

CCD-Black-and-White Video Camera Module

Operating Instructions

Before operating the unit, please read these instructions thoroughly and retain them for future reference.

XC-55/55BB

Sony Corporation © 2000 Printed in Japan

Owner's Record

The model and serial numbers are located on the bottom. Record the serial number in the space provided below. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. XC-55/55BB 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 the customers in the USA

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.

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

Für Kunden in Deutschland

Dieses Produkt kann im kommerziellen und in begrenztem Maße auch im industriellen Bereich eingesetzt werden. Dies ist eine Einrichtung, welche die Funk-Entstörung nach Klasse B besitzt.

For the customers in Canada

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

Pour les utilisateurs au Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Precautions

Do not touch any internal switches

Do not touch any internal switches unless instructed to do so in the Application Guide. Touching those switches may damage the system. For details, see the Application Guide. To obtain an application guide, contact your Sony dealer.

Power supply

Be sure to operate the video camera module according to the power requirement outlined under "Specifications" of the back side. In the U.S., use only with a UL-listed 12 V DC Class 2 power supply.

Foreign objects

Be careful not to spill liquids, or drop any flammable or metal objects into the camera body.

Operating and storage locations

Avoid operating or storing the camera in the following locations.

- Extremely hot or cold places (operating temperature -5°C to +45°C [23°F to 113°F])
- In direct sunlight for long periods, or close to heating equipment
- Damp or dusty places
- Where it is exposed to rain
- Locations subject to strong vibration
- Close to generators producing strong magnetism
- Close to generators producing powerful electromagnetic radiation, such as radio or TV transmitters

Care

- Remove dust or dirt on the surface of the lens or optical filter with a blower.
- Clean the cabinet with a soft, dry cloth. If it is very dirty, use a cloth dampened with a small quantity of neutral detergent, then wipe dry.
- Avoid the use of volatile solvents such as alcohol, benzene, and thinners. They may damage the surface finish, or impair the operation of the shutter adaptor.

Ventilation

Do not wrap the camera in a cloth, etc., during operation. This may cause the internal temperature to rise excessively and the camera to malfunction.

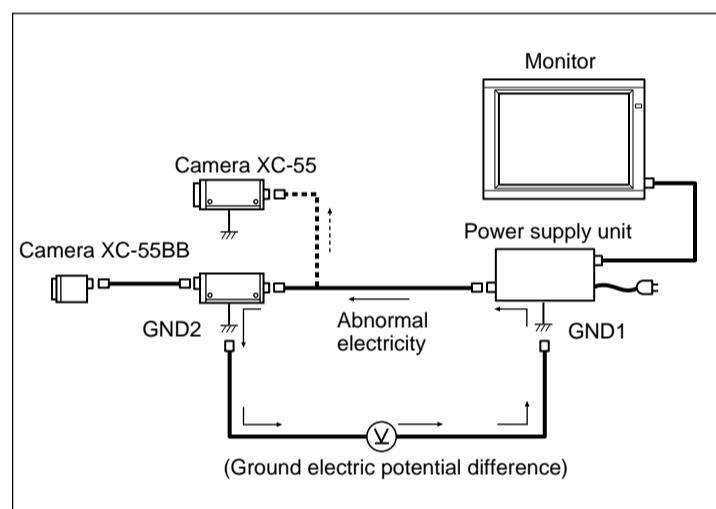
Miscellaneous

- Be careful not to spill water or other liquids on the camera or allow combustible or metallic objects inside the body. If used with foreign objects inside, the camera is liable to fail or cause a fire or an electric shock.
- If the product is transported or shipped, repack it as originally packed at the factory, or in materials equal in quality.

In the event of any problems with the operation of the video camera module, contact your Sony service representative.

When installing the camera

When you install the camera with various peripheral devices and if the devices have different ground electric potential, ground only one device. In case there is an ground electric potential difference, the camera may be damaged.



Features

The XC-55/55BB is a black-and-white video camera module that uses a CCD (Charge Coupled Device) solid-state image sensor compatible with the VGA (Video Graphic Array) format. The CCD uses an "all pixels independent read-out" method, which enables the CCD to output all pixel signals in 1/30 sec.

Wide range of operating modes

You can easily select the required operating mode. The gain, for example, can be set to AGC (A), to fixed gain (F), or to manual gain control (M) with a switch on the rear. An internal switch switches γ (gamma) compensation on or off. For details on the internal switch, see the Application Guide.

External synchronization

The camera module can be synchronized with the signals (explained below). The capture frequency range is $\pm 1\%$ of the horizontal scan frequency.

HD (horizontal drive)/VD (vertical drive) signals:

The camera module analyzes the HD and VD signals input from external synchronization and automatically determines whether to operate in interlace or non-interlace mode.

