

Color Camera Module

Technical Manual



**FCB-EX490E/EX490EP
FCB-EX48E/EX48EP**

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Features

- The EX-view HAD™ CCD features 380,000 (NTSC) or 440,000 (PAL) effective picture elements and high-sensitivity shooting. The minimum illumination required is 0.7 lux ($1/60$ s (NTSC), $1/50$ s (PAL), ICR OFF). (FCB-EX490E/P only)
- The CCD features 380,000 (NTSC) or 440,000 (PAL) effective picture elements and high-sensitivity shooting. The minimum illumination required is 0.4 lux ($1/60$ s (NTSC), $1/50$ s (PAL)). (FCB-EX48E/P only)
- A CCD for shooting a wide dynamic range is employed to perform progressive or interlaced scanning, and images with a wide dynamic range are obtained by a newly developed image signal processor (Wide Dynamic Range function). Furthermore, it is possible to automatically switch to this Wide Dynamic Range function, which enables you to obtain optimal images ranging from the dark areas of a subject to the light areas. (FCB-EX490E/P only)
- Low-noise images can be obtained even in low light environments using the 3D Noise Reduction (3D NR + 2D NR) function.
- A function to output interlaced or progressive images by digital output (equivalent to ITU-R BT656) is provided. (FCB-EX48E/P: Interlace mode only)
- 18× optical zoom (216× with digital zoom)
- Supporting external synchronization (V-lock)
- Images with a high resolution (550 TV lines) can be obtained using a newly developed Image Signal Processor for improved picture quality.
- An infrared (IR) Cut-Filter can be disengaged from the image path for increased sensitivity in low light environments. The ICR will automatically engage depending on the ambient light, allowing the camera to be effective in day/night environment. (FCB-EX490E/P only)
- VISCA is a communications protocol, which enables the camera to be controlled remotely from a host computer/controller.
- Six memory locations are provided to temporally save and recall up to six sets of camera settings.
- A Privacy Zone Masking function (max. 24 blocks) is available.
- A mosaic masking function has been added to the privacy zone masking function.
- A title composed of up to 11 lines can be set for displaying on the screen. 20 characters can be used on one line.
- E-FLIP and Mirror Image functions
- Alarm function with adjustable detection zones
- Adjustable AE response speed

With consideration given environmental protection, this module is designed to operate with low power consumption and also incorporates lead-free and halogen-free circuit boards.

Precautions

Software

Use of the demonstration software developed by Sony Corporation or use of the software with customer developed application software may damage hardware, the application program or the camera. Sony Corporation is not liable for any damages under these conditions.

Operation

Start the camera control software on your computer after you turn on the camera and the image is displayed.

Operation and storage locations

Do not shoot images that are extremely bright (e.g., light sources, the sun, etc.) for long periods of time. Do not use or store the camera in the following extreme conditions:

- Extremely hot or cold places (operating temperature -5°C to $+60^{\circ}\text{C}$ (41°F to 140°F))
- Close to generators of powerful electromagnetic radiation such as radio or TV transmitters
- Where it is subject to fluorescent light reflections
- Where it is subject to unstable (flickering, etc.) lighting conditions
- Where it is subject to strong vibration
- Where it is subject to radiation from laser beams

Care of the unit

Remove dust or dirt on the surface of the lens with a blower (commercially available).

Other

Do not apply excessive voltage. (Use only the specified voltage.) Otherwise, you may get an electric shock or a fire may occur.

In case of abnormal operation, contact your authorized Sony dealer or the store where you purchased the product.

Phenomena specific to CCD image sensors

The following phenomena that may appear in images are specific to CCD (Charge Coupled Device) image sensors. They do not indicate malfunctions.

White flecks

Although the CCD image sensors are produced with high-precision technologies, fine white flecks may be generated on the screen in rare cases, caused by cosmic rays, etc.

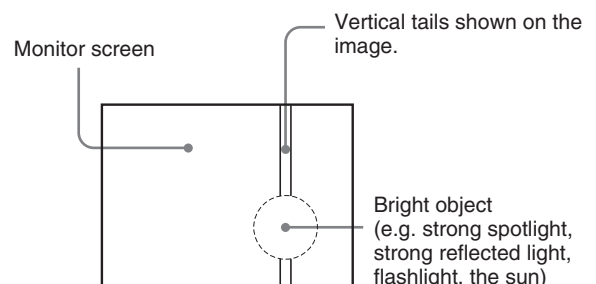
This is related to the principle of CCD image sensors and is not a malfunction.

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

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

Vertical smear

When an extremely bright object, such as a strong spotlight or flashlight, is being shot, vertical tails may be produced on the screen, or the image may be distorted.

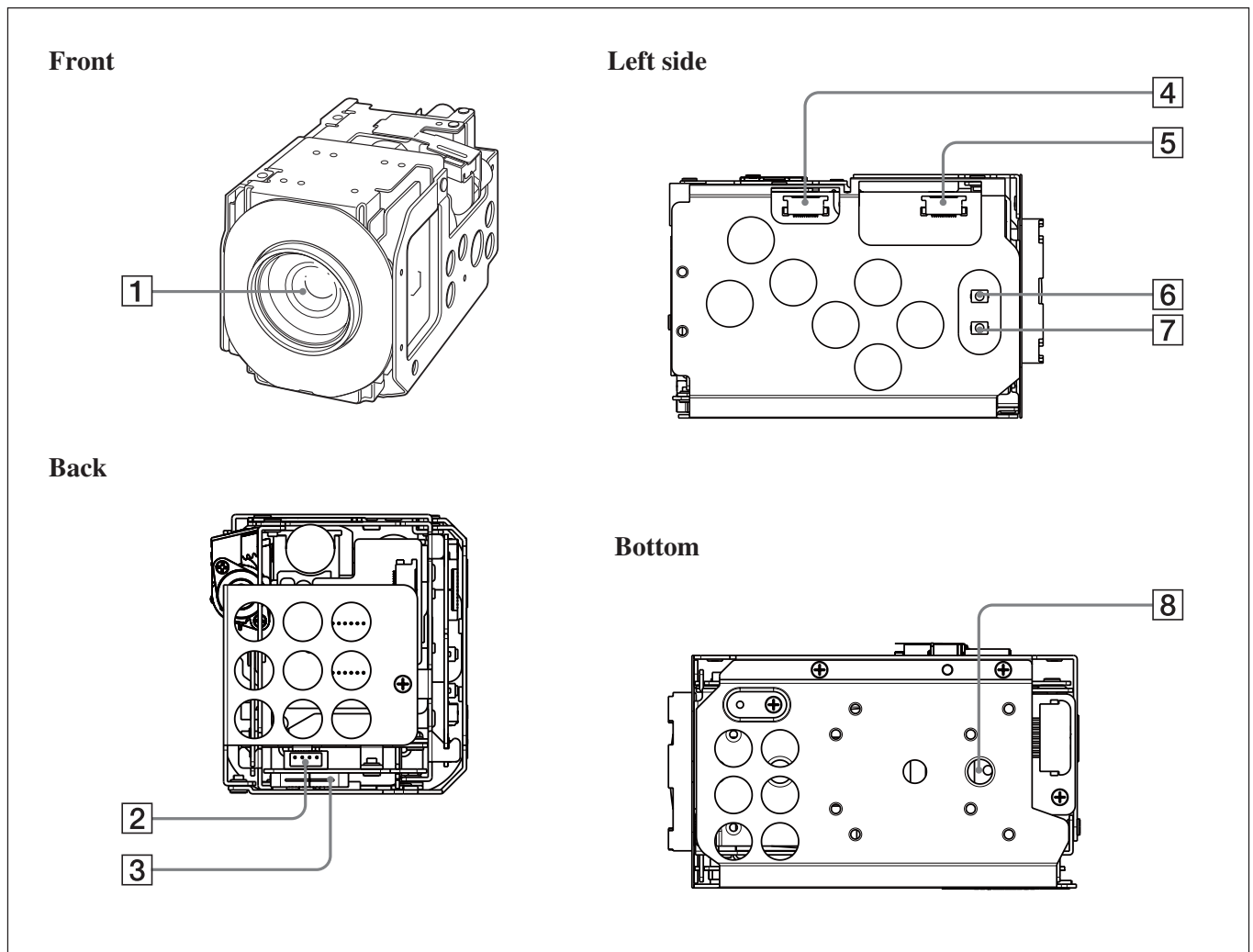


Aliasing

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

Locations of Controls

FCB-EX490E/EX490EP

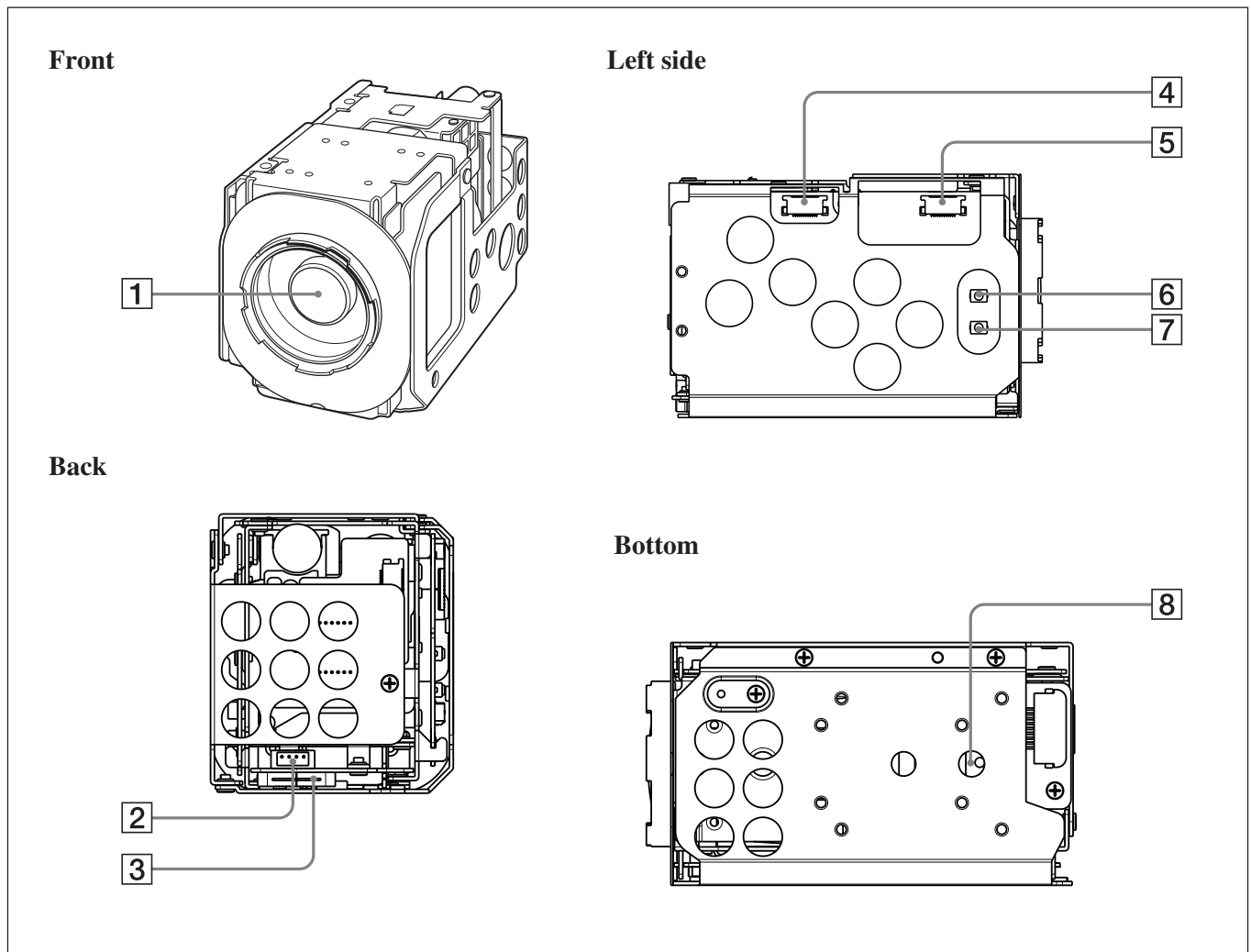


- 1 Lens
- 2 CN950 jack
- 3 CN951 jack
- 4 CN702 jack (for key SW)

- 5 CN200 jack (for digital output)
- 6 TELE button
- 7 WIDE button

- 8 Tripod screw hole
- When a tripod is used, please use 7 mm ($\frac{9}{32}$ in.) or less screw to attach it to the camera. Also, please be sure to attach the tripod securely.

FCB-EX48E/EX48EP



- 1** Lens
- 2** CN950 jack
- 3** CN951 jack
- 4** CN702 jack (for key SW)

- 5** CN200 jack (for digital output)
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When a tripod is used, please use 7 mm ($\frac{9}{32}$ in.) or less screw to attach it to the camera. Also, please be sure to attach the tripod securely.

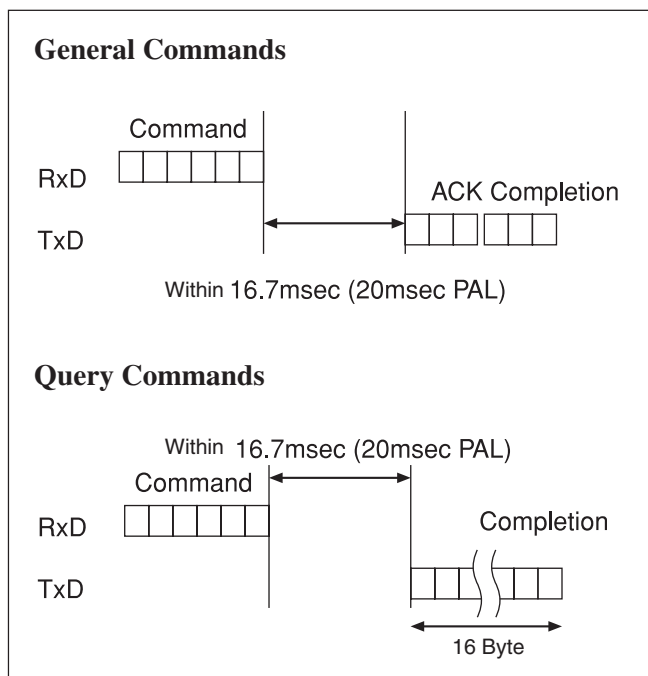
Basic Functions

Overview of Functions

VISCA commands are the basis of camera control.

Timing Chart

As VISCA Command processing can only be carried out one time in a Vertical cycle, it takes the maximum 1V cycle time for an ACK/Completion to be returned. If the Command ACK/Completion communication time can be cut shorter than the 1V cycle time, then every 1V cycle can receive a Command.



In general

- **Power On/Off**

Powers the camera on and off. When the power is off, the camera is able to accept only the lowest level of VISCA Commands; the display and other features are turned off.

- **I/F Clear**

Clears the Command buffer of the FCB camera. Clearing the buffer can also be carried out from the control application software when the power is on.

- **Address Set**

VISCA is a protocol, which normally supports a daisy chain of up to seven connected cameras via RS-232C interface. In such cases, the address set command can be used to assign addresses from 1 to 7 to each of the seven cameras, allowing you to control the seven cameras with the same personal computer. Although the FCB camera does not support direct connection of cameras in a daisy chain, be sure to use the address set command to set the address whenever a camera is connected for the first time.

- **ID Write**

Sets the camera ID.

- **Mute**

Blanks the screen and sends out a synchronizing signal.

- **Lens Initialize**

Initializes the zoom and focus of the lens. Even when power is already on, it initializes the zoom and the focus.

- **Comp Scan**

A pixel blemish-masking feature, which can be made to reevaluate overall CCD pixel blemishes and mask severely flawed pixels automatically upon receiving the COMP SCAN command. This feature helps to mask the flaws found in CCD imagers, even after the camera has been powered on for some time.

Zoom

The FCB camera employs a 18× optical zoom lens combined with a digital zoom function; this camera allows you to zoom up to 216×.

• Optical 18×, f = 4.1 to 73.8 mm (F 1.4 to F 3.0)

The horizontal angle of view is approximately 48.0 degrees (wide end) to 2.8 degrees (tele end). Digital Zoom enlarges the center of the subject by expanding each image in both the vertical and horizontal directions. When 216× zoom is used, the number of effective picture elements in each direction reduces to $\frac{1}{12}$ and the overall resolution deteriorates.

You can activate the zoom in the following three ways

• By pressing the TELE or WIDE buttons on the camera itself

• Using a VISCA Command

Using Standard Mode

Using Variable Mode

There are eight levels of zoom speed.

Direct Mode

Setting the zoom position enables quick movement to the designated position.

Digital Zoom ON/OFF

In these standard and variable Speed Modes, it is necessary to send Stop Command to stop the zoom operation.

• The Zoom Mode supports a Combined Mode and a Separate Mode.

Combined Mode

This is the previously existing zoom method. After the optical zoom has reached its maximum level, the camera switches to Digital Zoom Mode.

Separate Mode

In this mode, Optical Zoom and Digital Zoom can be operated separately. You can use digital zoom magnification at any time from within any level of optical magnification.

About Continues Zoom position Reply

With ZoomDirect mode, or when zooming according to a preset, the camera outputs zoom position data when Continues Zoom position Reply is set to ON via a command.

Continues Zoom position Reply: y0 07 04 69 0p 0p 0q 0q 0q 0q FF

pp: D-Zoom position

qqq: Zoom position

• Using an external key switch board connected to the jack for the key SW.

Focus

Focus has the following modes, all of which can be set using VISCA Commands.

• Auto Focus Mode

The minimum focus distance is 290 mm at the optical wide end and 800 mm at the optical tele end, and is independent of the digital zoom.

The Auto Focus (AF) function automatically adjusts the focus position to maximise the high frequency content of the picture in a center measurement area, taking into consideration the high luminance and strong contrast components.

- Normal AF Mode

This is the normal mode for AF operations.

- Interval AF Mode

The mode used for AF movements carried out at particular intervals. The time intervals for AF movements and for the timing of the stops can be set in one-second increments using the Set Time Command. The initial value for both is set to five seconds.

- Zoom Trigger Mode

When the zoom is changed with the TELE or the WIDE buttons, the pre-set value (initially set at 5 seconds) becomes that for AF Mode. Then, it stops.

AF sensitivity can be set to either Normal or LOW.

- Normal

Reaches the highest focus speed quickly. Use this when shooting a subject that moves frequently. Usually, this is the most appropriate mode.

- LOW

Improves the stability of the focus. When the lighting level is low, the AF function does not take effect, even though the brightness varies, contributing to a stable image.

• Manual Focus Mode

Manual Focus has both a Standard Speed Mode and a Variable Speed Mode. Standard Speed Mode focuses at a fixed rate of speed. Variable Speed Mode has eight speed levels that can be set using a VISCA Command.

In these standard and variable Speed Modes, it is necessary to send Stop Command to stop the zoom operation.

• One Push Trigger Mode

When a Trigger Command is sent, the lens moves to adjust the focus for the subject. The focus lens then holds that position until the next Trigger Command is input.

• Infinity Mode

The lens is forcibly moved to a position suitable for an unlimited distance.

• Near Limit Mode

Can be set in a range from 1000 (∞) to C000 (10 mm).

White Balance

White Balance has the following modes, all of which can be set using VISCA Commands.

- **Auto White Balance**

This mode computes the white balance value output using color information from the entire screen. It outputs the proper value using the color temperature radiating from a black subject based on a range of values from 3000 to 7500K.

This mode is the factory setting.

- **ATW**

Auto Tracing White balance (2000 to 10000K)

- **Indoor**

3200K Base Mode

- **Outdoor**

5800K Base Mode

- **One Push WB**

The One Push White Balance mode is a fixed white balance mode that may be automatically readjusted only at the request of the user (One Push Trigger), assuming that a white subject, in correct lighting conditions, and occupying more than 1/2 of the image, is submitted to the camera.

One Push White Balance data is lost when the power is turned off. If the power is turned off, reset One Push White Balance.

- **Manual WB**

Manual control of R and B gain, 256 steps each

- **Outdoor Auto**

This is an auto white balance mode specifically for outdoors. It allows you to capture images with natural white balance in the morning and evening.

- **Sodium Vapor Lamp Auto**

This is an auto white balance mode that is compatible with sodium vapor lamps.

- **Sodium Vapor Lamp**

This is a fixed white balance mode specifically for sodium vapor lamps.

Automatic Exposure Mode

A variety of AE functions are available for optimal output of subjects in lighting conditions that range from low to high.

- **Full Auto**

Auto Iris and Gain, Fixed Shutter Speed (NTSC: 1/60 sec., PAL: 1/50 sec.)

- **Gain Limit Setting**

The gain limit can be set in the AE mode. Use this setting when image signal-to-noise ratio is particularly important.

- **Shutter Priority**¹⁾

Variable Shutter Speed, Auto Iris and Gain (1/1 to 1/10,000 sec., 16 high-speed shutter speeds plus 6 low-speed shutter speeds)

1) Flicker can be eliminated by setting shutter to

→ 1/100s for NTSC models used in countries with a 50 Hz power supply frequency

→ 1/120s for PAL models used in countries with a 60 Hz power supply frequency

- **Iris Priority**

Variable Iris (F1.4 to Close, 18 steps), Auto Gain and Shutter speed

- **Manual**

Variable Shutter, Iris and Gain

- **Bright**

Variable Iris and Gain (Close to F1.4, 17 steps at 0 dB: F1.4, 15 steps from 0 to 28 dB)

AE – Shutter priority

The shutter speed can be set freely by the user to a total of 22 steps – 16 high speeds and 6 low speeds. When the slow shutter is set, the speed can be 1/30s, 1/15s, 1/8s, 1/4s, 1/2s, 1/1s. The picture output is read at a normal rate from the memory. The memory is updated at a low rate from the CCD. AF capability is low. In high speed mode, the shutter speed can be set up to 1/10,000s. The iris and gain are set automatically, according to the brightness of the subject.

| Data | NTSC (s) | PAL (s) |
|------|----------|---------|
| 15 | 1/10000 | 1/10000 |
| 14 | 1/6000 | 1/6000 |
| 13 | 1/4000 | 1/3500 |
| 12 | 1/3000 | 1/2500 |
| 11 | 1/2000 | 1/1750 |
| 10 | 1/1500 | 1/1250 |
| 0F | 1/1000 | 1/1000 |
| 0E | 1/725 | 1/600 |
| 0D | 1/500 | 1/425 |
| 0C | 1/350 | 1/300 |
| 0B | 1/250 | 1/215 |
| 0A | 1/180 | 1/150 |
| 09 | 1/125 | 1/120 |
| 08 | 1/100 | 1/100 |
| 07 | 1/90 | 1/75 |
| 06 | 1/60 | 1/50 |
| 05 | 1/30 | 1/25 |
| 04 | 1/15 | 1/12 |
| 03 | 1/8 | 1/6 |
| 02 | 1/4 | 1/3 |
| 01 | 1/2 | 1/2 |
| 00 | 1/1 | 1/1 |

AE – Iris priority

The iris can be set freely by the user to 18 steps between F1.4 and Close.

The gain and shutter speed are set automatically, according to the brightness of the subject.

| Data | Setting value | Data | Setting value |
|------|---------------|------|---------------|
| 11 | F1.4 | 08 | F6.8 |
| 10 | F1.6 | 07 | F8 |
| 0F | F2 | 06 | F9.6 |
| 0E | F2.4 | 05 | F11 |
| 0D | F2.8 | 04 | F14 |
| 0C | F3.4 | 03 | F16 |
| 0B | F4 | 02 | F19 |
| 0A | F4.8 | 01 | F22 |
| 09 | F5.6 | 00 | CLOSE |

AE – Manual

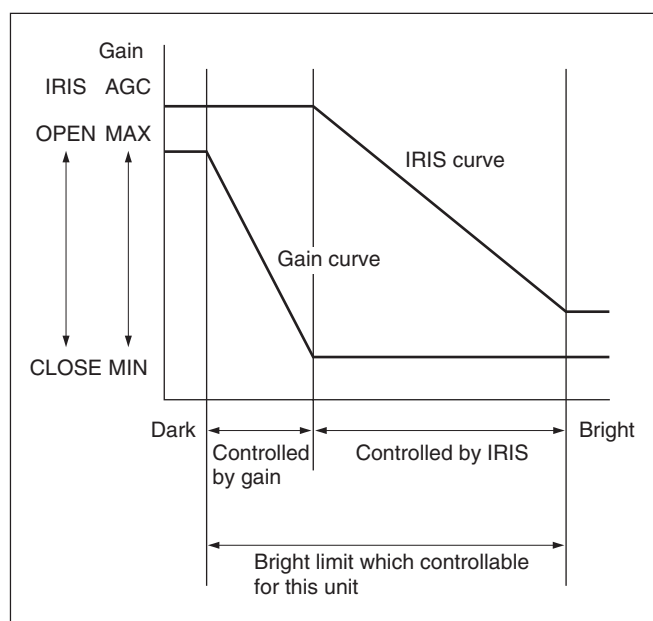
The shutter speed (22 steps), iris (18 steps) and gain (16 steps) can be set freely by the user.

AE – Bright

The bright control function adjusts both gain and iris using an internal algorithm, according to a brightness level freely set by the user. Exposure is controlled by gain when dark, and by iris when bright.

As both gain and iris are fixed, this mode is used when exposing at a fixed camera sensitivity. When switching from Full Auto or Shutter Priority Mode to Bright Mode, the current status will be retained for a short period of time.

Only when the AE mode is set to “Full Auto” or “Shutter Priority,” can you switch it to “Bright.”



