RR/77RR-CE Camera Adaptor

Before connection

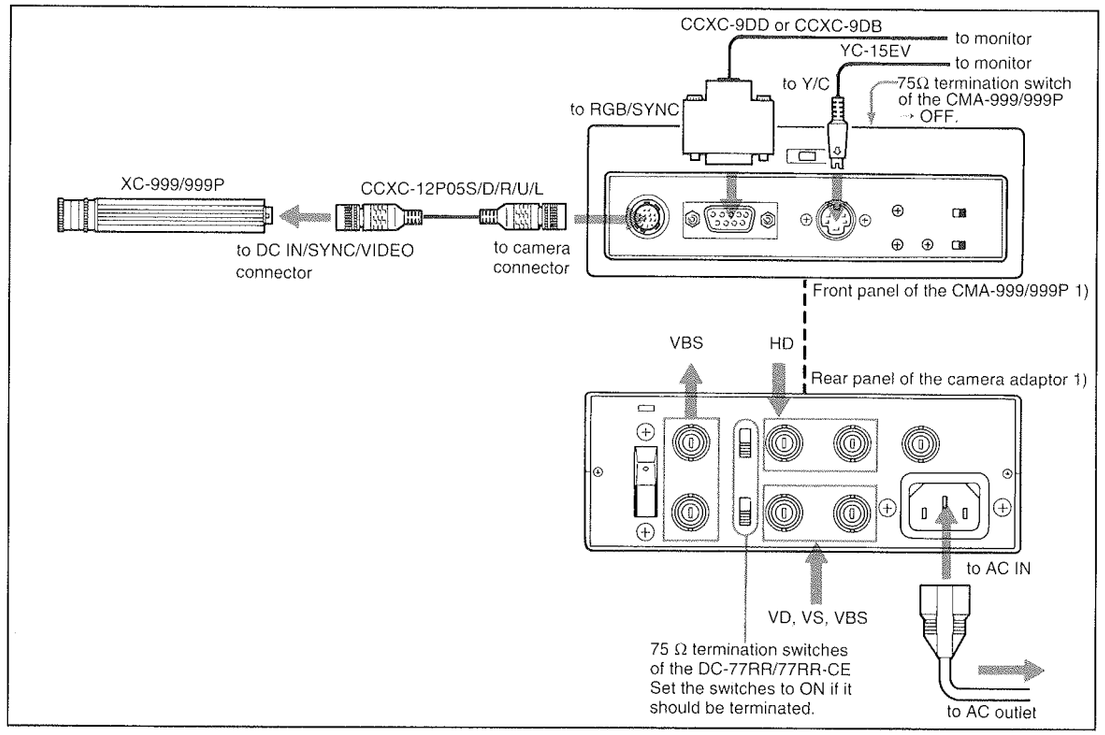
Install the CMA-999/999P RGB adaptor into the camera adaptor. For details, see the instruction manual for the DC-77RR/77RR-CE camera adaptor.

Notes

- Set the 75 Ω termination switch of the RGB adaptor to OFF.
- Insert the RGB adaptor into the camera adaptor firmly so that the DC IN/SYNC/VIDEO connector of the RGB adaptor is connected securely to the connector of the camera adaptor.

Connection

Make sure that the 75 Ω termination switch of the RGB adaptor is set to OFF.



1) The RGB adaptor is connected to the camera adaptor. Fix the RGB adaptor and the camera adaptor at the bottom of the camera adaptor by using two screws. Refer to the instruction manual of the DC-77RR/77RR-CE for detailed explanation of installing the RGB adaptor into the camera adaptor.

Genlock

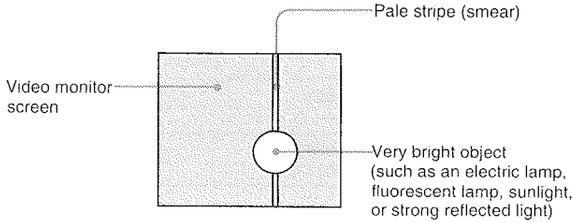
The color video camera module is designed so that internal sync and external sync are switched automatically. When the color video camera module receives the following external sync signal, the camera is synchronized to that external sync signal.