Wide range of electronic shutter modes

The electronic shutter built into this unit is indispensable in attaining the level of image resolution required for factory automation, etc., and comes with a variety of shutter modes.

• Electronic shutter

You can select the shutter speed from a wide range of settings (1/100 to 1/8000 sec.).

• E-DONPISHA¹⁾ II shutter

The E-DONPISHA is an external trigger shutter that can be useful when shooting moving objects. This function enables a camera in a fixed location to capture flickerless images of fast-moving objects. The shutter speed of E-DONPISHA II is controlled by the pulse width of the external trigger signal.

¹⁾ "DONPISHA" is a registered trademark of Sony Corporation.

Restart/Reset function

Adjusts the timing for image input/output by using a VD pulse for external synchronization. A long exposure is also available.

Body fixing

High-precision screw holes are provided for mounting a camera module according to the surface plane of the lens mount face, allowing mounting with an absolute minimum deviation of the optical axis.

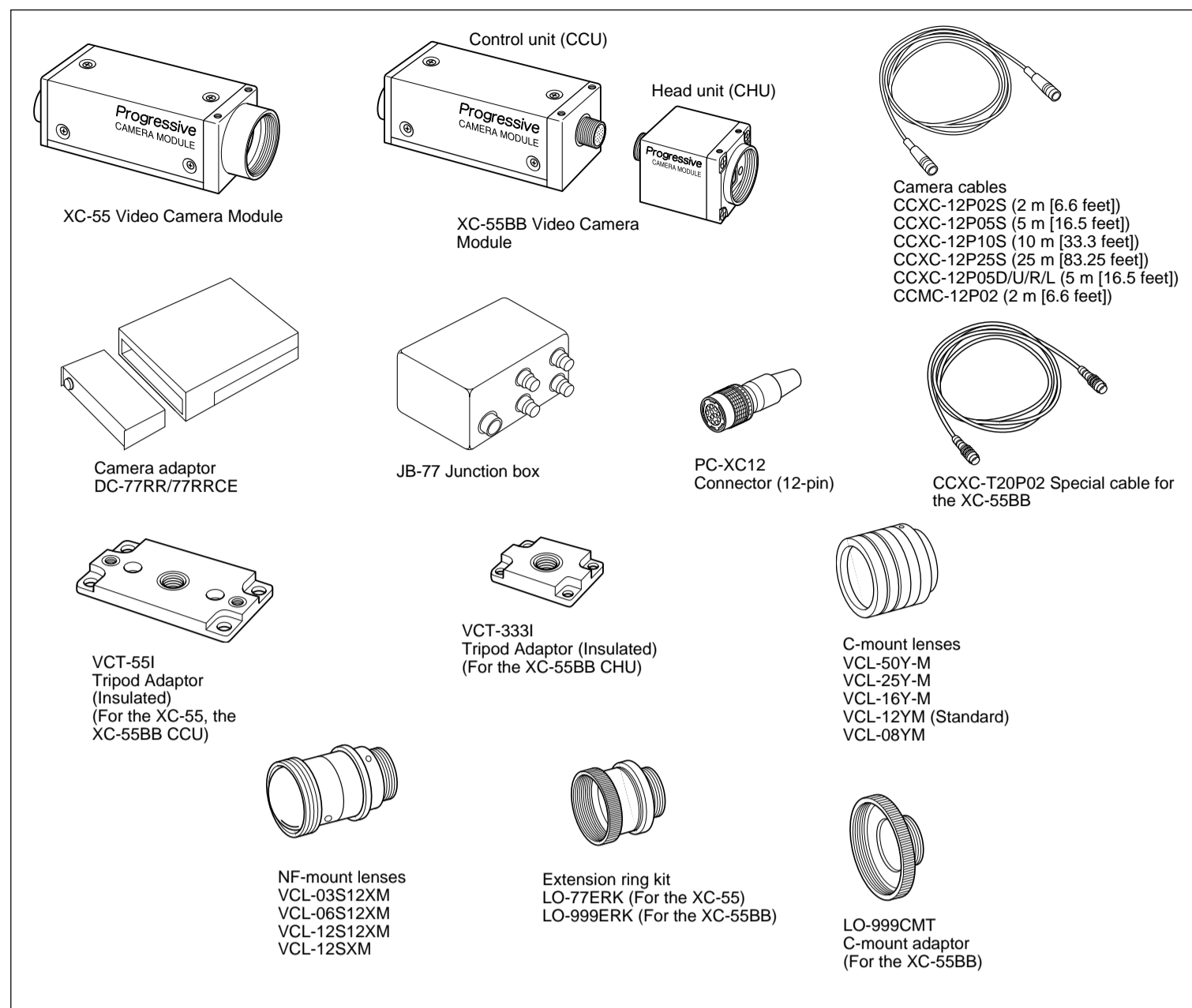
Other features

- Long life and high reliability
- Fine image, minimum distortion
- High resistance to vibration and impact
- Quick start-up
- Stability against strong magnetic fields
- Low power consumption 1.8 W (XC-55)
2.2 W (XC-55BB)