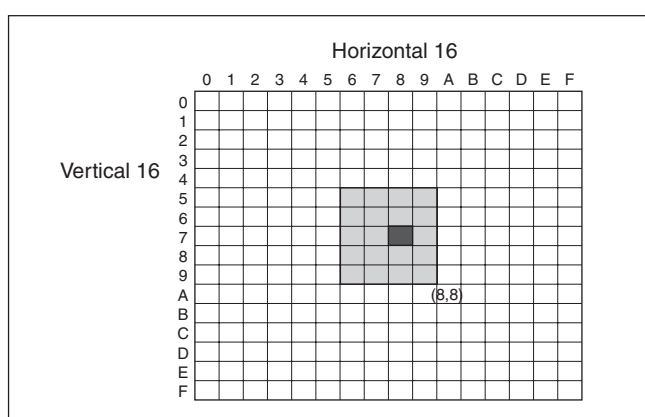
| Data | Iris | Gain | Data | Iris | Gain |
|------|------|-------|------|-------|------|
| 1F | F1.4 | 28 dB | 0F | F2 | 0 dB |
| 1E | F1.4 | 26 dB | 0E | F2.4 | 0 dB |
| 1D | F1.4 | 24 dB | 0D | F2.8 | 0 dB |
| 1C | F1.4 | 22 dB | 0C | F3.4 | 0 dB |
| 1B | F1.4 | 20 dB | 0B | F4 | 0 dB |
| 1A | F1.4 | 18 dB | 0A | F4.8 | 0 dB |
| 19 | F1.4 | 16 dB | 09 | F5.6 | 0 dB |
| 18 | F1.4 | 14 dB | 08 | F6.8 | 0 dB |
| 17 | F1.4 | 12 dB | 07 | F8 | 0 dB |
| 16 | F1.4 | 10 dB | 06 | F9.6 | 0 dB |
| 15 | F1.4 | 8 dB | 05 | F11 | 0 dB |
| 14 | F1.4 | 6 dB | 04 | F14 | 0 dB |
| 13 | F1.4 | 4 dB | 03 | F16 | 0 dB |
| 12 | F1.4 | 2 dB | 02 | F19 | 0 dB |
| 11 | F1.4 | 0 dB | 01 | F22 | 0 dB |
| 10 | F1.6 | 0 dB | 00 | CLOSE | 0 dB |

When switching from the Shutter Priority mode to the Bright mode, the shutter speed set in the Shutter Priority mode is maintained.

Spot Exposure Mode

In Full Auto AE, the level for the entire screen is computed and the optimum Auto Iris and Gain levels are determined. In Spot AE, a particular section of the subject can be designated, and then that portion of the image can be weighted and a value computed so that Iris and Gain can be optimized to obtain an image. For example, in an image with a lot of movement and with varying levels of brightness, portions without much change can be designated as such a “spot,” and changes to the screen can be minimized in that area. As shown in the diagram below, a range of 16 blocks vertically and 16 blocks horizontally can be designated.

In the case where the center is designated (shown in black), the level is computed along with a weighted value for the surrounding block (shaded), including the specified portions; and then the Gain and Iris are set. The value of the designated portions and the surrounding areas should be calculated as 100%, the rest should be set to 20%. The range of the Spot AE frame is fixed to 5 blocks vertically and 4 blocks horizontally.



Exposure Compensation

Exposure compensation is a function which offsets the internal reference brightness level used in the AE mode, by steps of 1.5 dB.

| Data | Step | Setting value |
|------|------|---------------|
| 0E | +7 | +10.5 dB |
| 0D | +6 | +9 dB |
| 0C | +5 | +7.5 dB |
| 0B | +4 | +6 dB |
| 0A | +3 | +4.5 dB |
| 09 | +2 | +3 dB |
| 08 | +1 | +1.5 dB |
| 07 | 0 | 0 dB |
| 06 | -1 | -1.5 dB |
| 05 | -2 | -3 dB |
| 04 | -3 | -4.5 dB |
| 03 | -4 | -6 dB |
| 02 | -5 | -7.5 dB |
| 01 | -6 | -9 dB |
| 00 | -7 | -10.5 dB |

Slow AE (Automatic Exposure)

The slow AE Response (automatic exposure) function allows you to reduce the exposure response speed. Usually the camera is set up so that the optimum exposure can be obtained automatically within about 1 second. However, using the slow AE response function allows you to lengthen the automatic exposure response speed from the factory setup speed (01 (hex) up to approx. two minutes (30 (hex))). For example, with the normal setting (about 1 second), if the headlights of a car are caught by the camera, the camera automatically adjusts the exposure so that it can shoot a high-intensity subject (in this case, the headlights). As a result, images around the headlights, that is, the rest of the subject, except the headlights, becomes relatively dark, and poorly distinguished. However, using the slow AE function means the AE response speed will be slower, and response time will be longer. As a result, even if the camera catches a high-intensity subject (e.g., the headlights) for a moment, you can still easily distinguish the portions of the image surrounding the headlights.

High Resolution Mode (Default)

A newly developed ISP function enables the filtering of signals. This allows the camera to provide images with a high resolution (550 TV lines).

Aperture Control

Aperture control is a function which adjusts the enhancement of the edges of objects in the picture. There are 16 levels of adjustment, starting from “no enhancement.” When shooting text, this control may help by making them sharper.

Back Light Compensation

When the background of the subject is too bright, or when the subject is too dark due to shooting in the AE mode, back light compensation will make the subject appear clearer.

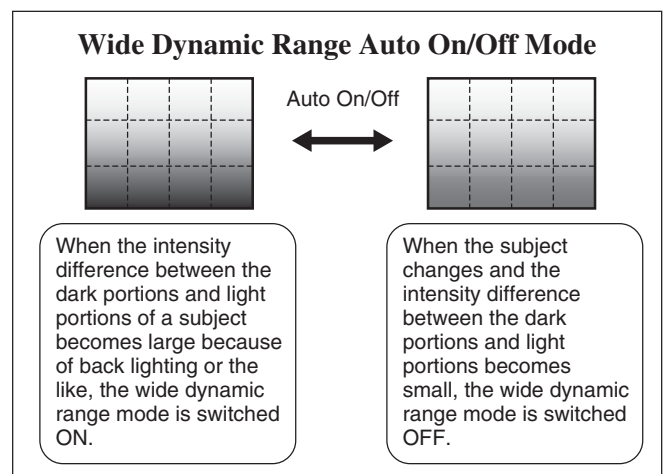
Wide Dynamic Range Mode (WD)

The Wide Dynamic Range mode is a function for dividing an image into several blocks and correcting blocked-up shadows and blown-out highlights in accordance with the intensity difference. It enables you to obtain images in which portions ranging from dark to light can be recognized, even when capturing a subject with a large intensity difference that is backlit or includes extremely light portions.

A CCD for shooting a wide dynamic range is employed, and a newly developed image signal processor combines a long exposure signal (normal shutter) and a signal of the high intensity portions obtained by a short exposure (high-speed shutter) to achieve images with a wide dynamic range.

Wide Dynamic Range Auto On/Off Mode

The wide dynamic range can be set to be automatically switched ON/OFF in accordance with the intensity difference obtained by dividing an image into several blocks and then averaging the intensity of each block.



The wide dynamic range mode includes the following operation modes.

- **WD Mode**

This mode corrects blocked-up shadows and blown-out highlights in accordance with the intensity difference.

- **WD Auto ON/OFF Mode**

This mode switches WD ON/OFF automatically in accordance with the intensity difference of the subject. Configure the sensitivity for when WD is switched from OFF to ON with the detection sensitivity parameter.

- **Exposure Ratio Mode**

This mode fixes the shutter speed of a short exposure. Configure the shutter speed of a long exposure by setting the ratio with regards to a short exposure with the exposure ratio parameter.

Blocked-up shadow correction is not performed in this mode.

- **Histogram Mode**

This mode uses a histogram to correct blocked-up shadows and blown-out highlights. (The operation is similar to that of FCB-EX490D/P Dver.)

About WD Set Parameter

(Command: 8x 01 04 2D 0p 0q 0r 0s 0t 0u 00 00 FF)

p: Screen display (0: Combined image, 1: Long/short division, 2: Long-time, 3: Short-time)

Set the screen display to a WD combination image, long/short exposure division image, long exposure image, or short exposure image.

q: Detection sensitivity (0: Low, 1: Mid, 2: Hi)

Select from three levels for detecting the intensity within the image for when switching Auto WD from OFF to ON.

r: Blocked-up shadow correction level can be set to one of four levels. (0:L 1:M 2:H 3:S)

s: Blown-out highlight correction level can be set to one of three levels. (0:L 1:M 2:H)

tu: Parameter to use in the exposure ratio mode. Specify the short exposure time by setting the magnification ratio (×1 to ×150) with regards to a long exposure time.

(FCB-EX490E/P only)

Note

When the wide dynamic range mode is ON, solarization may be observed in the images of some subjects. This phenomenon is unique to wide dynamic range mode, and is not an indication of a camera malfunction.

Noise Reduction

The NR (Noise Reduction) function removes noise (both random and non-random) to provide clearer images. By combining 2D filtering according to brightness and image color, and 3D filtering according to noise caused by motion and time difference, lower-noise images can be obtained for the corresponding image brightness of a moving subject.

This function has six steps: levels 1 to 5, plus off.

Level 1 applies to subject motion mainly using 2D filter effects. With level 5, 2D and 3D filter effects are maximized, providing the lowest-noise images, although moving subjects may show trails.

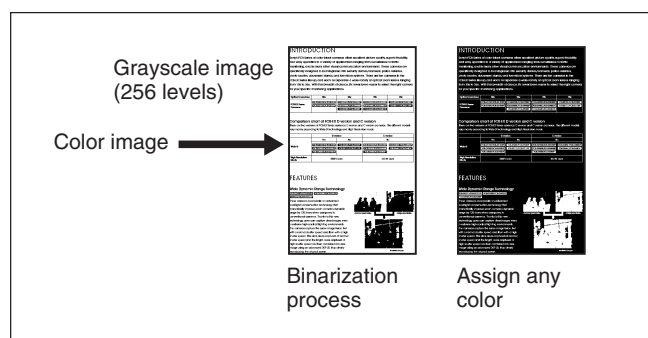
At each level, two filters are set according to noise and image motion characteristics, so the available level selections depend on the situation. The default setting is level 3.

Color Enhancement

A captured color image is converted to 256 levels of gray, and the binarization process is performed to convert all gray levels brighter than the threshold value to white, and all gray levels darker than the threshold value to black. (Any value can be set for the threshold level and hysteresis width.) Furthermore, any color can be assigned to each of the negative and positive.

Note

Flickering in images during color enhancement is not an indication of a camera malfunction. It can be reduced with the threshold level, hysteresis width, and edge enhancement (aperture) settings.



Temperature Reading Function

The conversion value (hex) of the temperature sensor built into the camera can be read by using a query command. The conversion value has an error of ± 3 C, and because the temperature sensor is inside the camera, this value is not the ambient temperature. Use it as a reference value.

Slow shutter – Auto/Manual

When set to “Auto,” ensures that the slow shutter is set automatically when the brightness drops. Effective only when the AE mode is set to “Full Auto.” Set to “Slow Shutter Manual” at shipment.

Note

The Slow Shutter Auto function is not available in WD mode.

ICR (IR Cut-Removable) Mode

An infrared (IR) Cut-Filter can be disengaged from the image path for increased sensitivity in low light environments. The ICR will automatically engage depending on the ambient light, allowing the camera to be effective in day/night environments. When the auto ICR mode is set to ON, the image becomes black and white. (FCB-EX490E/P only)

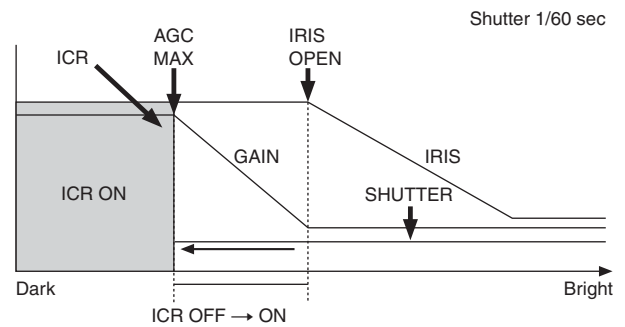
Auto ICR Mode

Auto ICR Mode automatically switches the settings needed for attaching or removing the IR Cut Filter. With a set level of darkness, the IR Cut Filter is automatically disabled (ICR ON), and the infrared sensitivity is increased. With a set level of brightness, the IR Cut Filter is automatically enabled (ICR OFF). Also, on systems equipped with an IR light, the internal data of the camera is used to make the proper decisions to avoid malfunctions.

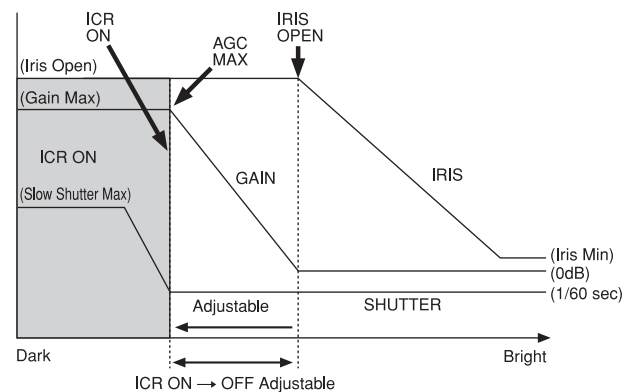
Auto ICR Mode operates with the AE Full Auto setting.

(FCB-EX490E/P only)

When Auto Slow Shutter is OFF (initial setting)



When Auto Slow Shutter is ON



Note

When in Auto_ICR_OFF state and WB data is added (default), a malfunction may occur when the subjects largely consisting of blue and green colors are taken.

Camera ID

The ID can be set up to 65,536 (0000 to FFFF). As this will be memorized in the nonvolatile memory inside, data will be saved regardless of whether it has been backed up.

Effect

It consists of the following functions.

- **Neg. Art:** Negative/Positive Reversal
- **Black White:** Monochrome Image

Others

E-FLIP

This function turns the video output from the camera upside down.

Mirror Image

This function reverses the video output from the camera horizontally.

Freeze

This function captures an image in the field memory of the camera so that this image can be output continuously.

Because communication inside the camera is based on V cycle, the captured image is always the one 3V to 4Vs after the sending of a Command. Thus, you can not specify a time period after sending EVEN, ODD or a Command.

Memory (Position preset)

Using the position preset function, 6 sets of camera shooting conditions can be stored and recalled. This function allows you to achieve the desired status instantly, even without adjusting the following items each time.

- Zoom Position
- Digital Zoom On/Off
- Focus Auto/Manual
- Focus Position
- AE Mode
- Shutter control parameters
- Bright Control
- Iris control parameters
- Gain control parameters
- Exposure Compensation On/Off
- Exposure Level
- Backlight Compensation On/Off
- Slow Shutter Auto/Manual
- Slow AE Response speed
- White Balance Mode
- R/B Gain
- Aperture
- ICR Shoot On/Off (FCB-EX490E/P only)
- WD On/Off (FCB-EX490E/P only)

Custom Preset

As with the position preset function, the camera shooting conditions can be stored and recalled. The settings are recalled when the power is turned on.

For setting items, see the “Initial Settings, Custom Preset and Backup” section on page 27.

User Memory Area

A user area of 16 bytes allows you to write data, such as an ID for each customer, data for each system, and so on, freely.

Note

Rewriting of memory is not unlimited. Be careful to avoid using the memory area for such as unnecessary tasks as rewriting the contents of the memory for every operation.

Register Setting

The camera's default settings can be changed by the register setting command.

Register Setting Command:

8x 01 04 24 mm 0p 0q FF

mm: Register No. (=00 to 7F)

pq: Register Value (=00 to FF)

Register Inquiry Command:

8x 09 04 24 mm FF

mm: Register No.

y0 50 0p 0p FF

pp: Register Value

(returned from the camera)

Example: To set communication speed to 38400 bps

8x 01 04 24 00 00 02 FF

After sending this command, turn power off and back on (power reset) to resume communication control at 38400 bps.

Example: Sending to confirm settings

8x 09 04 24 00 FF

y0 50 00 03 FF is returned from the camera

The register setting items and No. are as follows.

Baud Rate: 00

Communication speed can be changed.

OSD Language: 60

OSD Language can be changed.

CCD Scanning Mode: 72

CCD scanning mode can be changed.

(FCB-EX490E/P only)

Digital Output Mode: 73

The FCB camera supports various output modes.

This register “73” allows changing the output mode.

For details, see “Register Setting” on page 58.

Zoom Limit: 50 (Wide end), 51 (Tele end)

The Wide and Tele zoom limits can be set.

E-Zoom Max: 52

The maximum digital zoom limit can be specified (default is $\times 12$).

FocusTrace: 54

When zoom speed is given priority, using the ZoomDirect command changes focus at high speed (although the image may be blurred because focus is not tracked). For example, the focus transition time from Wide to Tele ends, which typically takes 2.8 seconds, can be reduced to 2 seconds.

FocusOffset: 55

Placing a dome cover in front of the camera may cause the focal distance of the camera to change. Especially at the Tele end, this effect exceeds the AF range, so focus cannot track, although it responds to changes in this value.

For details, see “Register Setting” on page 58.

Privacy Zone Settings

For details, see page 16.

Motion detection

For details, see page 20.

Title Display

- You can set a title composed of up to 11 lines. One line can contain up to 20 characters.
- You can set display on/off, the horizontal position of the first character, blinking state and color for each line.
- The camera gives priority to lines of a title when the camera status is displayed on the relevant line. On the lines where a title is not set, the camera status is displayed.

| | | |
|-------------|--------------------|--------|
| Line Number | 00 to 0A | |
| H-position | 00 to 17 | |
| Blink | 00: Does not blink | |
| | 01: Blinks | |
| Color | 00 | White |
| | 01 | Yellow |
| | 02 | Violet |
| | 03 | Red |
| | 04 | Cyan |
| | 05 | Green |
| | 06 | Blue |

| | | | | | | | |
|----|----|----|----|----|----|----|----|
| 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 |
| A | B | C | D | E | F | G | H |
| 08 | 09 | 0a | 0b | 0c | 0d | 0e | 0f |
| I | J | K | L | M | N | O | P |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| Q | R | S | T | U | V | W | X |
| 18 | 19 | 1a | 1b | 1c | 1d | 1e | 1f |
| Y | Z | & | | ? | ! | 1 | 2 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
| 28 | 29 | 2a | 2b | 2c | 2d | 2e | 2f |
| À | È | Ì | Ò | Ù | Á | É | Í |
| 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 |
| Ó | Ú | Â | Ê | Ô | Æ | Œ | Ã |
| 38 | 39 | 3a | 3b | 3c | 3d | 3e | 3f |
| Ö | Ñ | Ç | ß | Ä | Ï | Ö | Ü |
| 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 |
| Å | \$ | ₣ | ¥ | DM | £ | ¢ | ı |
| 48 | 49 | 4a | 4b | 4c | 4d | 4e | 4f |
| ø | “ | : | ‘ | . | , | / | - |

Synchronization methods

Internal and external synchronization are available; VISCA Commands allow you to switch between them.

• Internal synchronization

An internal vibrator inside the camera generates a synchronizing signal as a basic oscillator.

NTSC=59.94 Hz

PAL=50 Hz

• External synchronization (V-Lock Synchronization ¹⁾)

When a TTL level V-Lock pulse is input, the camera synchronizes to the input signal (V-lock synchronization). The frequency of the input signal synchronizes to within ± 1 Hz of the external synchronization.

Also, 360 degree phase adjustment is possible due to the phase adjustment of the V-lock signal.

When adjusting V-Phase, first make the phase adjustment with the Line Lock mode, then switch to Frequency Lock mode and enable external sync. If not performing phase adjustment, switch to Frequency Lock mode then enable external sync. See “Command List” on page 32.

Note

Noise may occur when performing phase adjustment with the Line Lock mode, although it should disappear when switching to Frequency Lock mode for external sync.

Because V-lock synchronization is a simple synchronization method, color signals like a VBS “Genlock” signal cannot be synchronized.

1) In V-lock synchronization, the camera makes a V-lock pulse (VL-PULSE) which synchronizes to the commercial power supply and uses it as the external synchronization input signal of the camera, using the fact that the V cycle (59.97 Hz vertical synchronization signal) and the frequency of the commercial power supply (60 Hz). The synchronous signal of the camera will automatically synchronize to the VL-PULSE in the camera.

Privacy Zone Masking Function

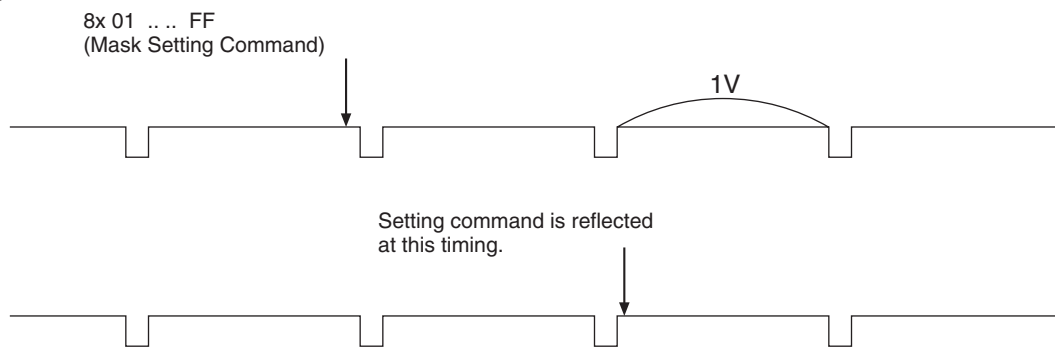
Privacy Zone masking protects private objects and areas such as house windows, entrances, and exits which are within the camera's range of vision but not subject to surveillance.

Privacy zone masking can be masked on the monitor to protect privacy.

Features

- Mask can be set on up to 24 places according to Pan/Tilt positions.
- Mask can be displayed on 8 places per screen simultaneously.
- Privacy Zones are displayed according to priority in alphabetical order.
- Individual on/off zone masking settings.
- Two colors from among 29 colors including mosaic can be individually set for each of 24 privacy zones.
- Interlocking control with zooming.
- Interlocking control with Pan/Tilt.
- Non-interlocking control with Pan/Tilt.

Timing chart



Privacy Zone Setting Command List

| Command Set | Command | Command Packet | Comments |
|-----------------|-------------------|---|--|
| CAM_PrivacyZone | SetMask | 8x 01 04 76 mm nn 0r 0r 0s 0s FF | Setting Mask(Size) See “mm: Mask setting list”, “nn: Setting”, and “pp: x, qq:y, rr: w, ss: h” in “Parameters” on page 18. |
| | Display | 8x 01 04 77 pp pp pp pp FF | Setting Mask Display On/Off See “pp pp pp pp: Mask bit” in “Parameters” on page 18. pp pp pp pp: Mask setting (0: OFF, 1: ON) |
| | SetMaskColor | 8x 01 04 78 pp pp pp pp qq rr FF | Setting Color of Mask See “pp pp pp pp: Mask bit” and “qq, rr: Color code” in “Parameters” on page 18. qq: Color setting when setting the Mask bit to 0 rr: Color setting when setting the Mask bit to 1 |
| | SetPanTiltAngle | 8x 01 04 79 0p 0p 0p 0q 0q 0q FF | Setting Pan/Tilt Angle See “Setting pan/tilt angle” in “Parameters” on page 18. ppp: Pan angle, qq: Tilt angle |
| | SetPTZMask | 8x 01 04 7B mm 0p 0p 0p 0q 0q 0q 0r 0r 0r FF | Setting the direct position of PTZ See “mm: Mask setting list” and “Setting pan/ tilt angle” in “Parameters” on page 18. ppp: Pan , qq: Tilt , rrr: Zoom |
| | Non_InterlockMask | 8x 01 04 6F mm 0p 0p 0q 0q 0r 0r 0s 0s FF | Setting non-interlocking the mask to pan/tilt See “mm: Mask setting list” and “pp:x, qq:y, rr:w, ss:h” in “Parameters” on page 18. |
| | Grid On | 8x 01 04 7C 02 FF | Setting Grid Display On/Off |
| | Grid Off | 8x 01 04 7C 03 FF | |
| | CenterLineOn | 8x 01 04 7C 04 FF | Setting the center line On |

Privacy Zone Inquiry Command List

| Inquiry Command | Command Packet | Inquiry Packet | Comments |
|---------------------------|-------------------|---|---|
| CAM_Privacy DisplayInq | 8x 09 04 77 FF | y0 50 pp pp pp pp FF | Inquiry about the status of Setting Mask Display On/Off See “pp pp pp pp: Mask bit” in “Parameters” on page 18. 1:On, 0:Off |
| CAM_PrivacyPan TiltInq | 8x 09 04 79 FF | y0 50 0p 0p 0p 0q 0q 0q FF | Inquiry about the pan/tilt position currently set See “Setting pan/tilt angle” in “Parameters” on page 18. ppp: Pan, qq: Tilt |
| CAM_Privacy PTZInq | 8x 09 04 7B mm FF | y0 50 0p 0p 0p 0q 0q 0q 0r 0r 0r 0r FF | Inquiry about pan/tilt/zoom position at the mm Mask setting See “mm: Mask setting list” and “Setting pan/ tilt angle” in “Parameters” on page 18. ppp: Pan Position, qq: Tilt Position rrr: Zoom Position |
| CAM_Privacy MonitorInq | 8x 09 04 6F FF | y0 50 pp pp pp pp FF | Inquiry about the mask currently displayed See “pp pp pp pp: Mask bit” in “Parameters” on page 18. |

Details of Setting Commands

Set Mask

Command: 8x 01 04 76 mm nn 0r 0r 0s 0s FF

Parameters:

| | |
|----|---|
| mm | Setting Mask See “mm: Mask setting list” in “Parameters” on page 18. |
| nn | Selects new setting or resetting for the zone. See “nn: Setting” in “Parameters” on page 18. |
| rr | Sets the half value “w” of the Mask Width. |
| ss | Sets the half value “h” of the Mask Height. See “pp: x, qq: y, rr: w, ss: h” in “Parameters” on page 18. |

Comments: To set the mask, first display the object at the center of the screen. When “nn” is set to 1, the current Pan/Tilt/Zoom position is recorded in internal memory.