Connection example	External sync signal		
	HD/VD	VS	VBS
XC-999/999P – JB-77	Genlock		No genlock
XC-999/999P – CMA-999/999P – JB-77	Genlock		
XC-999/999P – CMA-999/999P – DC-77RR/77RR-CE	Genlock		

CCD Special Characteristics

The following conditions that may be observed during the use of a CCD video camera are not associated with any fault of the camera:

Smearing
The picture may be smeared when a very bright object is shot.



Patterned noise
This may appear over the entire monitor screen when the camera is operated at a high temperature.

Jagged picture
When this stripes, straight lines, or the like are shot, the image monitored on the screen may appear jagged.

Specifications

Pickup device

Pickup device	Interline transfer 1/2 inch CCD
Color filter	Complementary color mosaic filter
Picture elements	XC-999: 768 (H) x 494 (V) XC-999P: 752 (H) x 582 (V)
Sensing area	6.4 x 4.8 mm

Optical and others

Lens mount	Special mount
Signal system	XC-999: NTSC standard XC-999P: PAL standard
Scanning system	XC-999: 525 lines, 2:1 interlace, 30 frames/s. XC-999P: 625 lines, 2:1 interlace, 25 frames/s.
Sync system	Internal/external (switched automatically)
External sync signal	HD/VD, VS
Horizontal resolution	XC-999: 470 TV lines XC-999P: 460 TV lines
Minimum illumination	4.5 lux, F1.2 AGC: ON 2000 lux F5.6 AGC: OFF (0 dB)
Sensitivity	
Video output	VBS / Y/C (selected with the switch) VBS: 1 Vp-p, 75 ohms, sync negative Y: 1 Vp-p, 75 ohms C: C level depends on the composite video out signal
Video signal to noise ratio	XC-999: more than 48 dB AGC: OFF (0dB) XC-999P: more than 46 dB AGC: OFF (0dB)
Shutter speed	4 speeds selectable: OFF (1/60 s (XC-999) or 1/50 s (XC-999P)), 1/1000 s, CCD IRIS and flickerless
White balance	4 modes selectable: ATW (auto tracing white balance), 3200K, 5600K and MAN (manual)
Gain control	2 modes selectable: AGC and fixed (0 dB)
Output connector	DC IN/SYNC/VIDEO: multi 12-pin LENS: 3-pin
Power requirement	10.5 to 15 V DC
Power consumption	3.5 W
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	–20°C to 60°C (–4°F to 140°F)
Operating humidity	80 % (no condensation permissible)
Storage humidity	90 % (no condensation permissible)
Shock resistance	Less than 70G
Dimensions	22 x 22 x 120 mm (w/h/d) (7/8 x 7/8 x 4 3/4 inches) excluding projecting parts
Weight	About 99 g (3 1/2 oz)
Accessories supplied	Tripod adaptor (1 set) Lens mount cap (1) Screw driver (1) Label (1)

Accessories not supplied

Camera adaptor

CMA-999/999P RGB adaptor
Specifications of the CMA-999/999P are as follows.

Power requirement	10.5 to 15 V DC
Power consumption	4.5 W
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	–20°C to 60°C (–4°F to 140°F)
Operating humidity	80 % (no condensation permissible)
Storage humidity	90 % (no condensation permissible)
Shock resistance	Less than 40G
Dimensions	135.5 x 30 x 69 mm (w/h/d) ($5\frac{3}{8}$ x $1\frac{3}{16}$ x $2\frac{3}{4}$ inches) excluding projecting parts
Weight	About 290 g ($10\frac{1}{4}$ oz)

Camera adaptor	DC-77RR/77RR-CE
Junction box	JB-77

Lens and lens accessories

Special mount lens	VCL-12S12XM special MT lens (f=12mm) VCL-06S12XM special MT lens (f=6mm)
C Mount adaptor	LO-999CMT
Extension ring kit	LO-999ERK

Cables

12-pin camera cable	CCXC-12P05S/D/R/U/L
Connecting cables	CCXC-9DD (with D-SUB 9-pin connectors) CCXC-9DB (with D-SUB 9-pin and five BNC connectors) YC-15EV (with DIN 4-pin connectors)

Design and specifications are subject to change without notice.

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