System Components

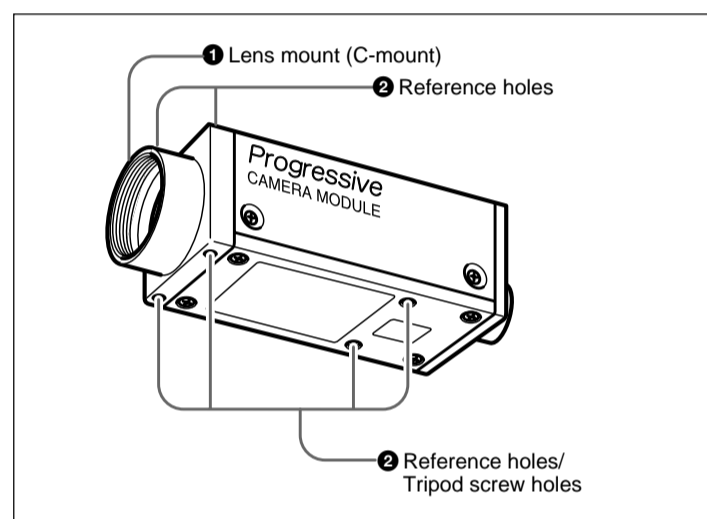
Pictured below are the components of the XC-55/55BB video camera module system.

A special cable CCXC-T20P02 is supplied with the XC-55BB. (An additional cable can be purchased as needed.)



Location and Function of Parts and Controls

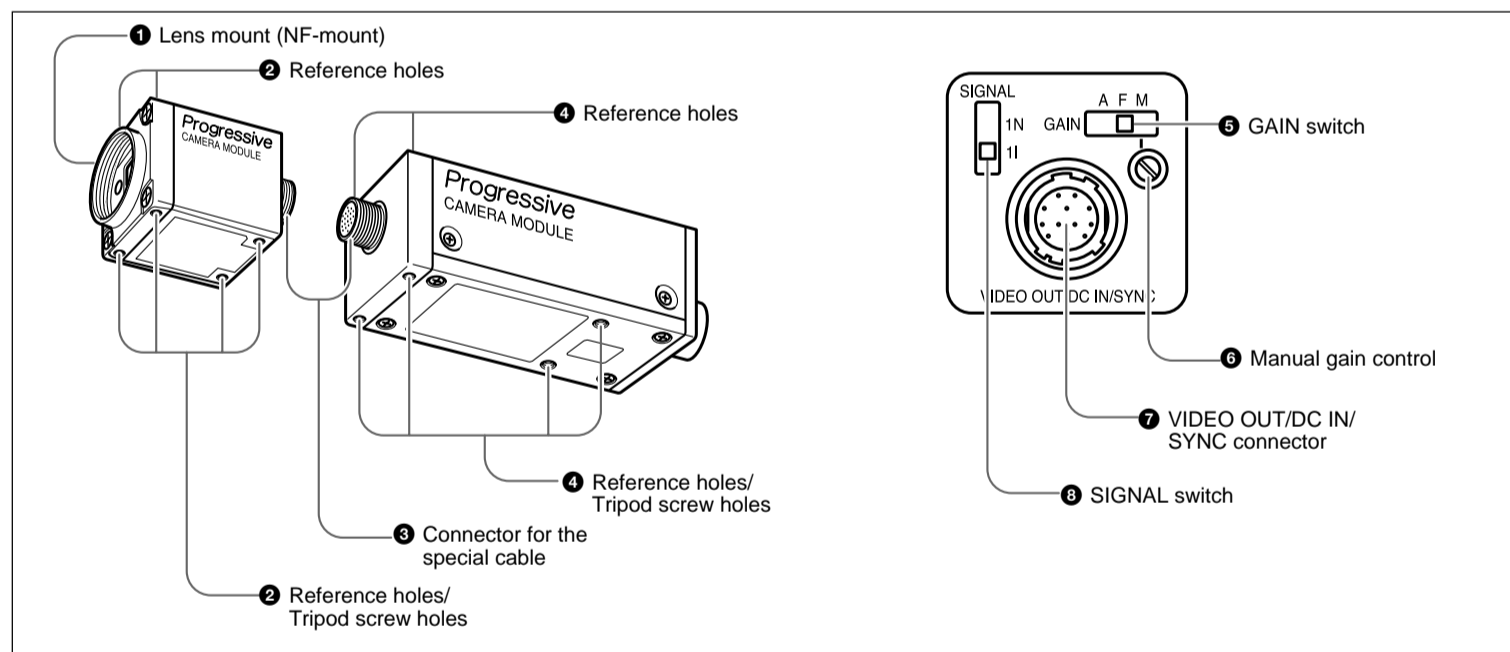
XC-55 Front Panel/Top Panel/Bottom Panel