When “nn” is set to 0, the Pan/Tilt/Zoom position in memory is not changed.

Notes

- The tilt angle at which you can set the mask is between –70 to +70 degrees.
- It is recommended that you set the size to at least twice the size of the object (height and width).

Set Display

Command: 8x 01 04 77 pp pp pp pp FF

Parameter:

| | |
|-------------|--|
| pp pp pp pp | Each 24 Privacy Zones corresponds to 1 bit. See “pp pp pp pp: Mask bit” in “Parameters” on page 18. |
|-------------|--|

Comments: Each of 24 Privacy zones can be switched on and off individually by a single VISCA command. If you want to display a Privacy zone, you must set its bit to 1. If you do not want to display a Privacy zone, you must set its bit to 0.

Set Mask Color

Command: 8x 01 04 78 pp pp pp pp qq rr FF

Parameter:

| | |
|-------------|---|
| pp pp pp pp | Each 24 Privacy Zones correspond with the BIT. See “pp pp pp pp: Mask bit” in “Parameters” on page 18. |
| qq | Set the color code include the semi-transparency code. |
| rr | Set the color code include the semi-transparency code. See “qq, rr: Color code” in “Parameters” on page 18. |

Comments: Two different color masks can be chosen.

The colors can be chosen from among 14 colors including the possibility for semi-transparency of each color. Therefore two colors from among the total of 29 colors including mosaic can be individually set for each of 24 privacy zones. If the bit of parameter (pp pp pp pp) is set to “0”, mask color will be “qq” color (Color code). If the bit of parameter (pp pp pp pp) is set to “1”, the mask color will be “rr” color (Color code).

Example: 8x 01 04 78 00 00 00 03 10 07 FF

The mask color of Mask_A and Mask_B is White (color code 07h), and the mask color of the other Mask (C to X) is semi-transparent Black (color code 10h).

Set Pan Tilt Angle

Command: 8x 01 04 79 0p 0p 0p 0q 0q 0q FF

Parameter:

| | |
|-----|--|
| ppp | Pan Angle |
| qqq | Tilt Angle See “Setting pan/tilt angle” in “Parameters” on page 18. |

Comments: Pan/Tilt angle settings are hexadecimal data.

The resolution of Pan/Tilt angle is 0.088 degrees.

Note

When you set the pan/tilt angle, locate the pan/tilt position at the center point of the FCB camera’s position.

Set PTZ Mask

Command: 8x 01 04 7B mm 0p 0p 0p 0q 0q 0q 0r 0r 0r 0r FF

Parameter:

| | |
|------|--|
| mm | Setting Mask See “mm: Mask setting list” in “Parameters” on page 18. |
| ppp | Pan Angle (000 to FFF) See “Setting pan/tilt angle” in “Parameters” on page 18. |
| qqq | Tilt Angle (000 to FFF) See “Setting pan/tilt angle” in “Parameters” on page 18. |
| rrrr | Zoom Position (000 to 4000) See “Zoom Ratio and Zoom Position (for reference)” on page 56. |

Comments: Mask can be set at the desired position by setting the pan tilt angle and zoom position using this command. The set value can be input by hexadecimal number.

Non Interlock Mask

Command: 8x 01 04 6F mm 0p 0p 0q 0q 0r 0r 0s 0s FF

Parameters:

| | |
|----|---|
| mm | Setting Mask See "mm: Mask setting list" in "Parameters" on page 18. |
| pp | Sets the center position "x" of the Mask on screen. |
| qq | Sets the center position "y" of the Mask on screen. |
| rr | Sets the half value "w" of the Mask Width. |
| ss | Sets the half value "h" of the Mask Height. See "pp: x, qq: y, rr: w, ss: h" in "Parameters" on page 18. |

Commands: Mask does not interlock with pan/tilt.

The limitations of parameters are as follows.
(hexadecimal representation)

x: $\pm 50h$

w: $\pm 50h$

y: $\pm 3ch$

h: $\pm 3ch$

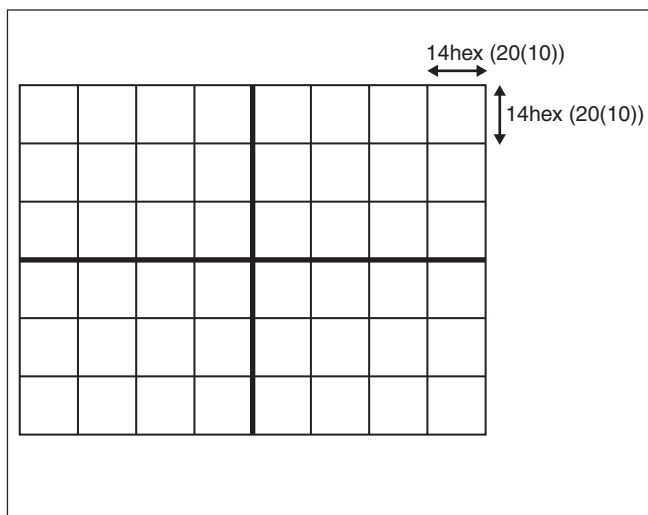
Note

When the Set Mask command and the Non Interlock Mask command are set to the same mask, the command set later becomes effective.

Grid

Use the grid displayed on the screen to set mask positions (see the figure below).

By executing the Center Line On command, only the x and y axes of the center are displayed. Grids lines disappear.



Motion Detection Function

This function instructs the camera to detect movement within the monitoring area and then send an alarm signal automatically.

The Detect signal goes out through the serial command (VISCA) communication line.

Features

- You can set a frame for the detection range of 12 (horizontally) \times 8 (vertically) blocks.
- You can set up to four frames.
- When the motion is detected in the set frame, the Alarm Replay VISCA command is sent.
- The threshold level for detection can be set (common to four frames).
- The interval of alarm detection can be set up to 256 seconds in units of one second.
- You can set on/off for each frame.
- The frame number is also sent with Alarm Replay to report in which frame the motion has been detected.

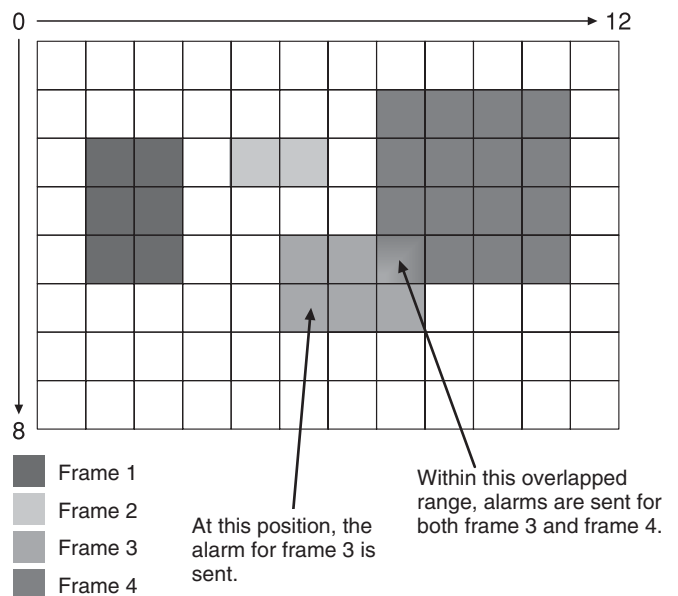
Frames

Setting frames

You can set the frame by assigning the starting point and terminating point vertically and horizontally. You can set up to four frames.

When motion is detected within the range where frames overlap

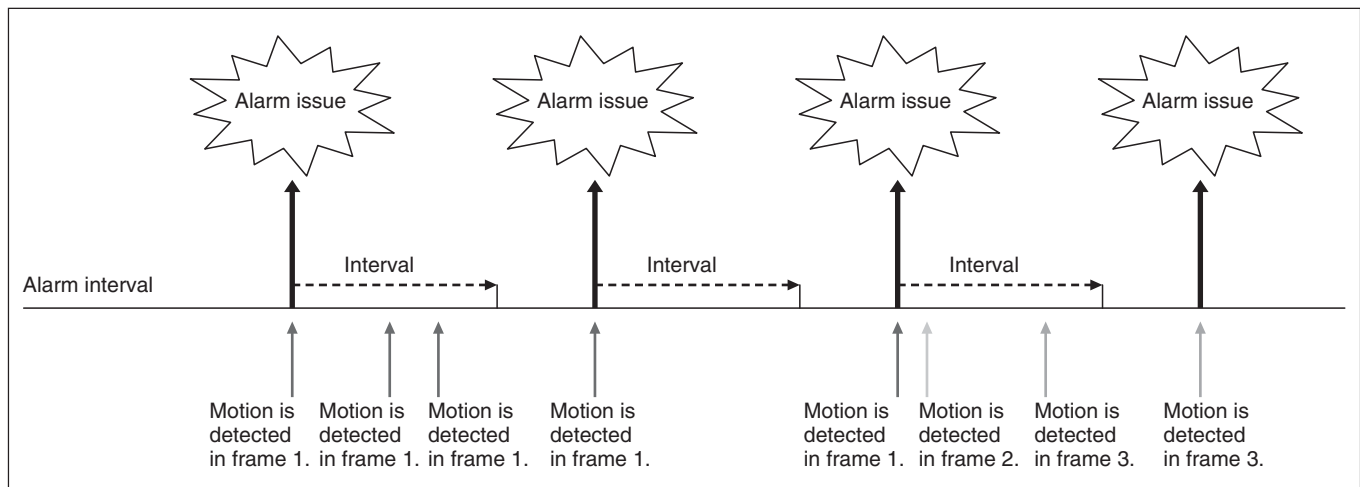
The alarms are sent for both frames.



Sending Alarms

- When motion is detected, the Alarm Replay command is issued via the serial command (VISCA) communication line.

- When multiple motions are detected or motion is detected in another frame within the set interval following the original time the alarm was issued, another alarm command is not issued.
- When motion is detected after the interval time elapsed, the alarm is issued again.



Setting Commands

• MD On/Off

The Display mode is selected by the Function Set command and frames are set by the Frame Set command. By sending an MD On command, the frame is displayed when motion is detected in the set frame. The Alarm Reply command is set via the serial command (VISCA) communication line.

8x 01 04 1B 02 FF --- On
8x 01 04 1B 03 FF --- Off

• Function Set

Select the detected frame, and set the Threshold Level and the Interval Time.

8x 01 04 1C 0m 0n 0p 0q 0r 0s FF
m: Display Mode on/off (bit0: Frame)
n: Detection Frame set on/off (bit0:Frame0,
bit1:Frame1, bit2:Frame2, bit3:Frame3)
-- (0 to F)
pq: Threshold -- (00 to FF)
rs: Interval time set -- (00 to FF)
(When pq and rs are 0, the command is received, but the setting is disabled.)

• Frame Set

You can set up to four frames by assigning the starting and terminating points.

Note

Set a terminating point higher vertically and horizontally than the starting point. If you set the wrong value, the command yields an error.

8x 01 04 1D 0m 0p 0q 0r 0s FF

m: Select Detection Frame (0: Frame0, 1: Frame1, 2: Frame2, 3: Frame3) -- (0, 1, 2, 3)
p: Frame set Start Horizontal Position -- (00 to 0B)
q: Frame set Start Vertical Position -- (00 to 07)
r: Frame set End Horizontal Position -- (01 to 0C)
s: Frame set End Vertical Position -- (01 to 08)

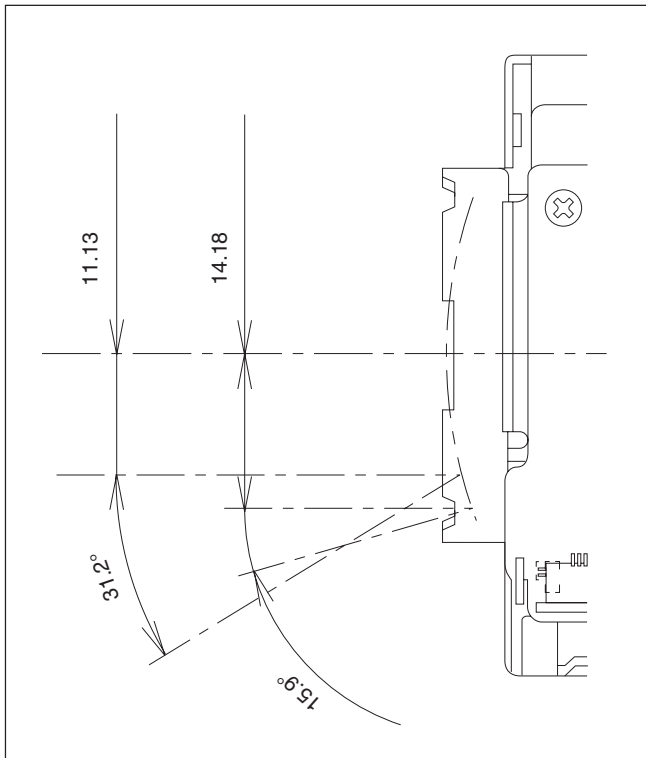
• Alarm Reply

When motion is detected in the set frame, the camera issues this command. This command includes the information on the number of the detected frame.

y0 07 04 1B 0p FF
p: Frame Number (bit0: Frame0, bit1: Frame1, bit2: Frame2, bit3: Frame3)

Eclipse

When designing the housing, refer to the dimensional allowance as shown in the figure below.



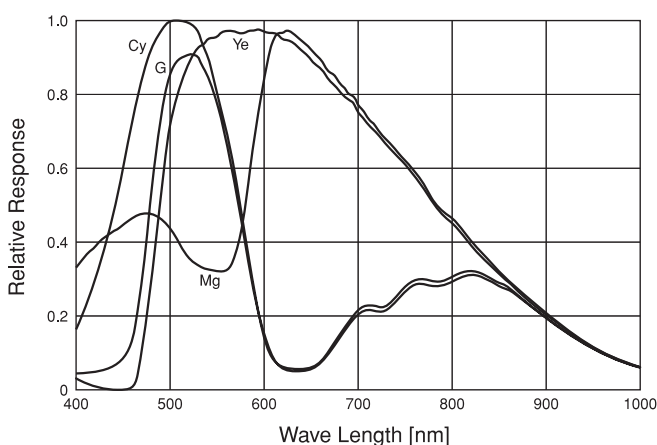
Vibration Specifications

Test Method (Random vibration)

- Fix the camera at the four fixation points of the base using M2 screws.
- Perform the random vibration test under the following conditions in the X, Y and Z directions for 20 minutes in each direction.
- The camera vibration specification is to have no malfunction after this test.

| | | | |
|-------------------------|--------------------------------|-------------------------------------|----------------------------|
| Power spectrum density | 5 to 50 Hz | 4.14 m ² /s ³ | {0.043 G ² /Hz} |
| | 50 to 100 Hz | -36 dB/oct | |
| Effective overall value | 14.3 m/s ² {1.46 G} | | |
| Test time | 20 minutes | | |

Spectral Sensitivity Characteristics (FCB-EX490E/P only)

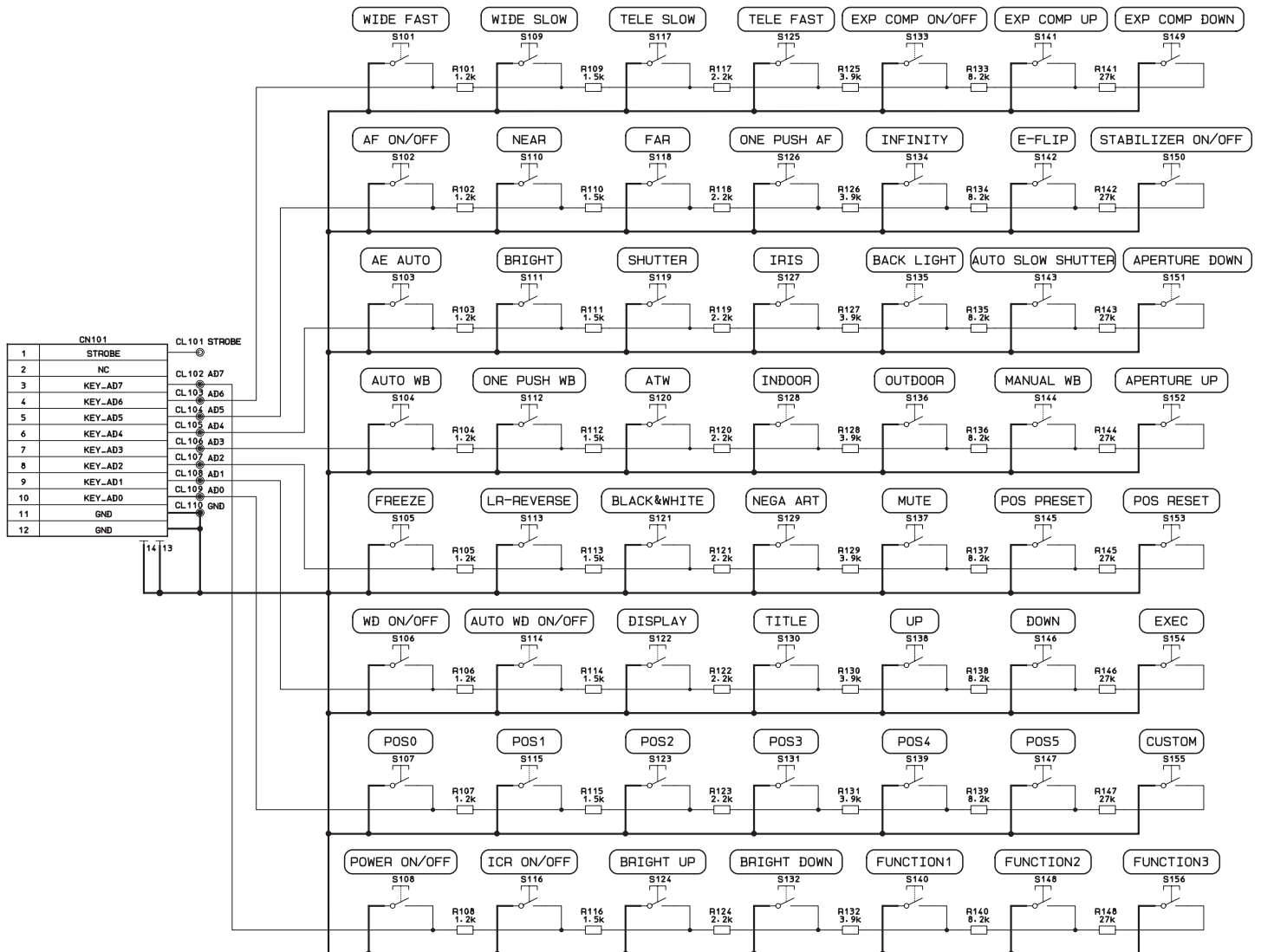


Use the graph as a reference value. (We can not guarantee these values.)

This data is measured when the IR cut filter is removed and the characteristics of the lens and optical source characteristics are ignored.

Key Switch Circuitry

The circuitry shown below is an example. Note that all switches in the figure do not function in all models. For more information, refer to the command list, check functions on the camera, or contact your Sony dealer.



The CN101 is connected to the FCB camera main unit.

Key Function Specifications

| Classification | Name | Function | Button operation | Mode display |
|----------------|-----------------|---|---|--|
| ZOOM | WIDE FAST | Move ZOOM to WIDE side quickly. | Pressing repeatedly allowed. | ZOOM bar displayed for 3 s. |
| | WIDE SLOW | Move ZOOM to WIDE side slowly. | Pressing repeatedly allowed. | ZOOM bar displayed for 3 s. |
| | TELE FAST | Move ZOOM to TELE side quickly. | Pressing repeatedly allowed. | ZOOM bar displayed for 3 s. |
| | TELE SLOW | Move ZOOM to TELE side slowly. | Pressing repeatedly allowed. | ZOOM bar displayed for 3 s. |
| FOCUS | AF ON/OFF | Switch between Auto Focus and Manual Focus. | Switch between Auto and Manual. | Manual F indication |
| | NEAR | Move focus to NEAR side in Manual Focus mode. | Pressing repeatedly allowed. | Near indication |
| | FAR | Move focus to FAR side in Manual Focus mode. | Pressing repeatedly allowed. | Far indication |
| | ONE PUSH AF | Perform AF operation once in Manual Focus mode. | Request One Push AF. | Manual F indication flashes while request is made. |
| | INFINITY | Move focus forcibly to Infinity resulting in Manual Focus mode, regardless of the current focus mode. | Request Infinity. | Far indication |
| AE | AE AUTO | Switch to AE FULL Auto mode. | Request AE Full Auto. | No display |
| | BRIGHT | Switch to variable brightness mode (BRIGHT), depending on the conditions for mode shifting. | Request Bright mode. Pressing Up/Down key repeatedly allowed. | Bright bar display |
| | SHUTTER | Shutter priority AE mode | Request shutter priority AE mode. Pressing Up/Down key repeatedly allowed. | Shutter code display |
| | IRIS | Iris priority AE mode | Request iris priority AE mode. Pressing Up/Down key repeatedly allowed. | Iris code display |
| | BACK LIGHT | Switch backlight on/off in AE FULL Auto mode. | Switch on/off. | Backlight indication |
| | EXP COMP ON/OFF | Switch the exposure compensation function ON/OFF. | Switch on/off. | Exposure compensation code display |
| | EXP COMP UP | Increase the exposure compensation (UP). (Used during exposure compensation mode. 1.5 dB increments.) | Request UP / pressing repeatedly allowed. | Exposure compensation code display |
| | EXP COMP DOWN | Decrease the exposure compensation (DOWN). (Used during exposure compensation mode. 1.5 dB increments.) | Request DOWN / pressing repeatedly allowed. | Exposure compensation code display |
| WD | WD ON/OFF | Switch the Wide Dynamic Range mode ON/OFF. | Switch on/off. | WDR character display |
| | AUTO WD ON/OFF | Switch the Auto Wide Dynamic Range mode ON/OFF. | Switch on/off. | WDR character display when WD is ON. |

| Classification | Name | Function | Button operation | Mode display |
|----------------|---------------|---|--|---|
| WB | AUTO WB | Switch to AUTO WB mode. | Request Auto WB mode. | No display |
| | ONE PUSH WB | Switch to One Push WB mode when pressed once and capture data when pressed 2nd time. | Request One Push WB mode and trigger. | One Push indication flashes at 0.8 Hz before capturing data, at 3.2 Hz during capturing, and stays lit after capturing. |
| | ATW | Switch to ATW mode. | Request ATW mode. | ATW display |
| | INDOOR | Enable WB at 3200K in INDOOR mode. | Request Indoor mode. | Indoor indication |
| | OUTDOOR | Enable WB at 5800K in OUTDOOR mode. | Request Outdoor mode. | Outdoor indication |
| | MANUAL WB | Switch to Manual WB mode. Enable R control when pressed once and enable B control when pressed 2nd time. Switchable with UP/DOWN key. | Switch between R control and B control in manual WB mode. Pressing Up/Down key repeatedly allowed. | “WB-MAN” (character display) |
| FEATURE | FREEZE | Capture still image. | Switch on/off. | CAPTURE indication |
| | LR REVERSE | Horizontal reversal | Switch on/off. | Horizontal reversal indication |
| | E-FLIP | Turn upside down | Switch on/off. | Turn upside down mark |
| | BLACK & WHITE | Black-and-white output | Switch on/off. | B&W display |
| | NEGA ART | Negative art output | Switch on/off. | Neg Art display |
| | MUTE | Muting video output | Switch on/off. | No display |
| DISPLAY | DISPLAY | Display | Switch on/off. | Display/no display |
| | TITLE | Title setting | Request setting. → Setting is started with Exec. Pressing Up/Down key repeatedly allowed. | Title setting screen display |
| | EXEC | Confirm title setting. | Select with Up/Down and confirm with Exec. | Sets screen selection and displays it in yellow. |
| UP/DOWN | UP | Data UP key (priority for AE mode, Bright, manual WB, title, and clock) | Request UP. | Selection highlighted. |
| | DOWN | Data DOWN key (priority for AE mode, Bright, manual WB, title, and clock) | Request DOWN. | Selection highlighted. |
| PRESET | POS0 | Recall preset position 0. | Request recall. | RECALL POS0 |
| | POS1 | Recall preset position 1. | Request recall. | RECALL POS1 |
| | POS2 | Recall preset position 2. | Request recall. | RECALL POS2 |
| | POS3 | Recall preset position 3. | Request recall. | RECALL POS3 |
| | POS4 | Recall preset position 4. | Request recall. | RECALL POS4 |
| | POS5 | Recall preset position 5. | Request recall. | RECALL POS5 |
| | CUSTOM | Recall custom preset. | Request recall. | RECALL |
| | POS PRESET | Write data. Enabled when pressed together with POS button. | Request setting. Enabled when pressed together with POS key. | PRESET display |
| | POS RESET | Delete data. Enabled when pressed together with POS button. | Request deletion. Enabled when pressed together with POS key. | RESET display |

| Classification | Name | Function | Button operation | Mode display |
|----------------|-------------------|--|--|---------------------------------|
| Others | APERTURE UP | Increase aperture (Aperture UP) | Request UP. | Aperture bar displayed for 3 s. |
| | APERTURE DOWN | Decrease aperture (Aperture DOWN) | Request DOWN. | Aperture bar displayed for 3 s. |
| | BRIGHT UP | Raise brightness setting (Bright UP) (When not in Bright mode, switching to Bright mode is made automatically depending on the conditions.) | Request UP./Pressing repeatedly allowed. | Bright bar display |
| | BRIGHT DOWN | Lower brightness setting (Bright DOWN) (When not in Bright mode, switching to Bright mode is made automatically depending on the conditions.) | Request DOWN./Pressing repeatedly allowed. | Bright bar display |
| | AUTO SLOW SHUTTER | Switch Auto Slow Shutter on/off. | Switch on/off. | “ASS” (character display) |
| | ICR ON/OFF | Switch ICR mode on/off | Switch on/off. | ICR indication |
| | STABILIZER ON/OFF | Switch the Image Stabilizer function ON/OFF. | Switch on/off. | Image Stabilizer “OFF” mark |
| | POWER ON/OFF | Switch the POWER (Standby) ON/OFF. | Switch on/off. | — |
| FUNCTION | FUNCTION1 | — | — | — |
| | FUNCTION2 | — | — | — |
| | FUNCTION3 | — | — | — |

Initial Settings, Custom Preset and Backup

Initial settings for the various functions of the FCB camera are indicated in the “Initial settings” column. The “Custom preset” column indicates whether the custom preset function can be used to store the settings. The function enables the stored settings to be recalled automatically when the camera is turned on. The “Back up at standby” column indicates whether the data is preserved even when the camera is powered OFF.

| Mode/Position setting | Initial settings | Custom preset | Back up at standby |
|--|---------------------------------|---------------|--------------------|
| Zoom Position | Wide end | ○ | ○ |
| D-Zoom On/Off | On | ○ | ○ |
| D-Zoom Separate/Combine | Combine | ○ | ○ |
| D-Zoom Position | 00h | ○ | ○ |
| Focus Position | — | ○ | ○ |
| Focus Auto/Manual | Auto | ○ | ○ |
| Near Limit Setting | 8000h (29 cm) | ○ | ○ |
| AF Sensitivity | Normal | ○ | ○ |
| AF Mode | Normal | ○ | ○ |
| AF Run Time | 5 sec | ○ | ○ |
| AF Interval | 5 sec | ○ | ○ |
| WB Mode | Auto | ○ | ○ |
| WB Data (Rgain, Bgain) | — | ○ | ○ |
| One Push WB Data | — | ○ | ○ |
| AE Mode | Full Auto | ○ | ○ |
| AE Response | 01 | ○ | ○ |
| WD On/Off/Auto ¹⁾ | Off | ○ | ○ |
| Slow Shutter Mode | Manual | ○ | ○ |
| Shutter Position | 1/60 sec (NTSC), 1/50 sec (PAL) | ○ | ○ |
| Iris Position | — | ○ | ○ |
| Gain Position | — | ○ | ○ |
| Bright Position | — | ○ | ○ |
| Exposure Compensation On/Off | Off | ○ | ○ |
| Exposure Compensation Amount | ±0 | ○ | ○ |
| BackLight On/Off | Off | ○ | ○ |
| Spot AE On/Off | Off | ○ | ○ |
| Spot AE Position Setting | X=8, Y=8 | ○ | ○ |
| Aperture Level | 6 | ○ | ○ |
| High Resolution Mode On/Off | On | ○ | ○ |
| LR Reverse On/Off | Off | ○ | ○ |
| Freeze On/Off | Off | × | × |
| Picture Effect | Off | ○ | ○ |
| ICR On/Off ¹⁾ | Off | ○ | ○ |
| Auto ICR On/Off ¹⁾ | Off | ○ | ○ |
| Auto ICR Threshold Level ¹⁾ | 0Ah | ○ | ○ |

A circle “○” in this column signifies that the data is preserved.