1 Lens mount (C-mount)
Attach a VCL-12YM standard lens, or any C-mount lens or other optical equipment.

2 Reference holes for locking the camera/Tripod screw holes
High-precision screw holes for locking the camera onto the lens mounted surface. Locking the camera minimizes optical axis deviation. For details, see the Application Guide. You can attach a tripod to the reference holes (4) on the bottom. You will need a tripod adapter VCT-551 to install the tripod. There are two more reference holes on the front of the top surface.

XC-55BB Front Panel/Top Panel/Bottom Panel and XC-55/55BB Rear Panel



1 Lens mount (NF-mount)
Install an NF mounted lens or optical device, e.g., the standard lens VCL-12S12XM. If you install a C-mount lens on the XC-55BB, you will need the C-mount adaptor LO-999CMT.

2 Reference holes for locking the camera/Tripod screw holes (head unit)
You can attach a tripod to the reference holes (4) on the bottom. You will need a tripod adapter VCT-333I to install the tripod. There are two more reference holes on the front of the top surface.

Note
The XC-55BB head unit (CHU) must have the same serial number as the control unit (CCU).

3 Connector for the special cable
Connect the head unit and the control unit with the supplied cable CCXC-T20P02.

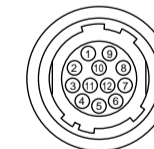
4 Reference holes for locking the camera/Tripod screw holes (control unit)
High-precision screw holes for locking the camera onto the lens mounted surface. Locking the camera minimizes optical axis deviation. For details, see the Application Guide. You can attach a tripod to the reference holes on the bottom of the head unit. You will need a tripod adapter VCT-551 to install the tripod. There are two more reference holes on the front of the top surface.

5 GAIN switch
Use this switch to select the following modes:
A: Automatic
F: Fixed
M: Manual

6 Manual gain control
Controls the gain level (0 to +18 dB) in manual gain mode (with the GAIN switch 5 set to M).

7 VIDEO OUT/DC IN/SYNC (Video signal output/DC power input/ sync signal I/O) connector (12-pin)
Connect a CCXC-12P05S camera cable to this connector, the +12 V DC power supply, and the video signal output from the camera module. When a sync signal generator outputting external sync signals is connected to this connector, the camera module is synchronized with the external sync signals.

The pin configuration of this connector is as follows:

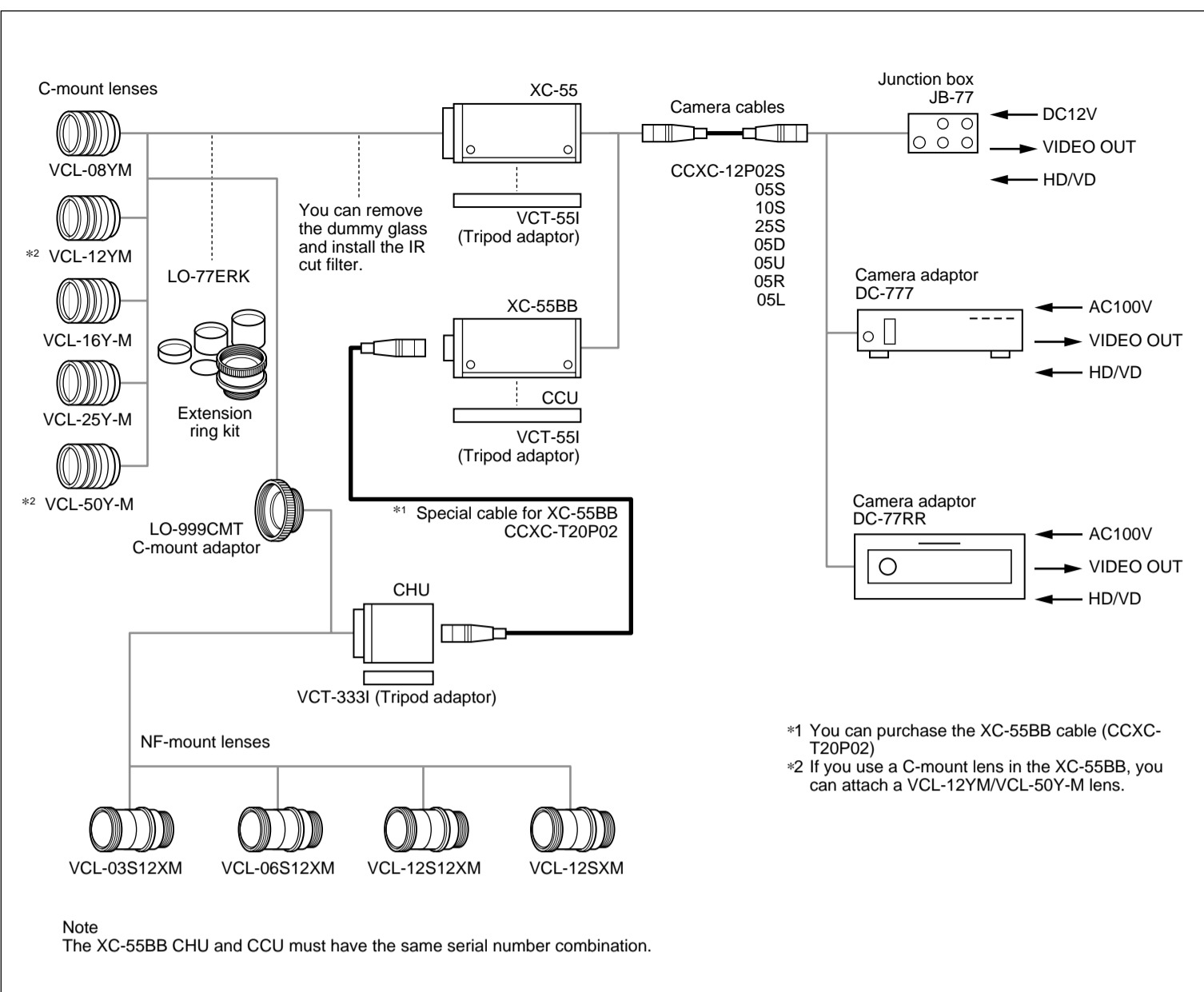


Pin no.	External sync mode	Camera sync output
1	Ground	Ground
2	+12 V DC	+12 V DC
3	Video output (ground)	Video output (ground)
4	Video output (signal)	Video output (signal)
5	HD input (ground)	HD output (ground)
6	HD input (signal)	HD output ^{*)} (signal)
7	VD input (signal)	VD output ^{*)} (signal)
8	TRIG input (ground)	TRIG input (ground)
9	TRIG input (signal)	TRIG input (signal)
10	Ground	Ground
11	+12 V DC	+12 V DC
12	VD input (ground)	VD output (ground)

^{*)} An internal switch change is necessary to output HD and VD signals. For details, see the Application Guide.

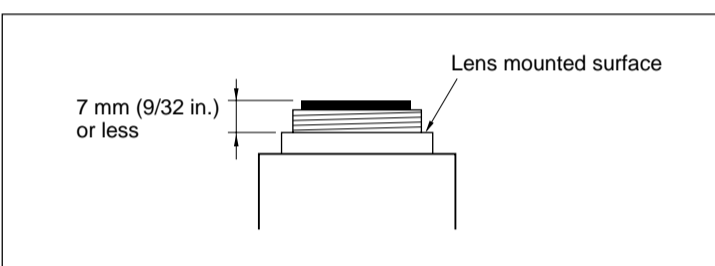
8 SIGNAL switch
Use this switch to select the following modes:
1I : Outputs the field accumulated signals (1/60 second interlaced) from VIDEO OUTPUT.
1N : Outputs the 1/30 non-interlaced signals from VIDEO OUTPUT.

Connections



Note for installing the C-mount lens to the XC-55

The lens must not project more than 7 mm (9/32 in.) from the lens mounted surface.

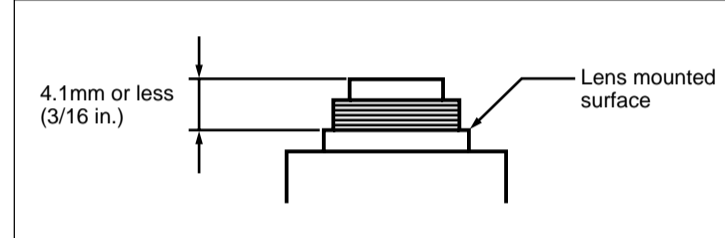


Note for installing the NF-mount lens (special lens) onto the XC-55BB

You cannot use the VCL-7S12XE (auto-iris lens).