A cross “×” signifies that the data IS NOT preserved.

¹⁾ FCB-EX490E/P only

| Mode/Position setting | Initial settings | Custom preset | Back up at standby |
|-------------------------------------|-----------------------------------|---------------|--------------------|
| Camera Memory | Same as the initial value setting | ○ | ○ |
| Display On/Off | Off | ○ | ○ |
| Mute On/Off | Off | × | × |
| WD Alarm On/Off ¹⁾ | Off | × | ○ |
| Auto ICR Alarm On/Off ¹⁾ | Off | ○ | ○ |
| NR Level | 3 | ○ | ○ |
| Gain Limit | — | ○ | ○ |
| Color Enhancement On/Off | Off | ○ | ○ |
| Title Display On/Off | Off | ○ | ○ |
| Title Setting | — | ○ | ○ |
| Mask Setting | — | ○ | ○ |
| Mask Display On/Off | Off | ○ | ○ |
| Mask Color Setting | — | ○ | ○ |
| Grid/Center Line Display On/Off | Off | ○ | ○ |
| Alarm On/Off | Off | ○ | ○ |
| Alarm Mode | — | ○ | ○ |
| Alarm Detect Level | — | ○ | ○ |
| E-Flip On/Off | Off | ○ | ○ |
| Privacy Zone On/Off | Off | ○ | ○ |
| Privacy Zone Setting | — | ○ | ○ |
| Key Lock On/Off | Off | ○ | ○ |
| Camera ID | 0000h | ○ | ○ |
| External Lock Mode | Internal | ○ | ○ |
| V-Phase | Vsync edge position | ○ | ○ |
| Alarm DayLight Threshold Level | — | ○ | ○ |
| MD On/Off | Off | ○ | ○ |
| MD Display Setting | Off | ○ | ○ |
| MD Threshold Level | 10h | ○ | ○ |
| MD Interval | 1 sec | ○ | ○ |
| MD Window Setting | — | ○ | ○ |
| ZoomPos Continuous Output On/Off | Off | × | ○ |
| ZoomPos Continuous Output Interval | 3Ch | × | ○ |

A circle “○” in this column signifies that the data is preserved.

A cross “×” signifies that the data IS NOT preserved.

¹⁾ FCB-EX490E/P only

Note

The number of times written to EEPROM (when Custom Preset is executed) is limited.

Mode Condition

Condition

| Mode | Power Off | Initializing | Power On | Freeze On | MemRecall |
|----------------|-----------|--------------|----------|-----------|-----------|
| Address Set | ○ | ○ | ○ | ○ | ○ |
| IF_Clear | ○ | ○ | ○ | ○ | ○ |
| Command Cancel | ○ | ○ | ○ | ○ | ○ |
| Power On/Off | ○ | ○ | ○ | ○ | ○ |

Lens

| Mode | Power Off | Initializing | Power On | Freeze On | MemRecall | Zoom Direct | Focus Direct | ZnFo Direct | Focus Auto |
|-------------------------------------|-----------|--------------|----------|-----------|-----------|-------------|--------------|-------------|------------|
| Zoom Tele/Wide/Stop | × | × | ○ | × | × | × | ○ | × | ○ |
| Zoom Direct | × | × | ○ | × | × | ○ | ○ | × | ○ |
| Zoom Focus Direct | × | × | ○ | × | × | × | × | ○ | × |
| D-Zoom On/Off | × | × | ○ | × | × | × | ○ | × | ○ |
| D-Zoom Separate/Combine | × | × | ○ | × | × | × | ○ | × | ○ |
| D-Zoom Tele/Wide/Stop | × | × | ○ | × | × | ○ | ○ | ○ | ○ |
| D-Zoom ×1/Max | × | × | ○ | × | × | ○ | ○ | ○ | ○ |
| D-Zoom Direct | × | × | ○ | × | × | ○ | ○ | ○ | ○ |
| Focus Far/Near/Stop | × | × | ○ | × | × | ○ | × | × | × |
| Focus Direct | × | × | ○ | × | × | ○ | ○ | × | × |
| Focus Auto/Manual | × | × | ○ | × | × | ○ | × | × | ○ |
| One Push AF | × | × | ○ | × | × | ○ | × | × | × |
| Focus Infinity | × | × | ○ | × | × | ○ | × | × | ○ |
| Focus Near Limit | × | × | ○ | × | × | ○ | × | × | ○ |
| AF Sensitivity Normal/Low | × | × | ○ | × | × | ○ | ○ | ○ | ○ |
| AF Mode Norm/Interval/Zoom | × | × | ○ | × | × | ○ | ○ | ○ | ○ |
| AF Activation Time/Interval Setting | × | × | ○ | × | × | ○ | ○ | ○ | ○ |
| Camera Memory Set/Reset | × | × | ○ | ○ | × | × | × | × | ○ |
| Camera Memory Recall | × | × | ○ | ○ | ○* | × | × | × | ○ |
| Lens Initialize | × | × | ○ | ○ | × | × | × | × | ○ |
| Comp Scan | × | × | ○ | ○ | × | × | × | × | ○ |

* × during recalling from key

White Balance

| Mode | Power Off | Initializing | Power On | Freeze On | MemRecall | WB AUTO | Indoor | Outdoor | Outdoor AUTO | Sodium Lamp | Sodium Lamp AUTO | OnePush | ATW | Manual |
|--------------------|-----------|--------------|----------|-----------|-----------|---------|--------|---------|--------------|-------------|------------------|---------|-----|--------|
| WB Mode Switchover | × | × | ○ | × | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| One Push WB | × | × | ○ | × | × | × | × | × | × | × | × | ○ | × | × |
| RGain Setting | × | × | ○ | × | × | × | × | × | × | × | × | × | × | ○ |
| BGain Setting | × | × | ○ | × | × | × | × | × | × | × | × | × | × | ○ |

Exposure

| Mode | Power Off | Initializing | Power On | Freeze On | MemRecall | AE Full Auto | AE Manual | ShutterPri | Iris Priority | Bright | WD ¹⁾ |
|-------------------------------|-----------|--------------|----------|-----------|-----------|--------------|-----------|------------|---------------|--------|------------------|
| AE Full Auto | × | × | ○ | × | × | ○ | ○ | ○ | ○ | ○ | ○ |
| AE Manual | × | × | ○ | × | × | ○ | ○ | ○ | ○ | ○ | ○ |
| Shutter Priority | × | × | ○ | × | × | ○ | ○ | ○ | ○ | ○ | ○ |
| Iris Priority | × | × | ○ | × | × | ○ | ○ | ○ | ○ | ○ | ○ |
| Bright | × | × | ○ | × | × | ○ | × | ○ | × | ○ | ○ |
| Shutter Setting | × | × | ○ | × | × | × | ○ | ○ | × | × | ○ |
| Iris Setting | × | × | ○ | × | × | × | ○ | × | ○ | × | ○ |
| Gain Setting | × | × | ○ | × | × | × | ○ | × | × | × | ○ |
| Bright Setting | × | × | ○ | × | × | × | × | × | × | ○ | ○ |
| Slow Shutter Auto/Manual | × | × | ○ | × | × | ○ | ○ | ○ | ○ | ○ | × |
| Exposure Compensation On/Off | × | × | ○ | × | × | ○ | ○ | ○ | ○ | ○ | × |
| Exposure Compensation Setting | × | × | ○ | × | × | ○ | ○ | ○ | ○ | ○ | × |
| BackLight On/Off | × | × | ○ | × | × | ○ | × | × | × | × | × |
| SpotAE On/Off | × | × | ○ | × | × | ○ | ○ | ○ | ○ | ○ | × |
| SpotAE Setting | × | × | ○ | × | × | ○ | ○ | ○ | ○ | ○ | × |
| WD On/Off ¹⁾ | × | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

¹⁾ FCB-EX490E/P only

Others

| Mode | Power Off | Initializing | Power On | Freeze On | MemRecall |
|--|-----------|--------------|----------|-----------|-----------|
| WD Alarm On/Off ¹⁾ | × | × | ○ | × | × |
| Aperture Setting | × | × | ○ | × | × |
| High Resolution Mode On/Off | × | × | ○ | ○ | ○ |
| LR_Reverse On/Off | × | × | ○ | × | × |
| Freeze On/Off | × | × | ○ | ○ | × |
| Picture Effect Setting | × | × | ○ | × | × |
| ICR On/Off ¹⁾ | × | × | ○ | × | × |
| Auto ICR On/Off ¹⁾ | × | × | ○ | × | × |
| Auto ICR Threshold Level Setting ¹⁾ | × | × | ○ | ○ | ○ |
| Auto ICR Alarm On/Off ¹⁾ | × | × | ○ | × | × |
| Display On/Off | × | × | ○ | ○ | ○ |
| Mute On/Off | × | × | ○ | ○ | ○ |
| TiIde Setting | × | × | ○ | ○ | ○ |
| Mask On/Off | × | × | ○ | ○ | ○ |
| Mask Setting | × | × | ○ | ○ | ○ |
| Key Lock On/Off | × | × | ○ | ○ | ○ |
| Alarm On/Off | × | × | ○ | ○ | ○ |
| Alarm Mode | × | × | ○ | ○ | ○ |
| MD On/Off | × | × | ○ | ○ | ○ |
| MD Function Setting | × | × | ○ | ○ | ○ |
| MD Window Setting | × | × | ○ | ○ | ○ |
| ID Write | × | × | ○ | ○ | ○ |
| Memory Save | × | × | ○ | ○ | ○ |
| Register Value Setting | × | × | ○ | ○ | ○ |
| Color Enhancement On/Off | × | × | ○ | ○ | ○ |
| NR Level Setting | × | × | ○ | ○ | ○ |

¹⁾ FCB-EX490E/P only

External Synchronization

| Mode | Power Off | Initializing | Power On | Freeze On | MemRecall |
|----------------------------|-----------|--------------|----------|-----------|-----------|
| External Lock Mode | × | × | ○ | ○ | ○ |
| V-Phase Up/Down/Stop/Reset | × | × | ○ | ○ | ○ |
| V-Phase Direct | × | × | ○ | ○ | ○ |

Command List

VISCA¹⁾/RS-232C Commands

This Manual outlines an RS-232 control protocol and command list for certain Sony cameras from which control software can be developed.

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Overview of VISCA

In VISCA, the device outputting commands, for example, a computer, is called the controller. The device receiving the commands, an FCB camera is called the peripheral device. In VISCA, up to seven peripheral devices like the FCB camera can be connected to one controller using communication conforming to the RS-232C standard. The parameters of RS-232C are as follows.

- Communication speed: 9.6 kbps/19.2 kbps/38.4 kbps
 - Data bits : 8
 - Start bit : 1
 - Stop bit : 1/2
 - Non parity
- Flow control using XON/XOFF and RTS/CTS, etc., is not supported.

1) VISCA is a protocol which controls consumer camcorders developed by Sony. “VISCA” is a trademark of Sony Corporation.

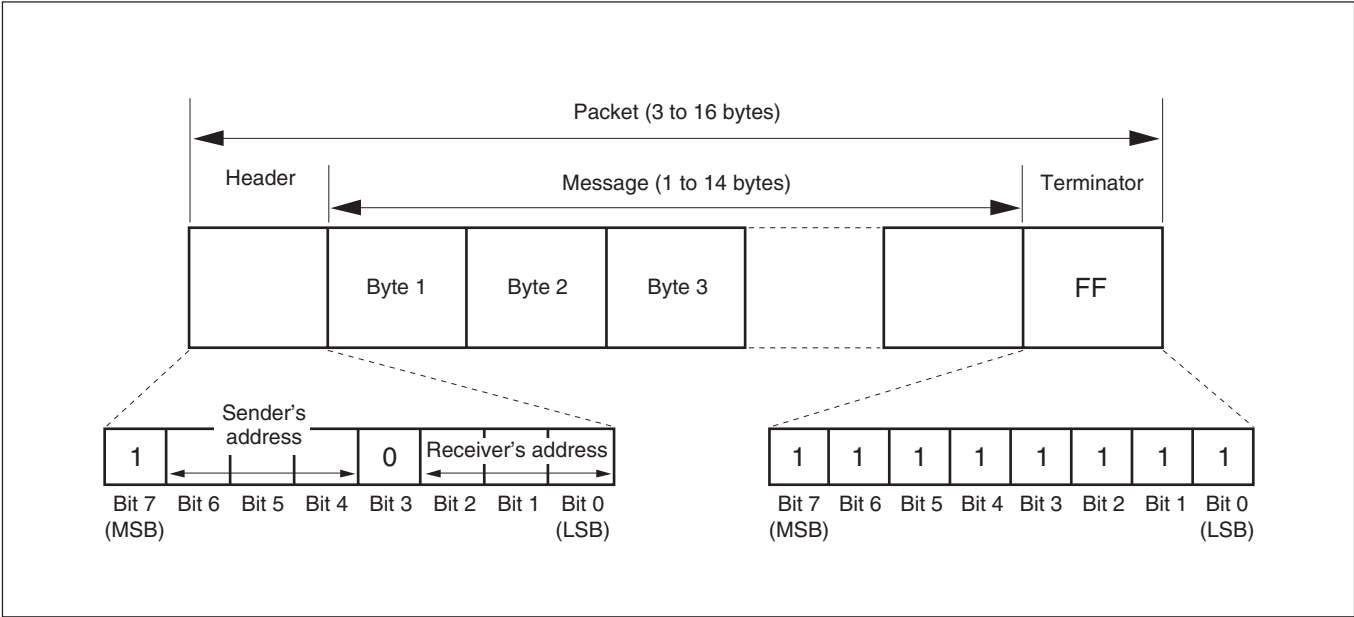
VISCA Communication Specifications

VISCA packet structure

The basic unit of VISCA communication is called a packet. The first byte of the packet is called the header and comprises the sender's and receiver's addresses. For example, the header of the packet sent to the FCB camera assigned address 1 from the controller (address 0) is hexadecimal 81H. The packet sent to the camera

assigned address 2 is 82H. In the command list, as the header is 8X, input the address of the camera at X. The header of the reply packet from the camera assigned address 1 is 90H. The packet from the camera assigned address 2 is A0H.

Some of the commands for setting cameras can be sent to all devices at one time (broadcast). In the case of broadcast, the header should be hexadecimal 88H. When the terminator is FFH, it signifies the end of the packet.



Command and inquiry

● Command

Sends operational commands to the FCB camera.

● Inquiry

Used for inquiring about the current state of the FCB camera.

| | Command Packet | Note |
|---------|-----------------|---|
| Inquiry | 8X QQ RR ... FF | QQ ¹⁾ = Command/Inquiry, RR ²⁾ = category code |

¹⁾ QQ = 01 (Command), 09 (Inquiry)

²⁾ RR = 00 (Interface), 04 (camera 1), 06 (Pan/Tilter), 07 (camera 2)

X = 1 to 7: FCB camera address

Responses for commands and inquiries

● ACK message

Returned by the FCB camera when it receives a command. No ACK message is returned for inquiries.

● Completion message

Returned by the FCB camera when execution of commands or inquiries is completed. In the case of inquiry commands, it will contain reply data for the inquiry after the 3rd byte of the packet. If the ACK message is omitted, the socket number will contain 0.

| | Reply Packet | Note |
|------------------------|--------------|-------------------|
| Ack | X0 4Y FF | Y = socket number |
| Completion (commands) | X0 5Y FF | Y = socket number |
| Completion (Inquiries) | X0 5Y ... FF | Y = socket number |

X = 9 to F: FCB camera address + 8

● Error message

When a command or inquiry command could not be executed or failed, an error message is returned instead of the completion message.

| Error Packet | Description |
|--------------|----------------------------------|
| X0 6Y 01 FF | Message length error (>14 bytes) |
| X0 6Y 02 FF | Syntax Error |
| X0 6Y 03 FF | Command buffer full |
| X0 6Y 04 FF | Command cancelled |
| X0 6Y 05 FF | No socket (to be cancelled) |
| X0 6Y 41 FF | Command not executable |

X = 9 to F: FCB camera address + 8, Y = socket number

Command execution cancel

To cancel a command which has already been sent, send the Cancel command as the next command. To cancel one of any two commands which have been sent, use the cancel message.

| | Cancel Packet | Note |
|--------|---------------|-------------------|
| Cancel | 8X 2Y FF | Y = socket number |

X = 1 to 7: FCB camera address, Y = socket number

An error message will be returned for this command, but this is not a fault. It indicates that the command has been canceled.

Socket number

When command messages are sent to the FCB camera, it is normal to send the next command message after waiting for the completion message or error message to return. However to deal with advanced uses, the FCB camera has two buffers (memories) for commands, so that up to two commands including the commands currently being executed can be received. When the FCB camera receives commands, it notifies the sender which command buffer was used using the socket number of the ACK message. As the completion message or error message also has a socket number, it indicates which command has ended. Even when two command buffers are being used at any one time, an FCB camera management command and some inquiry messages can be executed.

The ACK message is not returned for these commands and inquiries, and only the completion message of socket number 0 is returned.

VISCA Device Setting Command

Before starting control of the FCB camera, be sure to send the Address command and the IF_Clear command using the broadcast function.

For VISCA network administration

● Address

Sets an address of a peripheral device. Use when initializing the network, and receiving the following network change message.

● Network Change

Sent from the peripheral device to the controller when a device is removed from or added to the network. The address must be re-set when this message is received.

| | Packet | Note |
|------------------------------------|-------------|---------------------|
| Address | 88 30 01 FF | Always broadcasted. |
| Network Change | X0 38 FF | |
| X = 9 to F: FCB camera address + 8 | | |

VISCA interface command

● IF_Clear

Clears the command buffers in the FCB camera and cancels the command currently being executed.

| | Command Packet | Reply Packet | Note |
|--|----------------|----------------|------|
| IF_Clear | 8X 01 00 01FF | X0 50 FF | |
| IF_Clear (broadcast) | 88 01 00 01 FF | 88 01 00 01 FF | |
| X = 1 to 7: FCB camera address (For inquiry packet) | | | |
| X = 9 to F: FCB camera address +8 (For reply packet) | | | |

VISCA interface and inquiry

● CAM_VersionInq

Returns information on the VISCA interface.

| Inquiry | Inquiry Packet | Reply Packet | Description |
|----------------|----------------|-------------------------------|---|
| CAM_VersionInq | 8X 09 00 02 FF | Y0 50 GG GG HH HH JJ JJ KK FF | GGGG = Vender ID (0020: Sony) HHHH = Model ID 0456: FCB-EX490E 0457: FCB-EX490EP 0458: FCB-EX48E 0459: FCB-EX48EP JJJJ = ROM revision KK = Maximum socket #(02) |

X = 1 to 7: FCB camera address (For inquiry packet)

X = 9 to F: FCB camera address +8 (For reply packet)

VISCA Command/ACK Protocol

| Command | Command Message | Reply Message | Comments |
|---------------------|--------------------------------|---|--|
| General Command | 81 01 04 38 02 FF (Example) | 90 41 FF (ACK)+90 51 FF (Completion) 90 42 FF 90 52 FF | Returns ACK when a command has been accepted, and Completion when a command has been executed. |
| | 81 01 04 38 FF (Example) | 90 60 02 FF (Syntax Error) | Accepted a command which is not supported or a command lacking parameters. |
| | 81 01 04 38 02 FF (Example) | 90 60 03 FF (Command Buffer Full) | There are two commands currently being executed, and the command could not be accepted. |
| | 81 01 04 08 02 FF (Example) | 90 61 41 FF (Command Not Executable) 90 62 41 FF | Could not execute the command in the current mode. |
| Inquiry Command | 81 09 04 38 FF (Example) | 90 50 02 FF (Completion) | ACK is not returned for the inquiry command. |
| | 81 09 05 38 FF (Example) | 90 60 02 FF (Syntax Error) | Accepted an incompatible command. |
| Address Set | 88 30 01 FF | 88 30 02 FF | Returned the device address to +1. |
| IF_Clear(Broadcast) | 88 01 00 01 FF | 88 01 00 01 FF | Returned the same command. |
| IF_Clear (For x) | 8x 01 00 01 FF | z0 50 FF (Completion) | ACK is not returned for this command. |
| Command Cancel | 8x 2y FF | z0 6y 04 FF (Command Canceled) | Returned when the command of the socket specified is canceled. Completion for the command canceled is not returned. |
| | | z0 6y 05 FF (No Socket) | Returned when the command of the specified socket has already been completed or when the socket number specified is wrong. |

VISCA Camera-Issued Messages

ACK/Completion Messages

| | Command Messages | Comments |
|------------|----------------------------|--|
| ACK | z0 4y FF (y:Socket No.) | Returned when the command is accepted. |
| Completion | z0 5y FF (y:Socket No.) | Returned when the command has been executed. |

z = Device address + 8

Error Messages

| | Command Messages | Comments |
|------------------------|-------------------------------|--|
| Syntax Error | z0 60 02 FF | Returned when the command format is different or when a command with illegal command parameters is accepted. |
| Command Buffer Full | z0 60 03 FF | Indicates that two sockets are already being used (executing two commands) and the command could not be accepted when received. |
| Command Canceled | z0 6y 04 FF (y:Socket No.) | Returned when a command which is being executed in a socket specified by the cancel command is canceled. The completion message for the command is not returned. |
| No Socket | z0 6y 05 FF (y:Socket No.) | Returned when no command is executed in a socket specified by the cancel command, or when an invalid socket number is specified. |
| Command Not Executable | z0 6y 41 FF (y:Socket No.) | Returned when a command cannot be executed due to current conditions. For example, when commands controlling the focus manually are received during auto focus. |

Network Change Message

| | Command Message | Comments |
|----------------|-----------------|------------------------------------|
| Network Change | z0 38 FF | Issued when power is being routed. |

FCB Camera Commands

New Command List (1/1)

| Command Set | Command | Command Packet | Comments |
|---|---------------------|---|--|
| CAM_IRCorrection | Standard | 8x 01 04 11 00 FF | FOCUS IR compensation data switching |
| | IR Light | 8x 01 04 11 01 FF | |
| CAM_WB | Outdoor Auto | 8x 01 04 35 06 FF | Outdoor auto |
| | Sodium Lamp Auto | 8x 01 04 35 07 FF | Auto including sodium lamp source |
| | Sodium Lamp | 8x 01 04 35 08 FF | Sodium lamp source fixed mode |
| CAM_Gain | Gain Limit | 8x 01 04 2C 0p FF | p: Gain Positionf 4 (6 dB) to F (28 dB) |
| CAM_WD (FCB-EX490E/P only) | AutoOnOff | 8x 01 04 3D 00 FF | WideD ON/OFF auto switching |
| | On (RatioFix) | 8x 01 04 3D 01 FF | WideD ON (fixed exposure ratio mode) |
| | On (Dver Compati) | 8x 01 04 3D 04 FF | Wide ON (Dver operation) |
| | Refresh | 8x 01 04 10 0D FF | WideD restart |
| | Set Parameter | 8x 01 04 2D 0p 0q 0r 0s 0t 0u 00 00 FF | p: Screen display 0: Combined image, 1: Long/short division, 2: Long-time, 3: Short-time q: Detection sensitivity (0: L 1: M 2: H) r: Blocked-up shadow correction level (0: L 1: M 2: H 3: S) s: Blown-out highlight correction level (0: L 1: M 2: H) tu: Exposure ratio of short exposure (x1 to x150) |
| CAM_WDAlarmReply (FCB-EX490E/P only) | On | 8x 01 04 3B 02 FF | WideD auto switching alarm ON/OFF |
| | Off | 8x 01 04 3B 03 FF | |
| | (Reply) | y0 07 04 3B 02 FF | WideD OFF → ON |
| | | y0 07 04 3B 03 FF | WideD ON → OFF |
| CAM_NR | – | 8x 01 04 53 0p FF | p: NR Setting (0: OFF, level 1 to 5) |
| CAM _AutoICRAAlarmReply (FCB-EX490E/P only) | On | 8x 01 04 31 02 FF | Auto ICR switching alarm ON/OFF |
| | Off | 8x 01 04 31 03 FF | |
| | (Reply) | y0 07 04 31 02 FF | ICR OFF → ON |
| | | y0 07 04 31 03 FF | ICR ON → OFF |
| CAM_ExtLock | Internal Mode | 8x 01 04 55 00 FF | Internal Sync |
| | Line Lock Mode | 8x 01 04 55 01 FF | V-Phase Adjustment |
| | Frequency Lock Mode | 8x 01 04 55 02 FF | External Sync |
| CAM_ColorEnhance | Parameter Set | 8x 01 04 20 mm nn pp qq rr ss tt uu FF | mm: Threshold level nn: Hysteresis width pp: Fixed color Y of high-intensity side qq: Fixed color Cr of high-intensity side rr: Fixed color Cb of high-intensity side ss: Fixed color Y of low-intensity side tt: Fixed color Cr of low-intensity side uu: Fixed color Cb of low-intensity side * Set 00h to 7Fh for each parameter. |
| | On | 8x 01 04 50 02 FF | Color Enhancement ON/OFF |
| | Off | 8x 01 04 50 03 FF | |

Command List (1/6)

| Command Set | Command | Command Packet | Comments |
|------------------|----------------------|----------------------------|--------------------------------------|
| AddressSet | Broadcast | 88 30 01 FF | Address setting |
| IF_Clear | Broadcast | 88 01 00 01 FF | I/F Clesr |
| CommandCancel | – | 8x 2p FF | p: Socket No. (=1 or 2) |
| CAM_Power | On | 8x 01 04 00 02 FF | Power ON/OFF |
| | Off | 8x 01 04 00 03 FF | |
| CAM_Zoom | Stop | 8x 01 04 07 00 FF | |
| | Tele(Standard) | 8x 01 04 07 02 FF | |
| | Wide(Standard) | 8x 01 04 07 03 FF | |
| | Tele(Variable) | 8x 01 04 07 2p FF | p=0 (Low) to 7 (High) |
| | Wide(Variable) | 8x 01 04 07 3p FF | |
| | Direct | 8x 01 04 47 0p 0q 0r 0s FF | pqrs: Zoom Position |
| CAM_DZoom | On | 8x 01 04 06 02 FF | Digital zoom ON/OFF |
| | Off | 8x 01 04 06 03 FF | |
| | Combine Mode | 8x 01 04 36 00 FF | Optical/Digital Zoom Combined |
| | Separate Mode | 8x 01 04 36 01 FF | Optical/Digital Zoom Separate |
| | Stop | 8x 01 04 06 00 FF | |
| | Tele(Variable) | 8x 01 04 06 2p FF | p=0 (Low) to 7 (High) |
| | Wide(Variable) | 8x 01 04 06 3p FF | |
| | x1/Max | 8x 01 04 06 10 FF | x1/MAX Magnification Switchover |
| | Direct | 8x 01 04 46 00 00 0p 0q FF | pq: D-Zoom Position |
| CAM_Focus | Stop | 8x 01 04 08 00 FF | |
| | Far(Standard) | 8x 01 04 08 02 FF | |
| | Near(Standard) | 8x 01 04 08 03 FF | |
| | Far(Variable) | 8x 01 04 08 2p FF | p=0 (Low) to 7 (High) |
| | Near(Variable) | 8x 01 04 08 3p FF | |
| | Direct | 8x 01 04 48 0p 0q 0r 0s FF | pqrs: Focus Position |
| | Auto Focus | 8x 01 04 38 02 FF | AF ON/OFF |
| | Manual Focus | 8x 01 04 38 03 FF | |
| | Auto/Manual | 8x 01 04 38 10 FF | |
| | One Push Trigger | 8x 01 04 18 01 FF | One Push AF Trigger |
| | Infinity | 8x 01 04 18 02 FF | Forced infinity |
| | Near Limit | 8x 01 04 28 0p 0q 0r 0s FF | pqrs: Focus Near Limit Position |
| AF Sensitivity | Normal | 8x 01 04 58 02 FF | AF Sensitivity High/Low |
| | Low | 8x 01 04 58 03 FF | |
| CAM_AFMode | Normal AF | 8x 01 04 57 00 FF | AF Movement Mode |
| | Interval AF | 8x 01 04 57 01 FF | |
| | Zoom Trigger AF | 8x 01 04 57 02 FF | |
| | Active/Interval Time | 8x 01 04 27 0p 0q 0r 0s FF | pq: Movement Time, rs: Interval |
| CAM_IRCorrection | Standard | 8x 01 04 11 00 FF | FOCUS IR compensation data switching |
| | IR Light | 8x 01 04 11 01 FF | |
| CAM_ZoomFocus | Direct | 8x 01 04 47 0p 0q 0r 0s | pqrs: Zoom Position |
| | | 0t 0u 0v 0w FF | tuvw: Focus Position |
| CAM_Initialize | Lens | 8x 01 04 19 01 FF | Lens Initialization Start |
| | Comp Scan | 8x 01 04 19 02 FF | Correction of CCD pixel blemishes |

Command List (2/6)

| Command Set | Command | Command Packet | Comments |
|-----------------|------------------|----------------------------|--|
| CAM_WB | Auto | 8x 01 04 35 00 FF | Normal Auto |
| | Indoor | 8x 01 04 35 01 FF | Indoor mode |
| | Outdoor | 8x 01 04 35 02 FF | Outdoor mode |
| | One Push WB | 8x 01 04 35 03 FF | One Push WB mode |
| | ATW | 8x 01 04 35 04 FF | Auto Tracing White Balance |
| | Manual | 8x 01 04 35 05 FF | Manual Control mode |
| | One Push Trigger | 8x 01 04 10 05 FF | One Push WB Trigger |
| | Outdoor Auto | 8x 01 04 35 06 FF | Outdoor auto |
| | Sodium Lamp Auto | 8x 01 04 35 07 FF | Auto including sodium lamp source |
| | Sodium Lamp | 8x 01 04 35 08 FF | Sodium lamp source fixed mode |
| CAM_RGain | Reset | 8x 01 04 03 00 FF | Manual Control of R Gain |
| | Up | 8x 01 04 03 02 FF | |
| | Down | 8x 01 04 03 03 FF | |
| | Direct | 8x 01 04 43 00 00 0p 0q FF | pq: R Gain |
| CAM_BGain | Reset | 8x 01 04 04 00 FF | Manual Control of B Gain |
| | Up | 8x 01 04 04 02 FF | |
| | Down | 8x 01 04 04 03 FF | |
| | Direct | 8x 01 04 44 00 00 0p 0q FF | pq: B Gain |
| CAM_AE | Full Auto | 8x 01 04 39 00 FF | Automatic Exposure mode |
| | Manual | 8x 01 04 39 03 FF | Manual Control mode |
| | Shutter Priority | 8x 01 04 39 0A FF | Shutter Priority Automatic Exposure mode |
| | Iris Priority | 8x 01 04 39 0B FF | Iris Priority Automatic Exposure mode |
| | Bright | 8x 01 04 39 0D FF | Bright Mode (Manual control) |
| CAM_SlowShutter | Auto | 8x 01 04 5A 02 FF | Auto Slow Shutter ON/OFF |
| | Manual | 8x 01 04 5A 03 FF | |
| CAM_Shutter | Reset | 8x 01 04 0A 00 FF | Shutter Setting |
| | Up | 8x 01 04 0A 02 FF | |
| | Down | 8x 01 04 0A 03 FF | |
| | Direct | 8x 01 04 4A 00 00 0p 0q FF | pq: Shutter Position |
| CAM_Iris | Reset | 8x 01 04 0B 00 FF | Iris Setting |
| | Up | 8x 01 04 0B 02 FF | |
| | Down | 8x 01 04 0B 03 FF | |
| | Direct | 8x 01 04 4B 00 00 0p 0q FF | pq: Iris Position |
| CAM_Gain | Reset | 8x 01 04 0C 00 FF | Gain Setting |
| | Up | 8x 01 04 0C 02 FF | |
| | Down | 8x 01 04 0C 03 FF | |
| | Direct | 8x 01 04 4C 00 00 0p 0q FF | pq: Gain Position |
| | Gain Limit | 8x 01 04 2C 0p FF | p: Gain Position |
| CAM_Bright | Reset | 8x 01 04 0D 00 FF | Bright Setting |
| | Up | 8x 01 04 0D 02 FF | |
| | Down | 8x 01 04 0D 03 FF | |
| | Direct | 8x 01 04 4D 00 00 0p 0q FF | pq: Bright Position |
| CAM_ExpComp | On | 8x 01 04 3E 02 FF | Exposure Compensation ON/OFF |
| | Off | 8x 01 04 3E 03 FF | |
| | Reset | 8x 01 04 0E 00 FF | Exposure Compensation Amount Setting |
| | Up | 8x 01 04 0E 02 FF | |
| | Down | 8x 01 04 0E 03 FF | |
| | Direct | 8x 01 04 4E 00 00 0p 0q FF | pq: ExpComp Position |

Command List (3/6)

| Command Set | Command | Command Packet | Comments |
|---|------------------|---|---|
| CAM_Backlight | On | 8x 01 04 33 02 FF | Back Light Compensation ON/OFF |
| | Off | 8x 01 04 33 03 FF | |
| CAM_SpotAE | On | 8x 01 04 59 02 FF | Spot Automatic Exposure Setting |
| | Off | 8x 01 04 59 03 FF | |
| | Position | 8x 01 04 29 0p 0q 0r 0s FF | |
| CAM_AE_Response | DIRECT | 8x 01 04 5D pp FF | Automatic Exposure Response Setting (01 to 30) |
| CAM_WD (FCB-EX490E/P only) | On | 8x 01 04 3D 02 FF | Wide-D ON/OFF |
| | Off | 8x 01 04 3D 03 FF | |
| | AutoOnOff | 8x 01 04 3D 00 FF | Wide dynamic ON/OFF auto switching |
| | On(RatioFix) | 8x 01 04 3D 01 FF | Wide dynamic ON (Fixed exposure ratio mode) |
| | On(Dver Compati) | 8x 01 04 3D 04 FF | Wide dynamic ON (Dver operation) |
| | Refresh | 8x 01 04 10 0D FF | Wide dynamic restart |
| | Set Parameter | 8x 01 04 2D 0p 0q 0r 0s 0t 0u 00 00 FF | p: Screen display 0: Combined image, 1: Long/short division, 2: Long-time, 3: Short-time q: Detection sensitivity (0: L 1: M 2: H) r: Blocked-up shadow correction level (0: L 1: M 2: H 3: S) s: Blown-out highlight correction level (0: L 1: M 2: H) tu: Exposure ratio of short exposure (x1 to x150) |
| CAM_WDAlarmReply (FCB-EX490E/P only) | On | 8x 01 04 3B 02 FF | Wide dynamic auto switching alarm ON/OFF |
| | Off | 8x 01 04 3B 03 FF | |
| | (Reply) | y0 07 04 3B 02 FF | Wide dynamic OFF → ON |
| | | y0 07 04 3B 03 FF | Wide dynamic ON → OFF |
| CAM_Aperture | Reset | 8x 01 04 02 00 FF | Aperture Control |
| | Up | 8x 01 04 02 02 FF | |
| | Down | 8x 01 04 02 03 FF | |
| | Direct | 8x 01 04 42 00 00 0p 0q FF | pq: Aperture Gain |
| CAM_HR | On | 8x 01 04 52 02 FF | High-Resolution Mode ON/OFF |
| | Off | 8x 01 04 52 03 FF | |
| CAM_NR | – | 8x 01 04 53 0p FF | p: NR Setting (0: OFF, level 1 to 5) |
| CAM_LR_Reverse | On | 8x 01 04 61 02 FF | Mirror Image ON/OFF |
| | Off | 8x 01 04 61 03 FF | |
| CAM_Freeze | On | 8x 01 04 62 02 FF | Still Image ON/OFF |
| | Off | 8x 01 04 62 03 FF | |
| CAM_PictureEffect | Off | 8x 01 04 63 00 FF | Picture Effect Setting |
| | Neg.Art | 8x 01 04 63 02 FF | |
| | B&W | 8x 01 04 63 04 FF | |
| CAM_PictureFlip | On | 8x 01 04 66 02 FF | Picture flip ON/OFF |
| | Off | 8x 01 04 66 03 FF | |
| CAM_ICR (FCB-EX490E/P only) | On | 8x 01 04 01 02 FF | Infrared Mode ON/OFF |
| | Off | 8x 01 04 01 03 FF | |
| CAM_AutoICR (FCB-EX490E/P only) | On | 8x 01 04 51 02 FF | Auto dark-field mode On/Off |
| | Off | 8x 01 04 51 03 FF | |
| | Threshold | 8x 01 04 21 00 00 0p 0q FF | pq: ICR ON → OFF threshold level |

Command List (4/6)

| Command Set | Command | Command Packet | Comments |
|---|-------------|--|--|
| CAM _AutoICRAAlarmReply (FCB-EX490E/P only) | On | 8x 01 04 31 02 FF | Auto ICR switching Alarm ON/OFF |
| | Off | 8x 01 04 31 03 FF | |
| | (Reply) | y0 07 04 31 02 FF | ICR OFF → ON |
| | | y0 07 04 31 03 FF | ICR ON → OFF |
| CAM_Memory | Reset | 8x 01 04 3F 00 0p FF | p: Memory Number (=0 to 5) |
| | Set | 8x 01 04 3F 01 0p FF | |
| | Recall | 8x 01 04 3F 02 0p FF | |
| CAM_Display | On | 8x 01 04 15 02 FF (8x 01 06 06 02 FF) | Display ON/OFF |
| | Off | 8x 01 04 15 03 FF (8x 01 06 06 03 FF) | |
| | On/Off | 8x 01 04 15 10 FF (8x 01 06 06 10 FF) | |
| CAM_Title | Title Set1 | 8x 01 04 73 00 mm nn pp qq 00 00 00 00 00 00 FF | L: Line Number, nn: H-Position pp: Color, qq: Blink |
| | Title Set2 | 8x 01 04 73 01 mm nn pp qq rr ss tt uu vv ww FF | mnpqrstuvw: Display character setting (1st to 10th character) |
| | Title Set3 | 8x 01 04 73 02 mm nn pp qq rr ss tt uu vv ww FF | mnpqrstuvw: Display character setting (11th to 20th character) |
| | Title Clear | 8x 01 04 74 00 FF | Clear title setting |
| | On | 8x 01 04 74 02 FF | Title display ON/OFF |
| | Off | 8x 01 04 74 03 FF | |
| CAM_MultiLineTitle | Title Set1 | 8x 01 04 73 1L 00 nn pp qq rr 00 00 00 00 00 FF | L: Line Number, nn: H-position pp: Color, qq: Blink rr: Opening Title |
| | Title Set2 | 8x 01 04 73 2L mm nn pp qq rr ss tt uu vv ww FF | L: Line Number, mnpqrstuvw: Setting of characters (1 to 10) |
| | Title Set3 | 8x 01 04 73 3L mm nn pp qq rr ss tt uu vv ww FF | L: Line Number, mnpqrstuvw: Setting of characters (11 to 20) |
| | Title Clear | 8x 01 04 74 1p FF | Title Setting clear (p: 0 to a, f= all lines) |
| | On | 8x 01 04 74 2p FF | Title display On/Off (0 to a, f= all lines) |
| | Off | 8x 01 04 74 3p FF | |
| CAM_Mute | On | 8x 01 04 75 02 FF | Muting ON/OFF |
| | Off | 8x 01 04 75 03 FF | |
| | On/Off | 8x 01 04 75 10 FF | |

Command List (5/6)

| Command Set | Command | Command Packet | Comments |
|-----------------|---------------------|---|--|
| CAM_PrivacyZone | SetMask | 8x 01 04 76 mm nn 0r 0r 0s 0s FF | mm: Mask Settings nn 00: Modify, 01: New rr: W, ss:H |
| | Display | 8x 01 04 77 pp pp pp pp FF | Mask Display ON/OFF pp pp pp pp: Mask Settings (0:OFF, 1:ON) |
| | SetMaskColor | 8x 01 04 78 pp pp pp pp qq rr FF | pp pp pp pp: Mask Color Settings qq: Color Setting when 0 is selected rr: Color Setting when 1 is selected |
| | SetPanTiltAngle | 8x 01 04 79 0p 0p 0p 0q 0q 0q FF | Pan/Tilt Angle Settings ppp: Pan qqq: Tilt |
| | SetPTZMask | 8x 01 04 7B mm 0p 0p 0p 0q 0q 0q 0r 0r 0r FF | Pan/Tilt/Zoom Settings for Mask ppp: Pan, qq: Tilt, rrr: Zoom |
| | Non_InterlockMask | 8x 01 04 6F mm 0p 0p 0q 0q 0r 0r 0s 0s FF | mm: Non_Interlock Mask Settings pp: X, q: Y, rr: W, ss: H |
| | GridOn | 8x 01 04 7C 02 FF | Grid Display ON/OFF |
| | GridOff | 8x 01 04 7C 03 FF | Grid/Center Line Display Off |
| | CenterLineOn | 8x 01 04 7C 04 FF | Center Line Display On |
| CAM_KeyLock | Off | 8x 01 04 17 00 FF | Camera Control Enable/Disable |
| | On | 8x 01 04 17 02 FF | |
| CAM_IDWrite | – | 8x 01 04 22 0p 0q 0r 0s FF | pqrs: Camera ID (=0000 to FFFF) |
| CAM_MemSave | Write | 8x 01 04 23 0m 0p 0q 0r 0s FF | m: Address (=0 to 7) pqrs: Data (0000 to FFFF) |
| | | | |
| CAM_ExtLock | Internal Mode | 8x 01 04 55 00 FF | Internal Sync |
| | Line Lock Mode | 8x 01 04 55 01 FF | V-Phase Adjustment |
| | Frequency Lock Mode | 8x 01 04 55 02 FF | External Sync |
| CAM_VPhase | Stop | 8x 01 04 05 00 FF | – |
| | Up | 8x 01 04 05 02 FF | |
| | Down | 8x 01 04 05 03 FF | |
| | Up (Step) | 8x 01 04 05 2p FF | p=step (1-7) |
| | Down (Step) | 8x 01 04 05 3p FF | |
| | Reset | 8x 01 04 05 40 FF | Restore Factory Settings |
| | Direct | 8x 01 04 45 0p 0q 0r 0s FF | pqrs: V-Phase (0000 to) (NTSC: 0000 to 20Chex, PAL: 0000 to 270hex) |
| CAM_Alarm | On | 8x 01 04 6B 02 FF | Alarm ON/OFF |
| | Off | 8x 01 04 6B 03 FF | |
| | SetMode | 8x 01 04 6C pp FF | pp: Mode setting 00 Focus change detection (reference value is not updated) 01 Focus change detection (reference value is updated) 02 AE change detection (reference value is not updated) 03 AE change detection (reference value is updated) : 0C Day/Night judgement |
| | SetDayNighLevel | 8x 01 04 6D 0p 0p 0p 0q 0q 0q FF | ppp: Day judgement level setting qqq: Night judgement level setting |
| | Alarm(Reply) | y0 07 04 6B 01 FF | Detection level “ Low” → “High” |
| | | y0 07 04 6B 00 FF | Detection level “ High” → “Low” |

Command List (6/6)

| Command Set | Command | Command Packet | Comments |
|--------------------------|---------------|---|--|
| CAM_MD | On | 8x 01 04 1B 02 FF | Motion Detection On/Off |
| | Off | 8x 01 04 1B 03 FF | |
| | Function Set | 8x 01 04 1C 0m 0n 0p 0q 0r 0s FF | m: Display mode n: Detection Frame Set (0 to F) pq: Threshold Level (00 to FF) rs: Interval Time set (00 to FF) |
| | Window Set | 8x 01 04 1D 0m 0p 0q 0r 0s FF | m: Select Detection Frame (0, 1, 2, 3) p: Start Horizontal Position (00 to 0B) q: Start Vertical Position (00 to 07) r: Stop Horizontal Position (01 to 0C) s: Stop Vertical Position (01 to 08) |
| | Alarm (Reply) | y0 07 04 1B 0p FF | p: Detection Frame Number |
| CAM_Continuous | On | 8x 01 04 69 02 FF | ZoomPosition data Continuous Output On/Off |
| ZoomPosReply | Off | 8x 01 04 69 03 FF | |
| | (Reply) | y0 07 04 69 0p 0p 0q 0q 0q 0q FF | pp: D-Zoom Position * 00: When Zoom Mode is Combine qqqq: Zoom Position |
| CAM_ReplyIntervalTimeSet | – | 8x 01 04 6A 00 00 0p 0p FF | pp: Interval Time [Vertical timing] |
| CAM_RegisterValue | – | 8x 01 04 24 mm 0p 0p FF | mm: Register No. (=00-7F) pp: Register Value (=00-7F) |
| CAM_ColorEnhance | Parameter Set | 8x 01 04 20 mm nn pp qq rr ss tt uu FF | mm: Threshold level nn: Hysteresis width pp: Fixed color Y of high-intensity side qq: Fixed color Cr of high-intensity side rr: Fixed color Cb of high-intensity side ss: Fixed color Y of low-intensity side tt: Fixed color Cr of low-intensity side uu: Fixed color Cb of low-intensity side * Set 00h to 7Fh for each parameter. |
| | On | 8x 01 04 50 02 FF | Color Enhancement ON/OFF |
| | Off | 8x 01 04 50 03 FF | |

New Query Command List (1/1)

| Inquiry Command | Command Packet | Inquiry Packet | Comments |
|--|----------------|-------------------------------------|--|
| CAM_IRCorrectionInq | 8x 09 04 11 FF | y0 50 00 FF | Standard |
| | | y0 50 01 FF | IR Light |
| CAM_WBModeInq | 8x 09 04 35 FF | y0 50 06 FF | Outdoor Auto |
| | | y0 50 07 FF | Sodium Lamp Auto |
| | | y0 50 08 FF | Sodium Lamp |
| CAM_GainLimitInq | 8x 09 04 2C FF | y0 50 0q FF | p: Gain Limit |
| CAM_WDModeInq (FCB-EX490E/P only) | 8x 09 04 3D FF | y0 50 01 FF | On (RatioFix) |
| | | y0 50 04 FF | On (Dver operation) |
| CAM_WDParameterInq (FCB-EX490E/P only) | 8x 09 04 2D FF | y0 50 00 0p 0q 0r 0s 0t 0u 00 00 FF | p: Screen display q: Detection sensitivity r: Blocked-up shadow correction level s: Blown-out highlight correction level tu: Exposure ratio of short exposure |
| CAM_WDAlarmReplyInq (FCB-EX490E/P only) | 8x 09 04 3B FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_NRInq | 8x 09 04 53 FF | y0 50 0p FF | p: NR level |
| CAM_ExtLockInq | 8x 09 04 55 FF | y0 50 00 FF | Internal Sync |
| | | y0 50 01 FF | V-Phase Adjustment |
| | | y0 50 02 FF | External Sync |
| CAM_ColorEnhanceInq | 8x 09 04 20 FF | y0 50 mm nn pp qq rr ss tt uu FF | mm: Threshold level nn: Hysteresis width pp: Fixed color Y of high-intensity side qq: Fixed color Cr of high-intensity side rr: Fixed color Cb of high-intensity side ss: Fixed color Y of low-intensity side tt: Fixed color Cr of low-intensity side uu: Fixed color Cb of low-intensity side |
| | 8x 09 04 50 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_TempInq | 8x 09 04 68 FF | y0 50 00 00 0p 0p FF | pq: Temperature * Lens temperature |