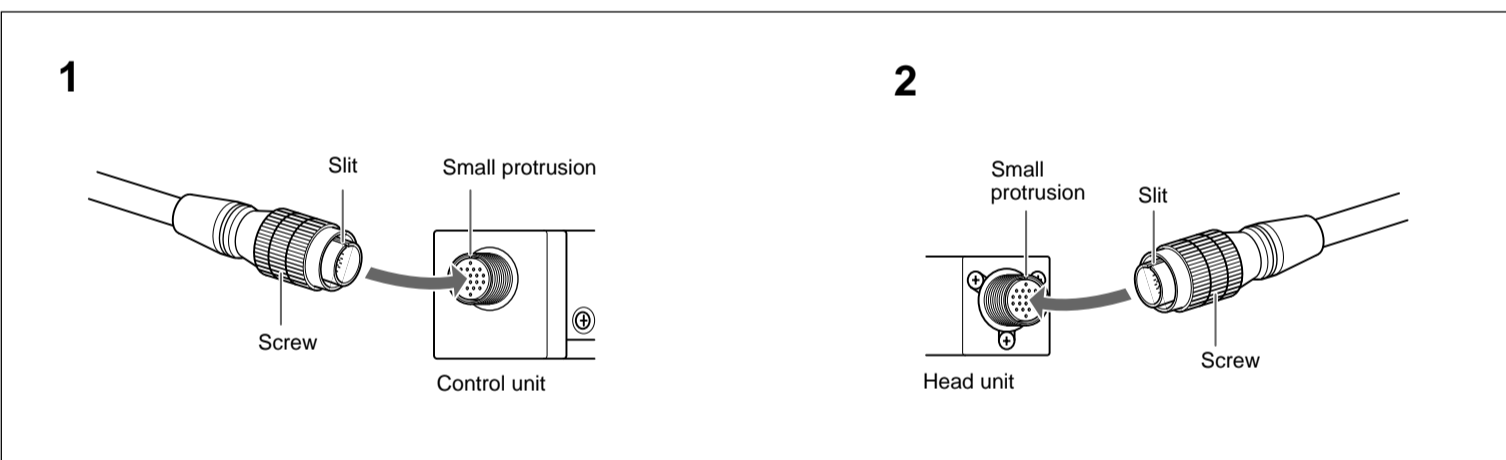
Notes for installing the C-mount lens to the XC-55BB

- To install the C mount lens, you will need a C mount adaptor LO-999CMT (not supplied). The protrusion on the C mount lens must be 4.1mm (3/16 in.) or less from the lens mounted surface.



- When you use a C mount adaptor, lock the C-mount lens instead of the camera head. This eliminates unnecessary force to the camera head.
- Do not use the C mount adaptor where there is excessive vibration or shock, otherwise the C mount adaptor and/or the camera may be damaged.

Connecting the Head Unit and the Control Unit (XC-55BB)



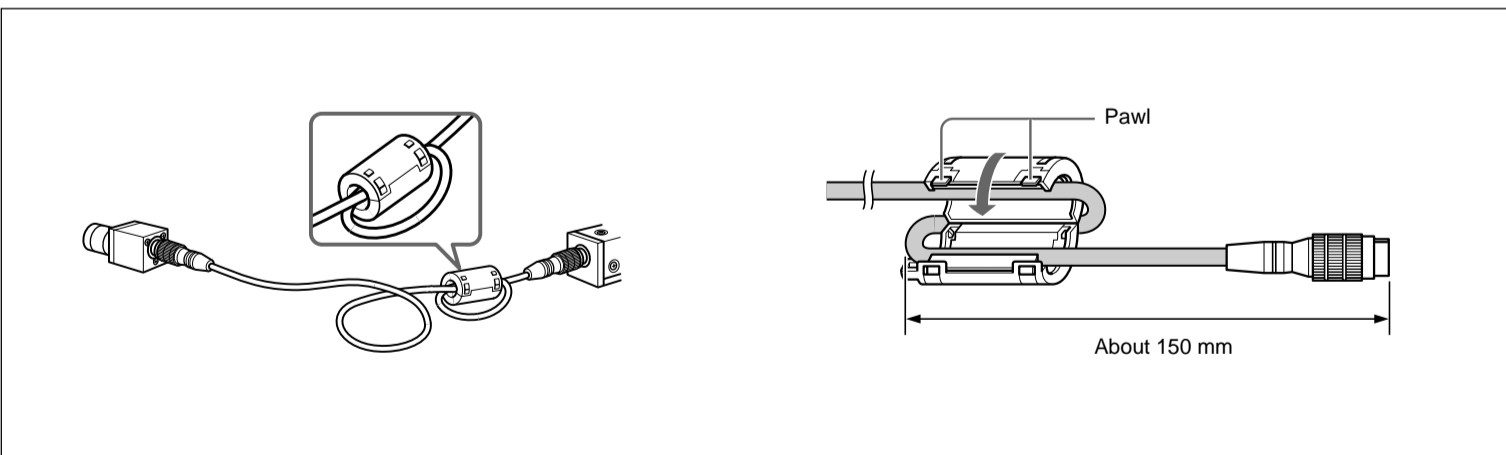
- Connect the cable (supplied) to control unit. Match the small protrusion with the slit in the plug. Insert the plug and tighten the screw.
- Similarly, connect the plug to head connector.

After connecting the cable, turn on the monitor power, then, turn on the power for the camera control unit.