Inquiry Command List (1/4)

| Inquiry Command | Command Packet | Inquiry Packet | Comments |
|------------------------|----------------|----------------------|---------------------------------|
| CAM_PowerInq | 8x 09 04 00 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_ZoomPosInq | 8x 09 04 47 FF | y0 50 0p 0q 0r 0s FF | pqrs: Zoom Position |
| CAM_DZoomModeInq | 8x 09 04 06 FF | y0 50 02 FF | D-Zoom On |
| | | y0 50 03 FF | D-Zoom Off |
| CAM_DZoomC/SMoDeInq | 8x 09 04 36 FF | y0 50 00 FF | Combine Mode |
| | | y0 50 01 FF | Separate Mode |
| CAM_DZoomPosInq | 8x 09 04 46 FF | y0 50 00 00 0p 0q FF | pq: D-Zoom Position |
| CAM_FocusModeInq | 8x 09 04 38 FF | y0 50 02 FF | Auto Focus |
| | | y0 50 03 FF | Manual Focus |
| CAM_FocusPosInq | 8x 09 04 48 FF | y0 50 0p 0q 0r 0s FF | pqrs: Focus Position |
| CAM_FocusNearLimitInq | 8x 09 04 28 FF | y0 50 0p 0q 0r 0s FF | pqrs: Focus Near Limit Position |
| CAM_AFSensitivityInq | 8x 09 04 58 FF | y0 50 02 FF | AF Sensitivity Normal |
| | | y0 50 03 FF | AF Sensitivity Low |
| CAM_AFModeInq | 8x 09 04 57 FF | y0 50 00 FF | Normal AF |
| | | y0 50 01 FF | Interval AF |
| | | y0 50 02 FF | Zoom Trigger AF |
| CAM_AFTimeSettingInq | 8x 09 04 27 FF | y0 50 0p 0q 0r 0s FF | pq: Movement Time, rs: Interval |
| CAM_IRCorrectionInq | 8x 09 04 11 FF | y0 50 00 FF | Standard |
| | | y0 50 01 FF | IR Light |
| CAM_WBModeInq | 8x 09 04 35 FF | y0 50 00 FF | Auto |
| | | y0 50 01 FF | In Door |
| | | y0 50 02 FF | Out Door |
| | | y0 50 03 FF | One Push WB |
| | | y0 50 04 FF | ATW |
| | | y0 50 05 FF | Manual |
| | | y0 50 06 FF | Outdoor Auto |
| | | y0 50 07 FF | Sodium Lamp Auto |
| | | y0 50 08 FF | Sodium Lamp |
| CAM_RGainInq | 8x 09 04 43 FF | y0 50 00 00 0p 0q FF | pq: R Gain |
| CAM_BGainInq | 8x 09 04 44 FF | y0 50 00 00 0p 0q FF | pq: B Gain |
| CAM_AEModeInq | 8x 09 04 39 FF | y0 50 00 FF | Full Auto |
| | | y0 50 03 FF | Manual |
| | | y0 50 0A FF | Shutter Priority |
| | | y0 50 0B FF | Iris Priority |
| | | y0 50 0D FF | Bright |
| CAM_SlowShutterModeInq | 8x 09 04 5A FF | y0 50 02 FF | Auto |
| | | y0 50 03 FF | Manual |
| CAM_ShutterPosInq | 8x 09 04 4A FF | y0 50 00 00 0p 0q FF | pq: Shutter Position |
| CAM_IrisPosInq | 8x 09 04 4B FF | y0 50 00 00 0p 0q FF | pq: Iris Position |
| CAM_GainPosInq | 8x 09 04 4C FF | y0 50 00 00 0p 0q FF | pq: Gain Position |
| CAM_GainLimitInq | 8x 09 04 2C FF | y0 50 0q FF | p: Gain Limit |
| CAM_BrightPosInq | 8x 09 04 4D FF | y0 50 00 00 0p 0q FF | pq: Bright Position |
| CAM_ExpCompModeInq | 8x 09 04 3E FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_ExpCompPosInq | 8x 09 04 4E FF | y0 50 00 00 0p 0q FF | pq: ExpComp Position |
| CAM_BacklightModeInq | 8x 09 04 33 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |

Inquiry Command List (2/4)

| Inquiry Command | Command Packet | Inquiry Packet | Comments |
|---|------------------------------------|----------------------------------|---|
| CAM_SpotAEModeInq | 8x 09 04 59 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_SpotAEPosInq | 8x 09 04 29 FF | y0 50 0p 0q 0r 0s FF | pq: X position, rs: Y position |
| CAM_AE_ResponseInq | 8x 09 04 5D FF | y0 50 pp FF | pp: 01 to 20 (hex) |
| CAM_WDModeInq (FCB-EX490E/P only) | 8x 09 04 3D FF | y0 50 02 FF | On Wide-D |
| | | y0 50 03 FF | Off |
| | | y0 50 00 FF | AutoOnOff |
| | | y0 50 01 FF | On (RatioFix) |
| | | y0 50 04 FF | On (Dver operation) |
| CAM_WDParameterInq (FCB-EX490E/P only) | 8x 09 04 2D FF | y0 50 0p 0q 0r 0s 0t 0u 00 00 FF | p: Screen display q: Detection sensitivity r: Blocked-up shadow correction level s: Blown-out highlight correction level tu: Exposure ratio of short exposure |
| CAM_WDAlarmReplyInq (FCB-EX490E/P only) | 8x 09 04 3B FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_ApertureInq | 8x 09 04 42 FF | y0 50 00 00 0p 0q FF | pq: Aperture Gain |
| CAM_HRModeInq | 8x 09 04 52 FF | y0 50 02 FF | On Hi-Resolution |
| | | y0 50 03 FF | Off |
| CAM_NRInq | 8x 09 04 53 FF | y0 50 0p FF | p: NR level |
| CAM_LR_ReverseModeInq | 8x 09 04 61 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_FreezeModeInq | 8x 09 04 62 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_PictureEffectModeInq | 8x 09 04 63 FF | y0 50 00 FF | Off |
| | | y0 50 02 FF | Neg.Art |
| | | y0 50 04 FF | B&W |
| CAM_PictureFlipModeInq | 8x 09 04 66 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_ICRModeInq (FCB-EX490E/P only) | 8x 09 04 01 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_AutoICRModeInq (FCB-EX490E/P only) | 8x 09 04 51 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_AutoICRThresholdInq (FCB-EX490E/P only) | 8x 09 04 21 FF | y0 50 00 00 0p 0q FF | pq: ICR ON → OFF Threshold Level |
| CAM_AutoICRAlarmReplyInq (FCB-EX490E/P only) | 8x 09 04 31 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_DisplayModeInq | 8x 09 04 15 FF (8x 09 06 06 FF) | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_MuteModeInq | 8x 09 04 75 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_PrivacyDisplayInq | 8x 09 04 77 FF | y0 50 pp pp pp pp FF | pp pp pp pp: Mask Display (0:OFF, 1:ON) |

Inquiry Command List (3/4)

| Inquiry Command | Command Packet | Inquiry Packet | Comments |
|---------------------------------------|-------------------|--|--|
| CAM_PrivacyPanTiltInq | 8x 09 04 79 FF | y0 50 0p 0p 0p 0q 0q 0q FF | ppp: Pan qqq: Tilt |
| CAM_PrivacyPTZInq | 8x 09 04 7B mm FF | y0 50 0p 0p 0p 0q 0q 0r 0r 0r FF | mm: Mask Settings ppp: Pan qqq: Tilt rrr: Zoom |
| CAM_PrivacyMonitorInq | 8x 09 04 6F FF | y0 50 pp pp pp pp FF | pp pp pp pp: Mask is displayed now. |
| CAM_KeyLockInq | 8x 09 04 17 FF | y0 50 00 FF | Off |
| | | y0 50 02 FF | On |
| CAM_IDInq | 8x 09 04 22 FF | y0 50 0p 0q 0r 0s FF | pqrs: Camera ID |
| CAM_MemSaveInq | 8x 09 04 23 0X FF | y0 50 0p 0p 0q 0q FF | X: 00 to 07 (Address) ppqq: 0x0000 to 0xFFFF (Data) |
| CAM_ExtLockInq | 8x 09 04 55 FF | y0 50 00 FF | Internal Sync |
| | | y0 50 01 FF | V-Phase Adjustment |
| | | y0 50 02 FF | External Sync |
| CAM_VPhasePosInq | 8x 09 04 45 FF | y0 50 0p 0q 0r 0s FF | pqrs: V-Phase Position |
| CAM_VersionInq | 8x 09 00 02 FF | y0 50 00 20 mn pq rs tu vw FF | mnpq: Model Code (04xx) rstu: ROM version vw: Socket Number (=02) |
| CAM_AlarmInq | 8x 09 04 6B FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_AlarmModeInq | 8x 09 04 6C FF | y0 50 pp FF | pp: Alarm Mode |
| CAM_AlarmDayNightLevelInq | 8x 09 04 6D FF | y0 50 0p 0p 0p 0q 0q 0q 0r 0r 0r FF | ppp: Day judgement level setting qqq: Night judgement level setting rrr: Current Automatic Exposure level setting |
| CAM_AlarmDetectLevelInq | 8x 09 04 6E FF | y0 50 01 FF | Detection level "High" |
| | | y0 50 00 FF | Detection level "Low" |
| CAM_MDModeInq | 8x 09 04 1B FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_MDFunctionInq | 8x 09 04 1C FF | y0 50 0m 0n 0p 0q FF | m: Display mode n: Detection Frame Set (0 to F) pq: Threshold Level (0 to FF) rs: Interval Time set (0 to FF) |
| CAM_MDWindowInq | 8x 09 04 1D 0m FF | y0 50 0p 0q 0r 0s FF | m: Select Detection Frame (0, 1, 2, 3) p: Start Horizontal Position (00 to 0B) q: Start Vertical Position (00 to 07) r: Stop Horizontal Position (01 to 0C) s: Stop Vertical Position (01 to 08) |
| CAM_ContinuousZoomPos ReplyModeInq | 8x 09 04 69 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_ReplyIntervalTimeInq | 8x 09 04 6A FF | y0 50 00 00 0p 0p FF | pp: Interval Time |
| CAM_RegisterValueInq | 8x 09 04 24 mm FF | y0 50 0p 0p ff | mm: Register No. (00 to 7F) pp: Register Value (00 to FF) |

Inquiry Command List (4/4)

| Inquiry Command | Command Packet | Inquiry Packet | Comments |
|---------------------|----------------|----------------------------------|--|
| CAM_ColorEnhanceInq | 8x 09 04 20 FF | y0 50 mm nn pp qq rr ss tt uu FF | mm: Threshold level nn: Hysteresis width pp: Fixed color Y of high-intensity side qq: Fixed color Cr of high-intensity side rr: Fixed color Cb of high-intensity side ss: Fixed color Y of low-intensity side tt: Fixed color Cr of low-intensity side uu: Fixed color Cb of low-intensity side |
| | 8x 09 04 50 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_TempInq | 8x 09 04 68 FF | y0 50 00 00 0p 0p FF | pq: Temperature * Lens temperature |

Block Inquiry Command List

Lens Control System Inquiry Commands..... Command Packet 8x 09 7E 7E 00 FF

| Byte | Bit | Comments | Byte | Bit | Comments | Byte | Bit | Comments | |
|------|-----|----------------------------|------|-----|----------------------|------|-----|--|---|
| 0 | 7 | Destination Address | 6 | 7 | 0 | 12 | 7 | 0 | |
| | 6 | | | 6 | 0 | | 6 | 0 | |
| | 5 | | | 5 | 0 | | 5 | 0 | |
| | 4 | | | 4 | 0 | | 4 | 0 | |
| | 3 | Source Address | | 3 | Focus Near Limit (H) | | 3 | 0 | |
| | 2 | | | 2 | | | 0 | | |
| | 1 | | | 1 | | | 0 | | |
| | 0 | | | 0 | | | 0 | | |
| 1 | 7 | 0 Completion Message (50h) | 7 | 7 | 0 | 13 | 7 | 0 | |
| | 6 | 1 | | 6 | 0 | | 6 | 0 | |
| | 5 | 0 | | 5 | 0 | | 5 | DZoomMode 0: Combine 1: Separate | |
| | 4 | 1 | | 4 | 0 | | 4 | 0: Normal 1: Interval 3 2: Zoom Trigger | |
| | 3 | 0 | | 3 | Focus Near Limit (L) | | 2 | AF Sensitivity 0: Slow 1: Normal | |
| | 2 | 0 | | 2 | | | 1 | Digital Zoom 1:On 0:Off | |
| | 1 | 0 | | 1 | | | 0 | Focus Mode 0:Manual 1:Auto | |
| | 0 | 0 | | 0 | | | 0 | | |
| 2 | 7 | 0 | 8 | 7 | 0 | 14 | 7 | 0 | |
| | 6 | 0 | | 6 | 0 | | 6 | 0 | |
| | 5 | 0 | | 5 | 0 | | 5 | 0 | |
| | 4 | 0 | | 4 | 0 | | 4 | 0 | |
| | 3 | Zoom Position (HH) | | 3 | Focus Position (HH) | | 3 | Low Contrast Detection 1: Yes 0: No | |
| | 2 | | | 2 | | | 2 | | Camera Memory Recall 1: Executing 0: Stopped |
| | 1 | | | 1 | | | 1 | | Focus Command 1: Executing 0: Stopped |
| | 0 | | | 0 | | | 0 | | Zoom Command 1: Executing 0: Stopped |
| 3 | 7 | 0 | 9 | 7 | 0 | 15 | 7 | 1 Terminator (FFh) | |
| | 6 | 0 | | 6 | 0 | | 6 | 1 | |
| | 5 | 0 | | 5 | 0 | | 5 | 1 | |
| | 4 | 0 | | 4 | 0 | | 4 | 1 | |
| | 3 | Zoom Position (HL) | | 3 | Focus Position (HL) | | 3 | Focus Position (LL) | |
| | 2 | | | 2 | | | 2 | | |
| | 1 | | | 1 | | | 1 | | |
| | 0 | | | 0 | | | 0 | | |
| 4 | 7 | 0 | 10 | 7 | 0 | 11 | 7 | 0 | |
| | 6 | 0 | | 6 | 0 | | 6 | 0 | |
| | 5 | 0 | | 5 | 0 | | 5 | 0 | |
| | 4 | 0 | | 4 | 0 | | 4 | 0 | |
| | 3 | Zoom Position (LH) | | 3 | Focus Position (LH) | | 3 | Focus Position (LL) | |
| | 2 | | | 2 | | | 2 | | |
| | 1 | | | 1 | | | 1 | | |
| | 0 | | | 0 | | | 0 | | |
| 5 | 7 | 0 | 11 | 7 | 0 | 11 | 7 | 0 | |
| | 6 | 0 | | 6 | 0 | | 6 | 0 | |
| | 5 | 0 | | 5 | 0 | | 5 | 0 | |
| | 4 | 0 | | 4 | 0 | | 4 | 0 | |
| | 3 | Zoom Position (LL) | | 3 | Focus Position (LL) | | 3 | Focus Position (LL) | |
| | 2 | | | 2 | | | 2 | | |
| | 1 | | | 1 | | | 1 | | |
| | 0 | | | 0 | | | 0 | | |

Camera Control System Inquiry Commands Command Packet 8x 09 7E 7E 01 FF

| Byte | Bit | Comments | Byte | Bit | Comments | Byte | Bit | Comments |
|------|-----|----------------------------|------|-----|------------------------------------|------|-----|-------------------------|
| 0 | 7 | Destination Address | 6 | 7 | 0 | 12 | 7 | 0 |
| | 6 | | | 6 | 0 | | 6 | 0 |
| | 5 | | | 5 | 0 | | 5 | 0 |
| | 4 | | | 4 | 0 | | 4 | 0 |
| | 3 | Source Address | | 3 | WB Mode | | 3 | Gain Position |
| | 2 | | | 2 | | | 2 | |
| | 1 | | | 1 | | | 1 | |
| | 0 | | | 0 | | | 0 | |
| 1 | 7 | 0 Completion Message (50h) | 7 | 7 | 0 | 13 | 7 | 0 |
| | 6 | 1 | | 6 | 0 | | 6 | 0 |
| | 5 | 0 | | 5 | 0 | | 5 | 0 |
| | 4 | 1 | | 4 | 0 | | 4 | Bright Position |
| | 3 | 0 | | 3 | 3 | | | |
| | 2 | 0 | | 2 | 2 | | | |
| | 1 | 0 | | 1 | 1 | | | |
| | 0 | 0 | | 0 | 0 | | | |
| 2 | 7 | 0 | 8 | 7 | 0 | 14 | 7 | 0 |
| | 6 | 0 | | 6 | 0 | | 6 | 0 |
| | 5 | 0 | | 5 | 0 | | 5 | 0 |
| | 4 | 0 | | 4 | 0 | | 4 | 0 |
| | 3 | R Gain (H) | | 3 | Exposure Mode | | 3 | Exposure Comp. Position |
| | 2 | | | 2 | | | 2 | |
| 1 | 1 | | 1 | | | | | |
| 3 | 7 | 0 | 9 | 7 | 0 | 15 | 7 | 1 Terminator (FFh) |
| | 6 | 0 | | 6 | 0 | | 6 | 1 |
| | 5 | 0 | | 5 | High-Resolution 1: On 0: Off | | 5 | 1 |
| | 4 | 0 | | 4 | Wide-D (1: Other than Off, 0: Off) | | 4 | 1 |
| | 3 | R Gain (L) | | 3 | Spot AE 1: On 0: Off | | 3 | 1 |
| | 2 | | | 2 | Back Light 1:On 0:Off | | 2 | 1 |
| | 1 | | | 1 | Exposure Comp. 1:On 0:Off | | 1 | 1 |
| | 0 | | | 0 | Slow Shutter 1:Auto 0:Manual | | 0 | 1 |
| 4 | 7 | | 0 | 10 | 7 | 0 | 11 | 7 |
| | 6 | 0 | 6 | | 0 | 6 | | 0 |
| | 5 | 0 | 5 | | 0 | 5 | | 0 |
| | 4 | 0 | 4 | | Shutter Position | 4 | | Iris Position |
| | 3 | B Gain (H) | 3 | | | 3 | | |
| | 2 | | 2 | | | 2 | | |
| | 1 | | 1 | | | 1 | | |
| | 0 | | 0 | | | 0 | | |
| 5 | 7 | 0 | 11 | 7 | 0 | 11 | 7 | 0 |
| | 6 | 0 | | 6 | 0 | | 6 | 0 |
| | 5 | 0 | | 5 | 0 | | 5 | 0 |
| | 4 | 0 | | 4 | Iris Position | | 4 | Iris Position |
| | 3 | B Gain (L) | | 3 | | | 3 | |
| | 2 | | | 2 | | | 2 | |
| | 1 | | | 1 | | | 1 | |
| | 0 | | | 0 | 0 | | | |

Other Inquiry Commands Command Packet 8x 09 7E 7E 02 FF

| Byte | Bit | Comments | Byte | Bit | Comments | Byte | Bit | Comments | |
|------|-----|--------------------------------|------|-----|----------------|------|-----|--|---|
| 0 | 7 | Destination Address | 6 | 7 | 0 | 12 | 7 | 0 | |
| | 6 | | | 6 | 0 | | 6 | 0 | |
| | 5 | | | 5 | 0 | | 5 | External Lock 1: Provided 0: Not provided | |
| | 4 | | | 4 | 0 | | 4 | Memory 1: Provided 0: Not provided | |
| | 3 | Source Address | | 3 | 0 | | 3 | Clock 1: Provided 0: Not provided | |
| | 2 | | | 2 | 0 | | 2 | ICR 1: Provided 0: Not provided | |
| | 1 | | | 1 | 0 | | 1 | Stabilizer (1: Provided, 0: Not provided) | |
| | 0 | | | 0 | 0 | | 0 | System 1:PAL 0:NTSC | |
| 1 | 7 | 0 Completion Message (50h) | 7 | 7 | 0 | 13 | 7 | 0 | |
| | 6 | 1 | | 6 | 0 | | 6 | 0 | |
| | 5 | 0 | | 5 | 0 | | 5 | External Lock status (1: Lock, 0: Unlock) | |
| | 4 | 1 | | 4 | 0 | | 4 | External Lock Mode 1: Line Lock 0: Internal | |
| | 3 | 0 | | 3 | 0 | | 3 | V-Phase (H) | |
| | 2 | 0 | | 2 | 0 | | 2 | | |
| | 1 | 0 | | 1 | 0 | | 1 | | |
| | 0 | 0 | | 0 | 0 | | 0 | | |
| 2 | 7 | 0 | 8 | 7 | 0 | 14 | 7 | 0 | |
| | 6 | 0 | | 6 | 0 | | 6 | 0 | |
| | 5 | 0 | | 5 | 0 | | 5 | V-Phase (L) | |
| | 4 | 0 | | 4 | 0 | | 4 | | |
| | 3 | Auto ICR Alarm (1: On, 0: Off) | | 3 | Camera ID (HH) | | 3 | | |
| | 2 | Auto ICR 1: On 0: Off | | 2 | | | 2 | | |
| | 1 | Key Lock 1: On 0: Off | | 1 | | | 1 | | |
| | 0 | Power 1:On 0:Off | | 0 | | | 0 | | |
| 3 | 7 | 0 | 9 | 7 | 0 | 15 | 7 | 1 Terminator (FFh) | |
| | 6 | 0 | | 6 | 0 | | 6 | 1 | |
| | 5 | 0 | | 5 | 0 | | 5 | 1 | |
| | 4 | ICR 1: On 0: Off | | 4 | 0 | | 4 | 1 | |
| | 3 | Freeze 1:On 0:Off | | 3 | Camera ID (HL) | | 3 | 1 | |
| | 2 | LR Reverse 1:On 0:Off | | 2 | | | 2 | 2 | 1 |
| | 1 | 0 | | 1 | | | 1 | 1 | 1 |
| | 0 | 0 | | 0 | | | 0 | 0 | 1 |
| 4 | 7 | 0 | 10 | 7 | 0 | 11 | 7 | 0 | |
| | 6 | 0 | | 6 | 0 | | 6 | 0 | |
| | 5 | Privacy Zone 1: On 0: Off | | 5 | 0 | | 5 | 0 | |
| | 4 | Mute 1: On 0: Off | | 4 | 0 | | 4 | 0 | |
| | 3 | Title Display 1: On 0: Off | | 3 | Camera ID (LH) | | 3 | Camera ID (LL) | |
| | 2 | Display 1: On 0: Off | | 2 | | | 2 | | |
| | 1 | 0 | | 1 | | | 1 | | |
| | 0 | 0 | | 0 | | | 0 | | |
| 5 | 7 | 0 | 11 | 7 | 0 | 11 | 7 | 0 | |
| | 6 | 0 | | 6 | 0 | | 6 | 0 | |
| | 5 | 0 | | 5 | 0 | | 5 | 0 | |
| | 4 | 0 | | 4 | 0 | | 4 | 0 | |
| | 3 | 0 | | 3 | Camera ID (LL) | | 3 | Camera ID (LL) | |
| | 2 | Picture Effect Mode | | 2 | | | 2 | | |
| | 1 | | | 1 | | | | | |
| | 0 | | | 0 | | | | | |

Enlargement Function1 Query Command Command Packet 8x 09 7E 7E 03 FF

| Byte | Bit | Comments | Byte | Bit | Comments | Byte | Bit | Comments |
|------|-----|----------------------------|------|-----|------------------------------|------|-----------------------|--|
| 0 | 7 | Destination Address | 6 | 7 | 0 | 11 | 7 | 0 |
| | 6 | | | 6 | 0 | | 6 | 0 |
| | 5 | | | 5 | 0 | | 5 | 0 |
| | 4 | | | 4 | 0 | | 4 | 0 |
| | 3 | Source Address | | 3 | AF Interval Time (H) | | 3 | 0 |
| | 2 | | | 2 | | | 2 | Advanced Privacy (1: Provided, 0: Not provided) |
| | 1 | | | 1 | | | 1 | Alarm (1: Provided, 0: Not provided) |
| | 0 | | | 0 | | | 0 | Picture flip (1: Provided, 0: Not provided) |
| 1 | 7 | 0 Completion Message (50h) | 7 | 7 | 0 | 12 | 7 | 0 |
| | 6 | 1 | | 6 | 0 | | 6 | 0 |
| | 5 | 0 | | 5 | 0 | | 5 | 0 |
| | 4 | 1 | | 4 | 0 | | 4 3 2 1 0 | AE Response |
| | 3 | 0 | | 3 | AF Interval Time (L) | | | |
| | 2 | 0 | | 2 | | | | |
| | 1 | 0 | | 1 | | | | |
| | 0 | 0 | | 0 | | | | |
| 2 | 7 | 0 | 8 | 7 | 0 | 13 | 7 | 0 |
| | 6 | 0 | | 6 | 0 | | 6 | 0 |
| | 5 | 0 | | 5 | 0 | | 5 | 0 |
| | 4 | 0 | | 4 | 0 | | 4 | 0 |
| | 3 | Digital Zoom Position (H) | | 3 | SpotAE Position (X) | | 3 | NR Level |
| | 2 | | | 2 | | | 2 | |
| | 1 | | | 1 | | | 1 | |
| | 0 | | | 0 | | | 0 | |
| 3 | 7 | 0 | 9 | 7 | 0 | 14 | 7 | 0 |
| | 6 | 0 | | 6 | 0 | | 6 | 0 |
| | 5 | 0 | | 5 | 0 | | 5 | 0 |
| | 4 | 0 | | 4 | 0 | | 4 | 0 |
| | 3 | Digital Zoom Position (L) | | 3 | SpotAE Position (Y) | | 3 | Gain Limit |
| | 2 | | | 2 | | | 2 | |
| | 1 | | | 1 | | | 1 | |
| | 0 | | | 0 | | | 0 | |
| 4 | 7 | 0 | 10 | 7 | 0 | 15 | 7 | 1 Terminator (FFh) |
| | 6 | 0 | | 6 | 0 | | 6 | 1 |
| | 5 | 0 | | 5 | 0 | | 5 | 1 |
| | 4 | 0 | | 4 | 0 | | 4 | 1 |
| | 3 | AF Activation Time (H) | | 3 | 0 | | 3 | 1 |
| | 2 | | | 2 | MD (1: On, 0: Off) | | 2 | 1 |
| | 1 | | | 1 | Alarm (1: On, 0: Off) | | 1 | 1 |
| | 0 | | | 0 | Picture flip (1: On, 0: Off) | | 0 | 1 |
| 5 | 7 | 0 | | | | | | |
| | 6 | 0 | | | | | | |
| | 5 | 0 | | | | | | |
| | 4 | 0 | | | | | | |
| | 3 | AF Activation Time (L) | | | | | | |
| | 2 | | | | | | | |
| | 1 | | | | | | | |
| | 0 | | | | | | | |