Installing the ferrit core

If you use this camera module in Europe, install the ferrit core on the cable.

Install the ferrit core on the control unit side of the cable.



Typical CCD Phenomena

The following effects on the monitor screen are characteristic of CCD cameras. They do not indicate any fault with the camera module.

Smear

This occurs when shooting a very bright object such as electric lighting, the sun, or a strong reflection.

This phenomenon is caused by an electric charge induced by infrared radiation deep in the photosensor. It appears as a vertical smear, since the CCD imaging element uses an interline transfer system.

Vertical aliasing

When you shoot vertical stripes or lines, they may appear jagged.

Blemishes

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

White speckles

When you shoot a dark object at a high temperature, small white dots may appear all over the image.

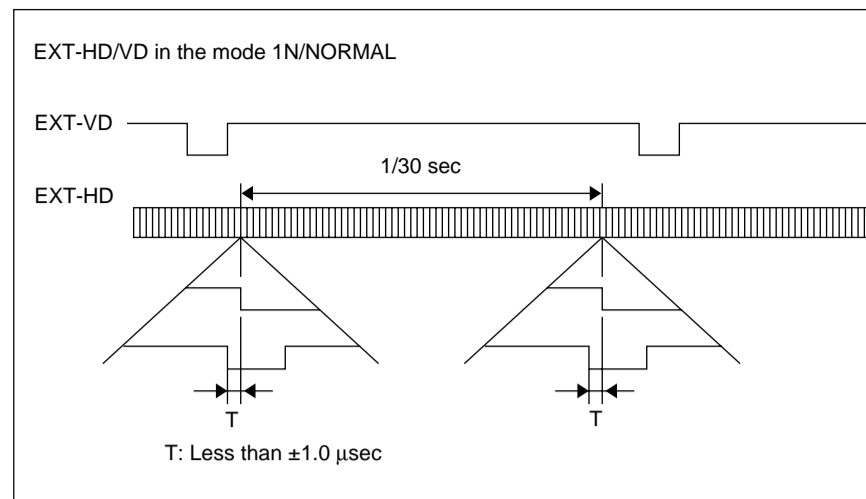
Note

If strong light enters a wide area of the screen, the screen may become dark. This is not a malfunction. If this occurs, avoid strong light or adjust the lens iris to reduce the light amount.

Video Output Modes

The camera has two modes to output video signals. You can select a mode with the SIGNAL switch on the rear panel.

Select a shutter mode with the internal switches. For details, see the Application Guide.



Video output mode	1I	1N
Shutter mode		
NORMAL	EXT-HD/VD INT-SYNC	EXT-HD/VD INT-SYNC
E-DONPISHA II	EXT-HD/VD only	EXT-HD/VD only
RESTART/RESET	EXT-HD/VD only	EXT-HD/VD only

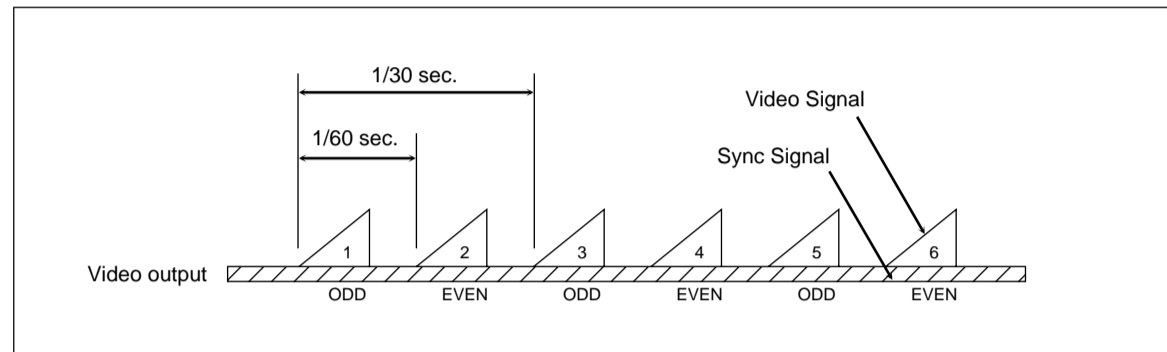
The Video Signal 1I Mode

In this mode, the field accumulated signals (1/60 interlaced) are output from VIDEO OUT.