Enlargement Function2 Query Command Command Packet 8x 09 7E 7E 04 FF

| Byte | Bit | Comments | Byte | Bit | Comments | Byte | Bit | Comments |
|------|---|---|------|-----|--|------|-----|--------------------|
| 0 | 7 | Destination Address | 6 | 7 | 0 | 11 | 7 | 0 |
| | 6 | | | 6 | 0 | | 6 | 0 |
| | 5 | | | 5 | 0 | | 5 | 0 |
| | 4 | | | 4 | 0 | | 4 | 0 |
| | 3 | Source Address | | 3 | WideD short exposure Exposure ratio (L) | | 3 | 0 |
| | 2 | | | 2 | | | 0 | |
| | 1 | | | 1 | | | 0 | |
| | 0 | | | 0 | | | 0 | |
| 1 | 7 | 0 Completion Message (50h) | 7 | 7 | 0 | 12 | 7 | 0 |
| | 6 | 1 | | 6 | 0 | | 6 | 0 |
| | 5 | 0 | | 5 | 0 | | 5 | 0 |
| | 4 | 1 | | 4 | 0 | | 4 | 0 |
| | 3 | 0 | | 3 | 0 | | 3 | 0 |
| | 2 | 0 | | 2 | 0 | | 2 | 0 |
| | 1 | 0 | | 1 | 0 | | 1 | 0 |
| | 0 | 0 | | 0 | 0 | | 0 | 0 |
| 2 | 7 | 0 | 8 | 7 | 0 | 13 | 7 | 0 |
| | 6 | 0 | | 6 | 0 | | 6 | 0 |
| | 5 | 0 | | 5 | 0 | | 5 | 0 |
| | 4 | 0 | | 4 | 0 | | 4 | 0 |
| | 3 | 0 | | 3 | 0 | | 3 | 0 |
| | 2 | WideD mode (0: OFF, 1: ON, 2: Auto ON/OFF, 3: ON (RatioFix), 4: ON (Dver)) | | 2 | 0 | | 2 | 0 |
| | 1 | | | 1 | 0 | | 1 | 0 |
| 0 | (RatioFix), 4: ON (Dver)) | 0 | 0 | 0 | 0 | | | |
| 3 | 7 | 0 | 9 | 7 | 0 | 14 | 7 | 0 |
| | 6 | 0 | | 6 | 0 | | 6 | 0 |
| | 5 | 0 | | 5 | 0 | | 5 | 0 |
| | 4 | 0 | | 4 | 0 | | 4 | 0 |
| | 3 | WideD screen display 0: Combined image 1: Long/short division 2: Long-time 3: Short-time | | 3 | 0 | | 3 | 0 |
| | 2 | | | 2 | 0 | | 2 | 0 |
| | 1 | | | 1 | 0 | | 1 | 0 |
| 0 | WideD detection sensitivity 0: L 1: M 2: H | 0 | 0 | 0 | 0 | | | |
| 4 | 7 | 0 | 10 | 7 | 0 | 15 | 7 | 1 Terminator (FFh) |
| | 6 | 0 | | 6 | 0 | | 6 | 1 |
| | 5 | 0 | | 5 | 0 | | 5 | 1 |
| | 4 | 0 | | 4 | 0 | | 4 | 1 |
| | 3 | WideD blocked-up shadow correction level 0: L 1: M 2: H 3: S | | 3 | 0 | | 3 | 1 |
| | 2 | | | 2 | 0 | | 2 | 1 |
| | 1 | | | 1 | 0 | | 1 | 1 |
| | 0 | WideD blown-out highlight correction level 0: L 1: M 2: H | | 0 | 0 | | 0 | 1 |
| 5 | 7 | 0 | | | | | | |
| | 6 | 0 | | | | | | |
| | 5 | 0 | | | | | | |
| | 4 | 0 | | | | | | |
| | 3 | WideD short exposure Exposure ratio (H) | | | | | | |
| | 2 | | | | | | | |
| 1 | | | | | | | | |
| 0 | | | | | | | | |

VISCA Command Setting Values

Exposure control (1/2)

| | | NTSC (s) | PAL (s) |
|---------------|----|----------|---------|
| Shutter Speed | 15 | 1/10000 | 1/10000 |
| | 14 | 1/6000 | 1/6000 |
| | 13 | 1/4000 | 1/3500 |
| | 12 | 1/3000 | 1/2500 |
| | 11 | 1/2000 | 1/1750 |
| | 10 | 1/1500 | 1/1250 |
| | 0F | 1/1000 | 1/1000 |
| | 0E | 1/725 | 1/600 |
| | 0D | 1/500 | 1/425 |
| | 0C | 1/350 | 1/300 |
| | 0B | 1/250 | 1/215 |
| | 0A | 1/180 | 1/150 |
| | 09 | 1/125 | 1/120 |
| | 08 | 1/100 | 1/100 |
| | 07 | 1/90 | 1/75 |
| | 06 | 1/60 | 1/50 |
| | 05 | 1/30 | 1/25 |
| | 04 | 1/15 | 1/12 |
| | 03 | 1/8 | 1/6 |
| | 02 | 1/4 | 1/3 |
| | 01 | 1/2 | 1/2 |
| | 00 | 1/1 | 1/1 |
| Iris | 11 | F1.4 | |
| | 10 | F1.6 | |
| | 0F | F2 | |
| | 0E | F2.4 | |
| | 0D | F2.8 | |
| | 0C | F3.4 | |
| | 0B | F4 | |
| | 0A | F4.8 | |
| | 09 | F5.6 | |
| | 08 | F6.8 | |
| | 07 | F8 | |
| | 06 | F9.6 | |
| | 05 | F11 | |
| | 04 | F14 | |
| | 03 | F16 | |
| | 02 | F19 | |
| | 01 | F22 | |
| | 00 | CLOSE | |

| | | |
|------------|----|--------|
| Gain | 0F | +28 dB |
| | 0E | +26 dB |
| | 0D | +24 dB |
| | 0C | +22 dB |
| | 0B | +20 dB |
| | 0A | +18 dB |
| | 09 | +16 dB |
| | 08 | +14 dB |
| | 07 | +12 dB |
| | 06 | +10 dB |
| | 05 | +8 dB |
| | 04 | +6 dB |
| | 03 | +4 dB |
| | 02 | +2 dB |
| | 01 | 0 dB |
| | 00 | -3 dB |
| Gain Limit | 0F | +28 dB |
| | 0E | +26 dB |
| | 0D | +24 dB |
| | 0C | +22 dB |
| | 0B | +20 dB |
| | 0A | +18 dB |
| | 09 | +16 dB |
| | 08 | +14 dB |
| | 07 | +12 dB |
| | 06 | +10 dB |
| | 05 | +8 dB |
| | 04 | +6 dB |

Exposure control (2/2)

| | | IRIS | GAIN |
|----------------|----|-------|----------|
| Bright | 1F | F1.4 | +28 dB |
| | 1E | F1.4 | +26 dB |
| | 1D | F1.4 | +24 dB |
| | 1C | F1.4 | +22 dB |
| | 1B | F1.4 | +20 dB |
| | 1A | F1.4 | +18 dB |
| | 19 | F1.4 | +16 dB |
| | 18 | F1.4 | +14 dB |
| | 17 | F1.4 | +12 dB |
| | 16 | F1.4 | +10 dB |
| | 15 | F1.4 | +8 dB |
| | 14 | F1.4 | +6 dB |
| | 13 | F1.4 | +4 dB |
| | 12 | F1.4 | +2 dB |
| | 11 | F1.4 | 0 dB |
| | 10 | F1.6 | 0 dB |
| | 0F | F2 | 0 dB |
| | 0E | F2.4 | 0 dB |
| | 0D | F2.8 | 0 dB |
| | 0C | F3.4 | 0 dB |
| | 0B | F4 | 0 dB |
| | 0A | F4.8 | 0 dB |
| | 09 | F5.6 | 0 dB |
| | 08 | F6.8 | 0 dB |
| | 07 | F8 | 0 dB |
| | 06 | F9.6 | 0 dB |
| | 05 | F11 | 0 dB |
| | 04 | F14 | 0 dB |
| | 03 | F16 | 0 dB |
| | 02 | F19 | 0 dB |
| | 01 | F22 | 0 dB |
| | 00 | CLOSE | 0 dB |
| Exposure Comp. | 0E | +7 | +10.5 dB |
| | 0D | +6 | +9 dB |
| | 0C | +5 | +7.5 dB |
| | 0B | +4 | +6 dB |
| | 0A | +3 | +4.5 dB |
| | 09 | +2 | +3 dB |
| | 08 | +1 | +1.5 dB |
| | 07 | 0 | 0 dB |
| | 06 | -1 | -1.5 dB |
| | 05 | -2 | -3 dB |
| | 04 | -3 | -4.5 dB |
| | 03 | -4 | -6 dB |
| | 02 | -5 | -7.5 dB |
| | 01 | -6 | -9 dB |
| | 00 | -7 | -10.5 dB |

Zoom Ratio and Zoom Position
(for reference)

| Zoom Ratio ×36 Lens | Optical Zoom Positon Data |
|------------------------|------------------------------|
| ×1 | 0000 |
| ×2 | 1804 |
| ×3 | 2296 |
| ×4 | 28F0 |
| ×5 | 2D58 |
| ×6 | 30AA |
| ×7 | 3350 |
| ×8 | 357E |
| ×9 | 3758 |
| ×10 | 38EF |
| ×11 | 3A52 |
| ×12 | 3B84 |
| ×13 | 3C90 |
| ×14 | 3D7A |
| ×15 | 3E42 |
| ×16 | 3EEE |
| ×17 | 3F82 |
| ×18 | 4000 |

Digital Zoom Combine mode

| X12-NTSC/PAL | |
|--------------------|----------------------------|
| Digital Zoom Ratio | Digital Zoom Position Data |
| ×1 | 4000 |
| ×2 | 6000 |
| ×3 | 6A80 |
| ×4 | 7000 |
| ×5 | 7300 |
| ×6 | 7540 |
| ×7 | 76C0 |
| ×8 | 7800 |
| ×9 | 78C0 |
| ×10 | 7980 |
| ×11 | 7A00 |
| ×12 | 7AC0 |

Digital Zoom Separate mode

| X12-NTSC/PAL | |
|--------------------|----------------------------|
| Digital Zoom Ratio | Digital Zoom Position Data |
| ×1 | 00 |
| ×2 | 80 |
| ×3 | AA |
| ×4 | C0 |
| ×5 | CC |
| ×6 | D5 |
| ×7 | DB |
| ×8 | E0 |
| ×9 | E3 |
| ×10 | E6 |
| ×11 | E8 |
| ×12 | EB |

Lens control

| Zoom Position | 0000 to 4000 to 7AC0 Wide end Optical Digital Tele end Tele end | |
|------------------|--|--|
| Focus Position | 1000 to C000 Far end Near end | |
| Focus Near Limit | 1000: Over Inf 2000: 8 m 3000: 3.5 m 4000: 2 m 5000: 1.4 m 6000: 1 m 7000: 80 cm 8000: 29 cm 9000: 10 cm A000: 4.7 cm B000: 2.3 cm C000: 1 cm | As the distance on the left will differ due to temperature characteristics, etc., use as approximate values. * The lower 1 byte is fixed at 00. |

Title setting

| | | |
|-------------|--------------------|--------|
| Line number | 00 to 0A | |
| H-position | 00 to 17 | |
| Blink | 00: Dose not blink | |
| | 01: Blinks | |
| Color | 00 | White |
| | 01 | Yellow |
| | 02 | Violet |
| | 03 | Red |
| | 04 | Cyan |
| | 05 | Green |
| | 06 | Blue |

| | | | | | | | |
|----|----|----|----|----|----|----|----|
| 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 |
| A | B | C | D | E | F | G | H |
| 08 | 09 | 0a | 0b | 0c | 0d | 0e | 0f |
| I | J | K | L | M | N | O | P |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| Q | R | S | T | U | V | W | X |
| 18 | 19 | 1a | 1b | 1c | 1d | 1e | 1f |
| Y | Z | & | | ? | ! | 1 | 2 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
| 28 | 29 | 2a | 2b | 2c | 2d | 2e | 2f |
| À | È | Ì | Ò | Ù | Á | É | Í |
| 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 |
| Ó | Ú | Â | Ê | Ô | Æ | Œ | Ã |
| 38 | 39 | 3a | 3b | 3c | 3d | 3e | 3f |
| Õ | Ñ | Ç | ß | Ä | Ï | Ö | Ü |
| 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 |
| Å | \$ | ₣ | ¥ | DM | £ | ¢ | ı |
| 48 | 49 | 4a | 4b | 4c | 4d | 4e | 4f |
| ø | “ | : | ‘ | . | , | / | - |

Temperature Reading Conversion Value (Reference Value)

| Reading Value pq (hex) | Temperature Conversion Value (°C) |
|------------------------|-----------------------------------|
| 00 | −3 to +3 |
| 0A | 7 to 13 |
| 14 | 17 to 23 |
| 1E | 27 to 33 |
| 28 | 37 to 43 |
| 32 | 47 to 53 |
| 3C | 57 to 63 |

Register Setting

| | Register No. | Value | |
|---|--------------|-------|---|
| VISCA Baud Rate ¹⁾ | 00 | 00 | 9600 bps |
| | | 01 | 19200 bps |
| | | 02 | 38400 bps |
| OSD Language | 60 | 00 | English |
| | | 03 | Chinese |
| CCD Scanning Mode ¹⁾ (FCB-EX48E/P: Interlace mode only) | 72 | 00 | Interlaced |
| | | 01 | Progressive |
| Digital Output Mode ¹⁾ (FCB-EX490E/P only) * Enabled when the CCD Scanning Mode is Progressive. | 73 | 00 | 60p/50p |
| | | | (30p/25p × 2) Clock rate: 56 MHz |
| | | 01 | 60p/50p Clock rate: 56 MHz |
| | | 04 | 30p/25p Clock rate: 28 MHz (Stop analog output) |
| Zoom Limit ¹⁾ | 50 | 00-FF | Wide Limit (0: Disabled) |
| | 51 | 00-FF | Tele Limit (0: Disabled) |
| E-Zoom Max ¹⁾ | 52 | 00-FF | Max. digital zoom ratio = 256 ÷ (256-Value) |
| FocusTrace @ZoomDirect ¹⁾ | 54 | 00 | OFF |
| | | 01 | ON |
| FocusOffset @DomeCover | 55 | 00-FF | 00: None to FF: Max. |

¹⁾ The register settings are enabled when the power is turned off and then back on again. After turning the power back on again, verify that the mode settings have been changed.

Others

| | | | |
|--|----|----|---------------------------|
| AF Active Time ¹⁾ | 00 | to | FF |
| AF Interval Time ¹⁾ | 00 | to | FF |
| Spot AE X position | 00 | to | 0F |
| Spot AE Y position | 00 | to | 0F |
| R Gain | 00 | to | FF |
| B Gain | 00 | to | FF |
| Aperture Level | 00 | to | 0F |
| NR Level | 00 | to | 05 |
| V-Phase | 00 | to | 020C (NTSC) 0270 (PAL) |
| AE Response | 01 | to | 30 |
| AutoICR ON → OFF Threshold Level (FCB-EX490E/P only) | 00 | to | 1C |
| MD Threshold Level | 00 | to | FF |
| MD Interval Time ¹⁾ | 00 | to | FF |
| MD Set Horizontal Position | 00 | to | 0C |
| MD Set Vertical Position | 00 | to | 08 |
| Color Enhancement Threshold Level | 00 | to | 7F |
| Color Enhancement Hysteresis Width | 00 | to | 7F |
| Color Enhancement Fixed Color Y | 00 | to | 7F |
| Color Enhancement Fixed Color Cr ²⁾ | 00 | to | 7F |
| Color Enhancement Fixed Color Cb ²⁾ | 00 | to | 7F |

¹⁾ Unit: One second

²⁾ 40 center

Specifications

FCB-490E/P

| | |
|--------------------------|--|
| Picture elements | FCB-EX490E: Approx. 380K pixels FCB-EX490EP: Approx. 440K pixels |
| Horizontal resolution | 550 TV lines (WIDE end) |
| Lens | 18× zoom F= 4.1 mm (WIDE) to 73.8 mm (TELE), F1.4 to F3.0 Zoom movement speed (NTSC) Optical WIDE/Optical TELE 2.5 sec (Focus Tracking ON) 2.0 sec (Focus Tracking OFF) Optical WIDE/Digital TELE 4.5 sec (Focus Tracking ON) 2.0 sec (Focus Tracking OFF) Digital WIDE/Digital TELE 2.0 sec (PAL) Optical WIDE/Optical TELE 2.8 sec (Focus Tracking ON) 2.4 sec (Focus Tracking OFF) Optical WIDE/Digital TELE 5.2 sec (Focus Tracking ON) 2.4 sec (Focus Tracking OFF) Digital WIDE/Digital TELE 2.5 sec Focus Movement time ∞ to Near 0.5 sec |
| Digital zoom | 18× (216× with optical zoom) |
| Angle of view (H) | Approx. 48 degree (WIDE end) to Approx. 2.8 degree (TELE end) |
| Min. working distance | 290 mm (WIDE end), 800 mm (TELE end) |
| Sync system | Internal/External (V-Lock) |
| Min. illumination | 0.7 lux/1/60 sec (NTSC), 1/50 sec (Interlace mode) 0.04 lux/1/4 sec (NTSC), 1/3 sec (PAL) (Typical value) ICR-ON Mode 0.01 lux/1/4 sec (NTSC), 1/3 sec (PAL) |
| Recommended illumination | 100 to 100,000 lux |
| S/N ratio | 50 dB (Weight ON) |

| | |
|--------------------------------------|---|
| Back light compensation | ON/OFF |
| Electronic shutter speed | FCB-EX490E: 1/4 to 1/10000 sec. (20 steps) FCB-EX490EP: 1/3 to 1/10000 sec. (20 steps) |
| White balance | AUTO, ATW, Indoor, Outdoor, One Push WB, Manual WB, Outdoor Auto, Sodium Vapor Lamp (Fix/Auto) |
| Gain | Auto/Manual (−3 dB to +28 dB, 16 steps) Max. Gain Limit (6 dB to 28 dB, 12 steps) |
| Wide dynamic range | ON/OFF/AUTO |
| 3D noise reduction | ON/OFF (level 5 to 1 / OFF, 6 steps) |
| Color Enhancement | ON/OFF |
| Aperture control | 16 steps |
| Preset | 6-POSITIONS |
| Serial interface | VISCA protocol (TTL/CMOS) 9.6 Kbps, 19.2 Kbps, 38.4 Kbps, Stop bit, 1/2 bit |
| Video Output | VBS: 1.0 Vp-p (Sync negative), Y/C Output Digital (ITU-R BT656 equiv.) Progressive/Interlace |
| Storage temperature/Humidity | −20 °C to +60 °C (−4 °F to +140 °F)/ 20% to 95% |
| Operating temperature/Humidity | −5 °C to +60 °C (32 °F to +122 °F)/ 20% to 80% |
| Power requirements/Power consumption | 6 to 12 V DC/2.4 W (4.4 W) |
| Weight | Approx. 230 g (8.1 oz.) |
| Dimensions | 52.7 × 57.5 × 88.5 mm (2 1/8 × 2 3/8 × 3 1/2 in.) (w/h/d) |

Design and specifications are subject to change without notice.

FCB-48E/P

| | |
|--------------------------|--|
| Picture elements | FCB-EX48E: Approx. 380K pixels FCB-EX48EP: Approx. 440K pixels |
| Horizontal resolution | 550 TV lines (WIDE end) |
| Lens | 18× zoom F= 4.1 mm (WIDE) to 73.8 mm (TELE), F1.4 to F3.0 Zoom movement speed (NTSC) Optical WIDE/Optical TELE 2.5 sec (Focus Tracking ON) 2.0 sec (Focus Tracking OFF) Optical WIDE/Digital TELE 4.5 sec (Focus Tracking ON) 2.0 sec (Focus Tracking OFF) Digital WIDE/Digital TELE 2.0 sec (PAL) Optical WIDE/Optical TELE 2.8 sec (Focus Tracking ON) 2.4 sec (Focus Tracking OFF) Optical WIDE/Digital TELE 5.2 sec (Focus Tracking ON) 2.4 sec (Focus Tracking OFF) Digital WIDE/Digital TELE 2.5 sec Focus Movement time ∞ to Near 0.5 sec |
| Digital zoom | 18× (216× with optical zoom) |
| Angle of view (H) | Approx. 48 degree (WIDE end) to Approx. 2.8 degree (TELE end) |
| Min. working distance | 290 mm (WIDE end), 800 mm (TELE end) |
| Sync system | Internal/External (V-Lock) |
| Min. illumination | 0.4 lux/1/60 sec (NTSC), 1/50 sec (Interlace mode) |
| | 0.02 lux/1/4 sec (NTSC), 1/3 sec (PAL) (Typical value) |
| Recommended illumination | 100 to 100,000 lux |
| S/N ratio | 50 dB (Weight ON) |
| Back light compensation | ON/OFF |
| Electronic shutter speed | FCB-EX48E: 1/4 to 1/10000 sec. (20 steps) FCB-EX48EP: 1/3 to 1/10000 sec. (20 steps) |
| White balance | AUTO, ATW, Indoor, Outdoor, One Push WB, Manual WB, Outdoor Auto, Sodium Vapor Lamp (Fix/Auto) |
| Gain | Auto/Manual (−3 dB to +28 dB, 16 steps) Max. Gain Limit (6 dB to 28 dB, 12 steps) |

| | |
|--------------------------------------|--|
| 3D noise reduction | ON/OFF (level 5 to 1 / OFF, 6 steps) |
| Color Enhancement | ON/OFF |
| Aperture control | 16 steps |
| Preset | 6-POSITIONS |
| Serial interface | VISCA protocol (TTL/CMOS) 9.6 Kbps, 19.2 Kbps, 38.4 Kbps, Stop bit, 1/2 bit |
| Video Output | VBS: 1.0 Vp-p (Sync negative), Y/C Output Digital (ITU-R BT656 equiv.) Interlace |
| Storage temperature/Humidity | −20 °C to +60 °C (−4 °F to +140 °F)/ 20% to 95% |
| Operating temperature/Humidity | −5 °C to +60 °C (32 °F to +122 °F)/ 20% to 80% |
| Power requirements/Power consumption | 6 to 12 V DC/2.0W (3.1 W) |
| Weight | Approx. 230 g (8.1 oz.) |
| Dimensions | 50.0 × 57.5 × 88.5 mm (2 × 2 3/8 × 3 1/2 in.) (w/h/d) |

Design and specifications are subject to change without notice.

Digital Output Function

FCB-490E/P

| Operation Mode | Digital Output (ITU-R BT656 equiv.) |
|----------------|---|
| Interlace | FCB-EX490E/P: 60i/50i, clock rate: 28 MHz |
| Interlace WD | |
| Progressive | FCB-EX490E/P: 60p/50p, clock rate: 56 MHz |
| | FCB-EX490E/P: 60p/50p (30p/25p × 2), clock rate: 56 MHz |
| | FCB-EX490E/P: 30p/25p, clock rate: 28 MHz |
| Progressive WD | FCB-EX490E/P: 60p/50p (30p/25p × 2), clock rate: 56 MHz |
| | FCB-EX490E/P: 30p/25p, clock rate: 28 MHz |

Slow shutter is not available in the Interlace WD or Progressive WD mode.