The field definition is as follows:

- Falling edge of HD/VD is corresponded: ODD field
- Falling edge of HD/VD is not corresponded: EVEN field

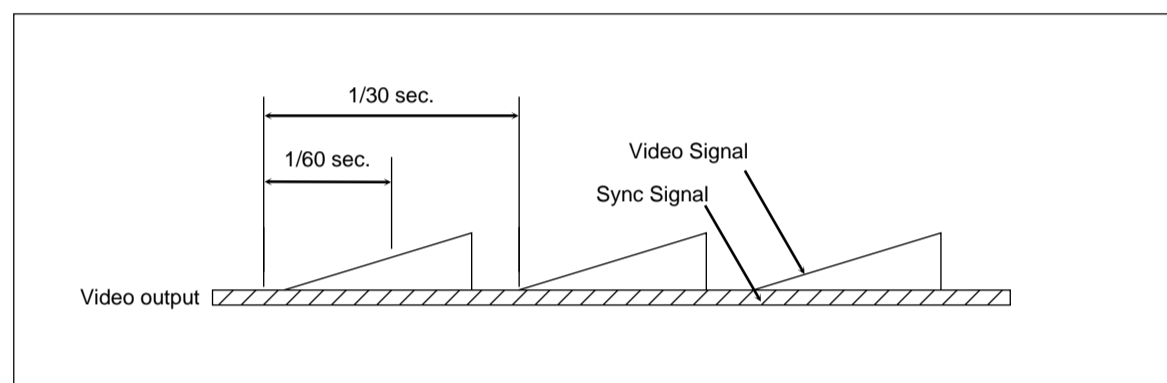
The camera module is corresponded to the EIA format.



Video signal 1I mode timing chart

The Video Signal 1N Mode

In this mode, the camera module outputs 1/30 sec. non-interface signals from the VIDEO OUT connector.



Video signal 1N mode timing chart

Specifications

Imaging system

Pickup device	Interline-transfer CCD
Effective picture elements	659 × 494 (horizontal/vertical)
Sensing area	1/3type size
CCD vertical drive frequency	15.734 kHz ± 1%
CCD horizontal drive frequency	12.2727 MHz
Signal system	EIA system
Cell size	7.4 × 7.4 μm (horizontal/vertical)

Optical system and others

Lens mount	C mount (XC-55), NF mount (XC-55BB)
Flange focal length	17.526 mm (C mount), 12.00 mm (NF mount)
Synchronization	Internal/external (automatically switched according to input signal)
External sync signal I/O	HD/VD (HD/VD level: 2 to 5 Vp-p, automatically switched between HD/VD according to input signal; I/O selection by internal switch)
External sync allowance frequency	±1% (of horizontal sync frequency)
Jitter	Within ±50 nsec
Scanning system	525 lines 2:1 interlace mode (1I mode) Non-interlace mode (1N mode)
Video output	1.0 Vp-p, sync negative, 75 ohms unbalanced
Horizontal resolution	500 TV lines
Vertical effective lines	483 lines
Sensitivity	400 lx., F5.6 (γ compensation ON, 0 dB)
Minimum illumination	0.5 lx. (AGC mode, F1.4, γ compensation ON)
Video S/N ratio	56 dB
Gain	AGC/Fixed gain/Manual gain control (selected with the GAIN switch on the rear panel)
γ	γ compensation/γ - ON/OFF (0.45/1) (selected with internal switch)

White clip	115 IRE ± 10 IRE
Shutter mode	Normal shutter/E-DONPISHA II shutter
Shutter speed (normal mode)	1/100, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/8000 sec. (selected with internal switch)
Power requirements	+12 V DC (range: 10.5 to 15.0 V)
Power consumption	XC-55: 1.8 W (±10%) XC-55BB: 2.2 W (±10%)
Operating temperature	-5°C to +45°C (+23°F to +113°F)
Storage temperature	-30°C to +60°C (-22°F to +140°F)
Operating relative humidity	25% to 80% (no condensation)
Storage relative humidity	20% to 90% (no condensation)
Vibration resistance	10 G (20 Hz to 200 Hz, 20 minutes in each X, Y or Z direction)
Shock resistance	70 G
External dimensions (w/h/d)	XC-55: 29 × 29 × 67 mm (1 3/16 × 1 3/16 × 2 3/4 inches) (excluding protruding parts) XC-55BB: (CHU) 22 × 22 × 30 mm (7/8 × 7/8 × 1 3/16 inches) (excluding protruding parts) (CCU) 29 × 29 × 67 mm (1 3/16 × 1 3/16 × 2 3/4 inches) (excluding protruding parts)
Mass	XC-55: Approx. 110 g (4 oz) XC-55BB: (CHU) Approx. 40 g (1 oz) (CCU) Approx. 100 g (4 oz)
Supplied accessories	Lens mount cap (1) Special cable CCXC-T20P02 (For connecting CCU/CHU of XC-55BB) Operating Instructions (1) Ferrite core (1)

Design and specifications are subject to change without notice.

Warranty and Maintenance

For queries on a period and terms of the warranty, contact the store where you purchased the product.

About the User's Guide

The Operating Instructions describe the functions and use of this product.

For more details, see the User's Guide. Please ask your sales representative about the User's Guide.