FCB-48E/P

| Operation Mode | Digital Output (ITU-R BT656 equiv.) |
|----------------|--|
| Interlace | FCB-EX48E/P: 60i/50i, clock rate: 28 MHz |

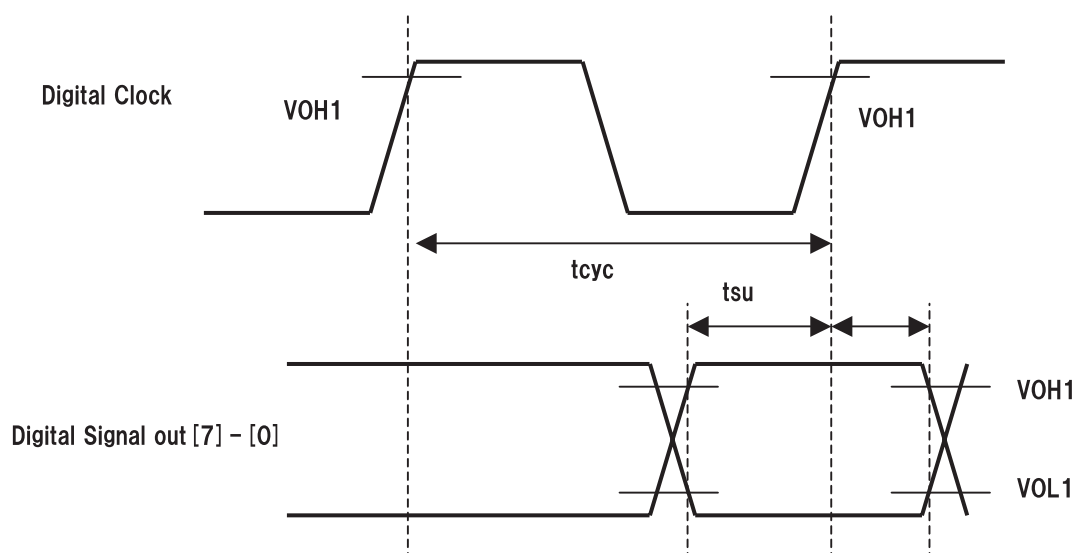
Digital Output Characteristics

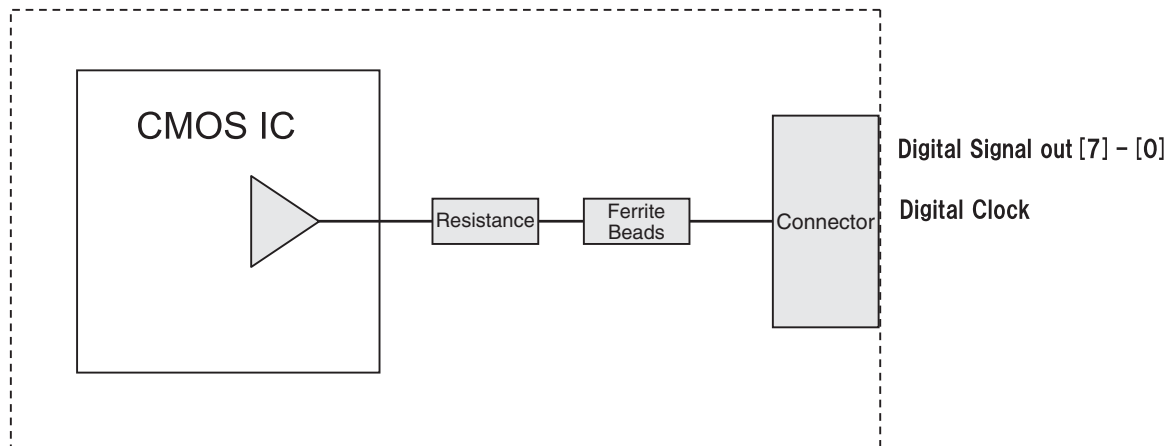
DC characteristics

| ITEM | | SIGN | Rating Value | | UNIT |
|----------------|---|------|--------------|-----|------|
| | | | MIN | MAX | |
| Output voltage | Digital Signal out [7] - [0] Digital Clock | VOH1 | 2.58 | | V |
| | | VOL1 | | 0.4 | V |

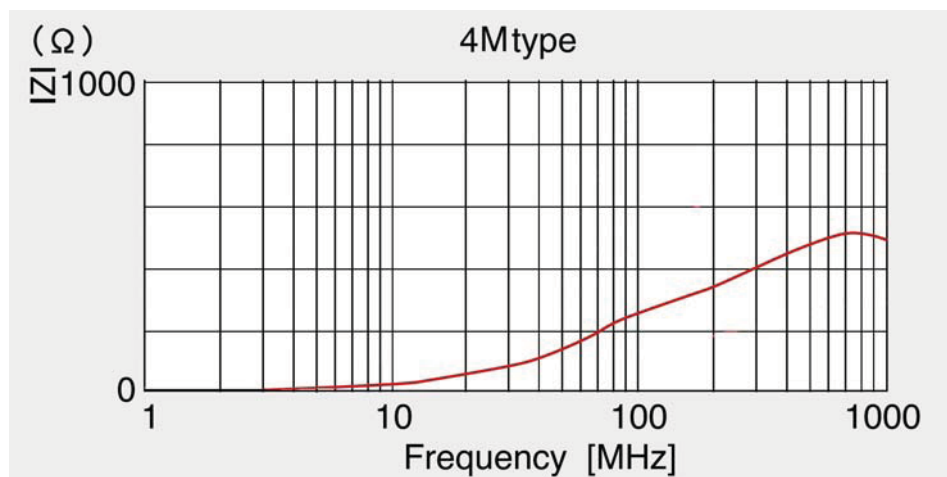
AC characteristics

| MODEL | MODE | ITEM | SIGN | Typ |
|--|-------------|------------------------|-----------|------|
| FCB-EX490E FCB-EX48E (Interlace mode only) | Interlace | Clock cycle period | tcyc (ns) | 35.2 |
| | | Data output setup time | tsu (ns) | 13.5 |
| | | Data output hold time | thd (ns) | 18.5 |
| | Progressive | Clock cycle period | tcyc (ns) | 17.6 |
| | | Data output setup time | tsu (ns) | 12.5 |
| | | Data output hold time | thd (ns) | 2.5 |
| FCB-EX490EP FCB-EX48EP (Interlace mode only) | Interlace | Clock cycle period | tcyc (ns) | 35.2 |
| | | Data output setup time | tsu (ns) | 14.6 |
| | | Data output hold time | thd (ns) | 18.5 |
| | Progressive | Clock cycle period | tcyc (ns) | 17.4 |
| | | Data output setup time | tsu (ns) | 5.5 |
| | | Data output hold time | thd (ns) | 9.5 |



FCB Interior – Digital Output**Ferrite Beads**

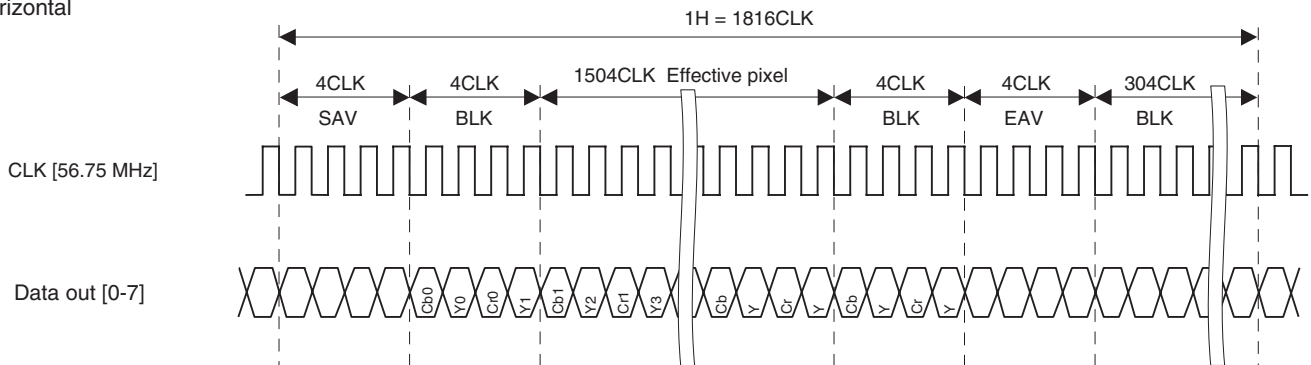
Product number: BK20104M241-T (Taiyo Yuden)

Impedance Frequency Characteristics (Reference)

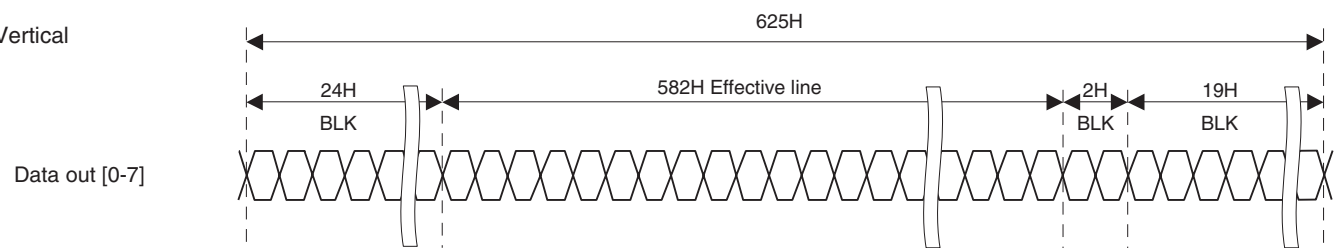
FCB-EX490EP

Digital Output Timing [50p mode]

Horizontal



Vertical

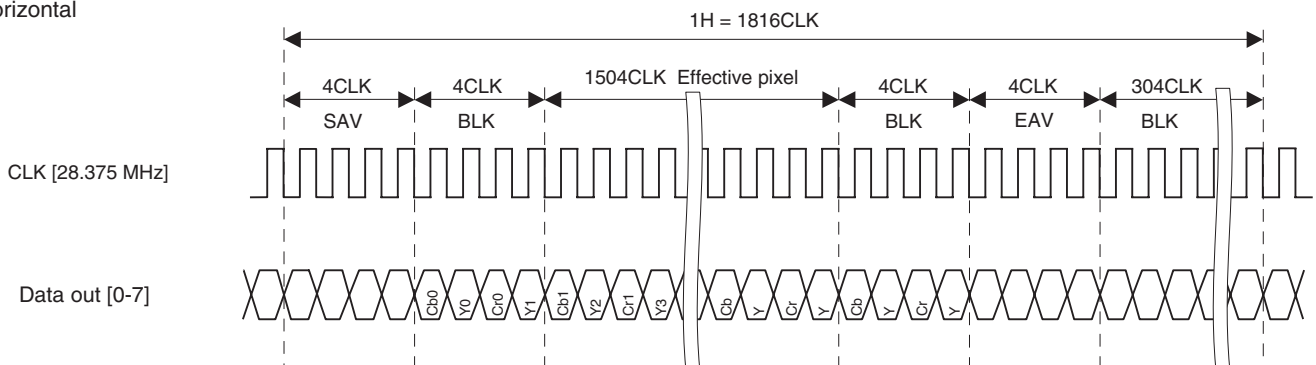


BLK : Black data (Y 10, Cb/Cr 80)

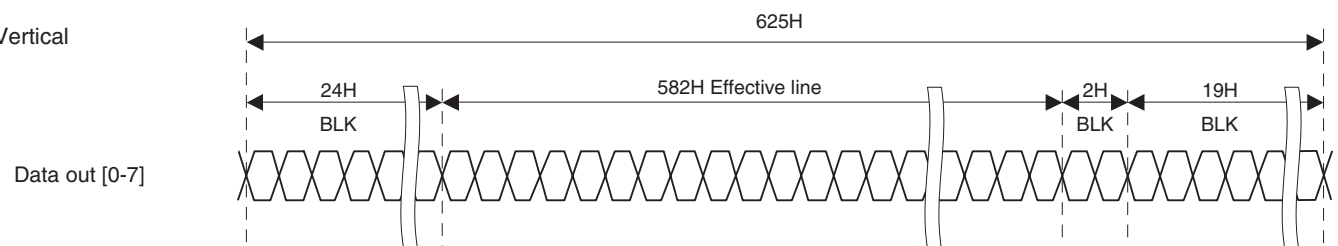
FCB-EX490EP

Digital Output Timing [25p mode]

Horizontal



Vertical

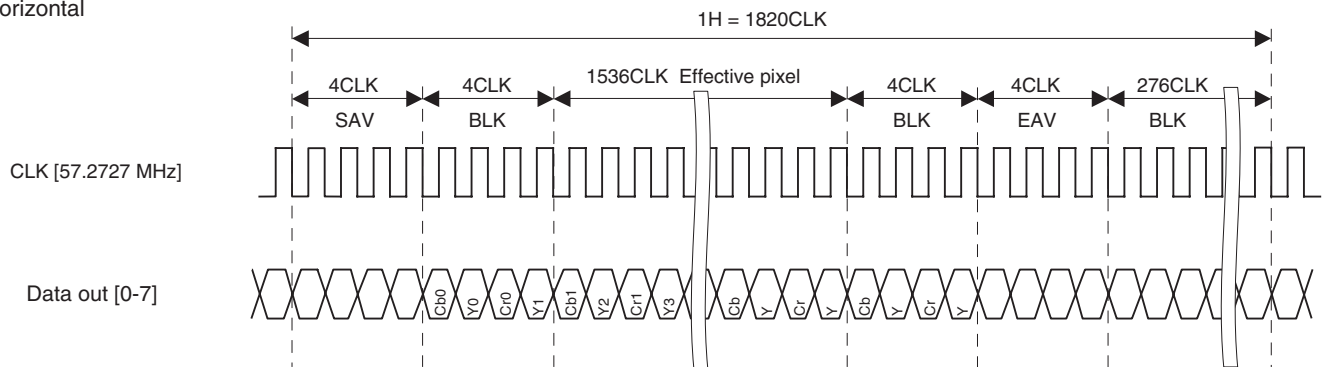


BLK : Black data (Y 10, Cb/Cr 80)

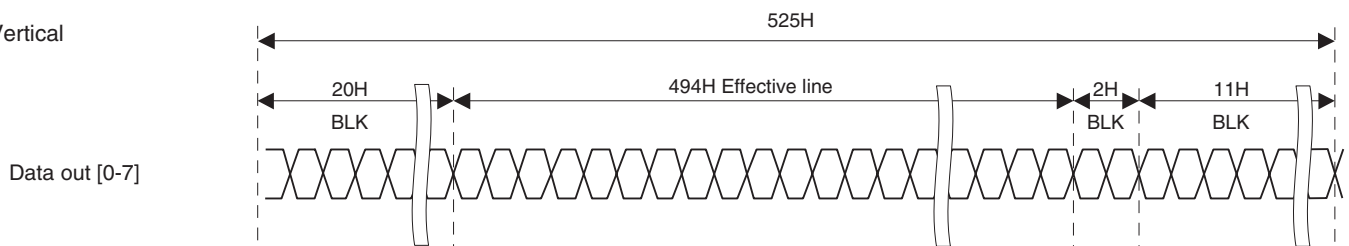
FCB-EX490E

Digital Output Timing [60p mode]

Horizontal



Vertical

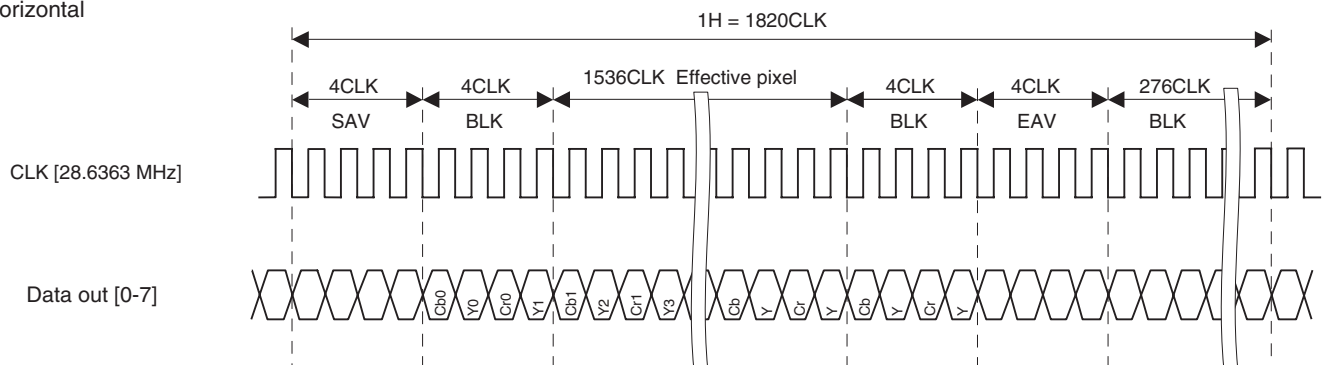


BLK : Black data (Y 10, Cb/Cr 80)

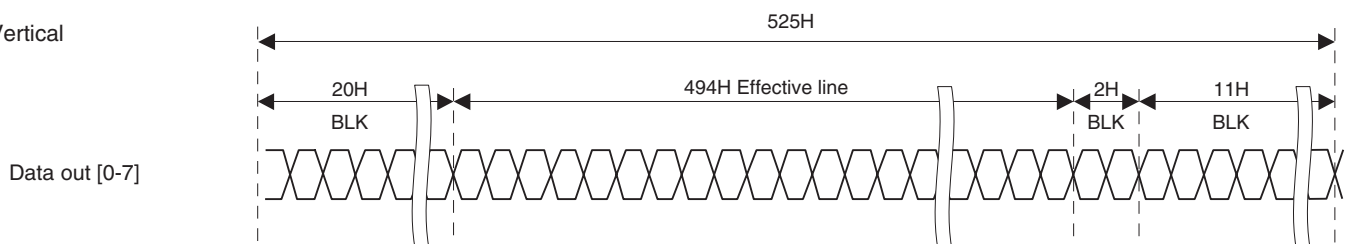
FCB-EX490E

Digital Output Timing [30p mode]

Horizontal



Vertical

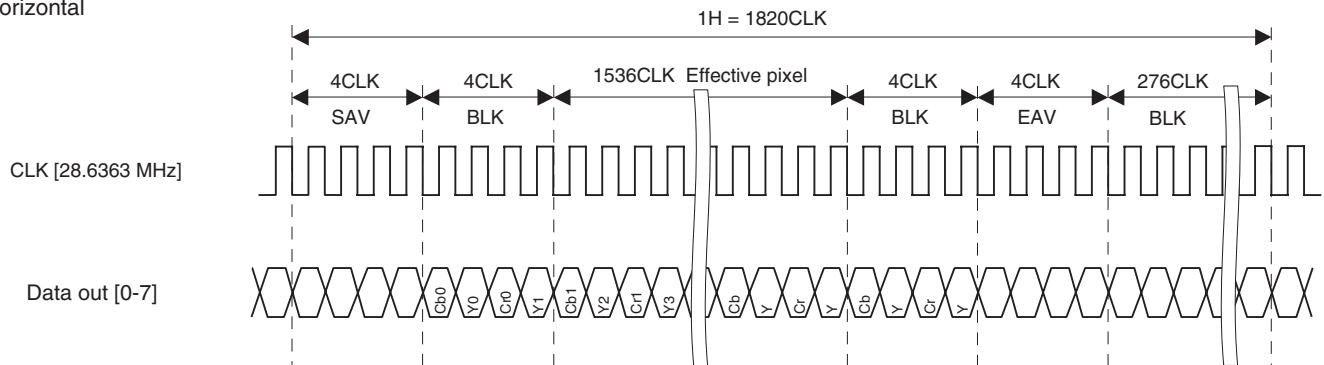


BLK : Black data (Y 10, Cb/Cr 80)

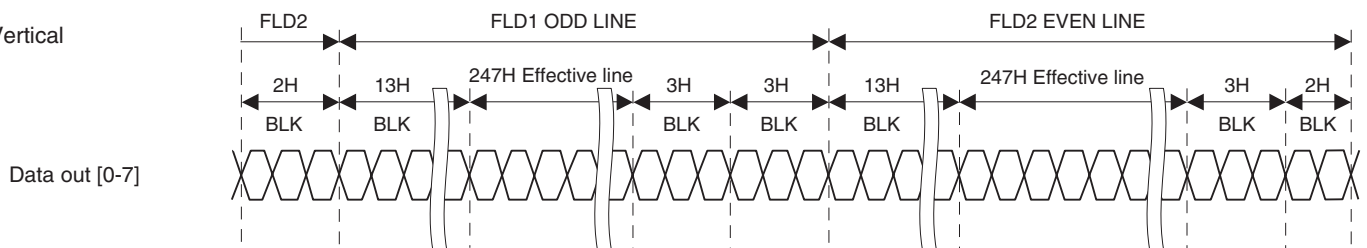
FCB-EX490E

Digital Output Timing [60i mode]

Horizontal



Vertical

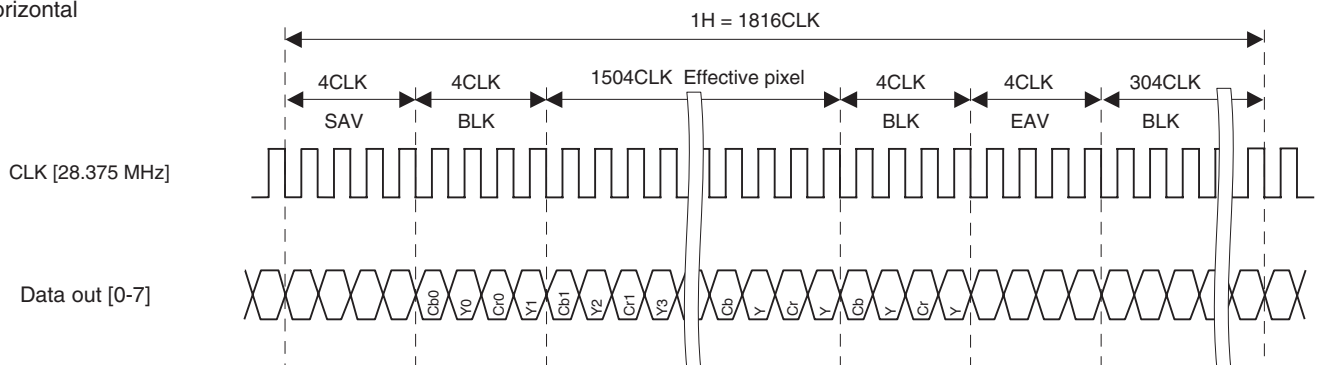


BLK : Black data (Y 10, Cb/Cr 80)

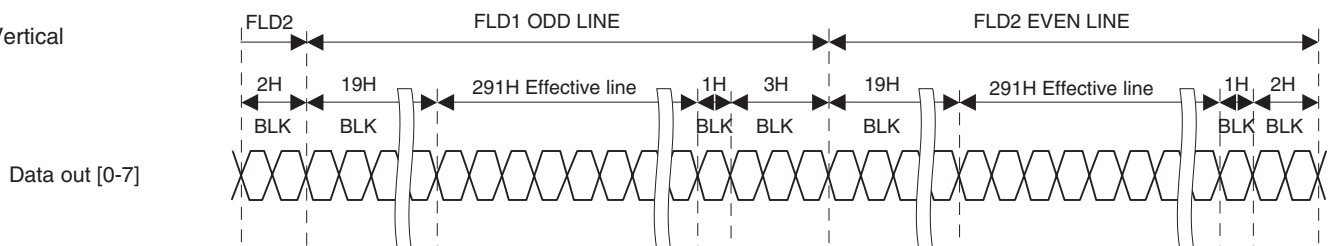
FCB-EX490EP

Digital Output Timing [50i mode]

Horizontal



Vertical

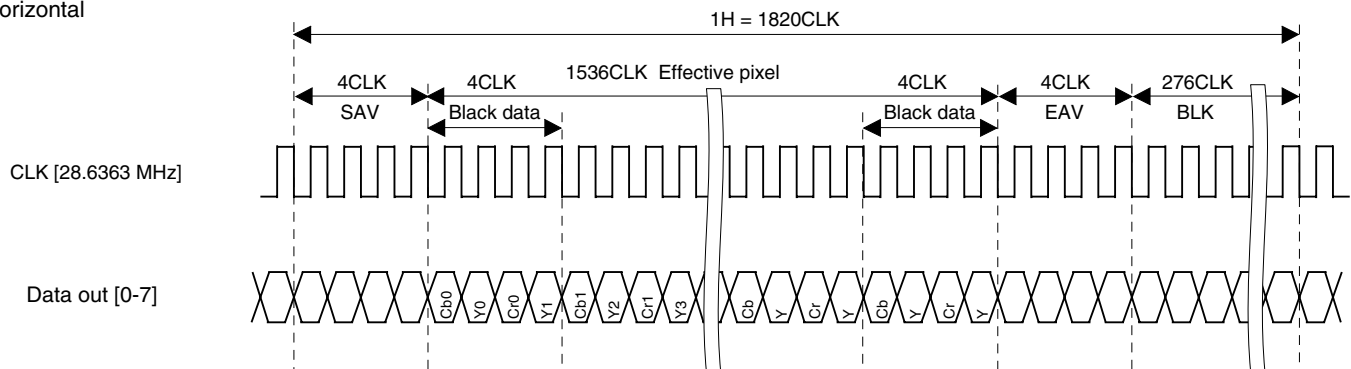


BLK : Black data (Y 10, Cb/Cr 80)

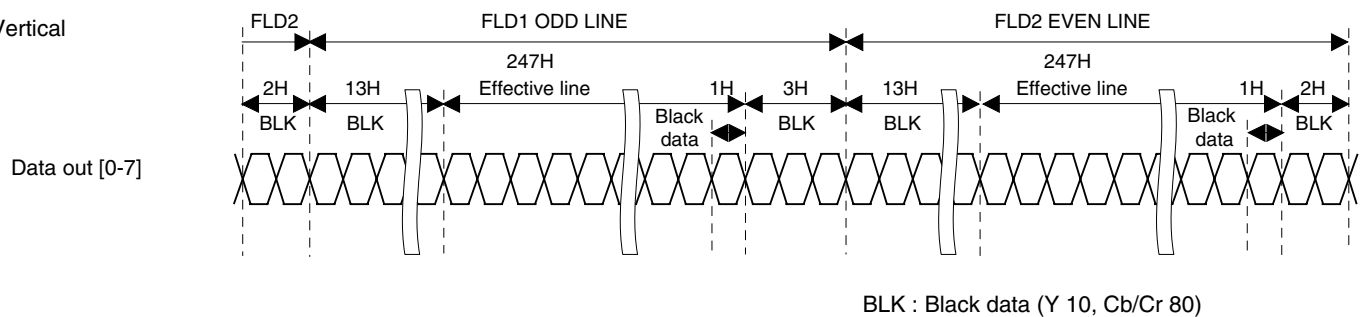
FCB-EX48E

Digital Output Timing [60i mode]

Horizontal



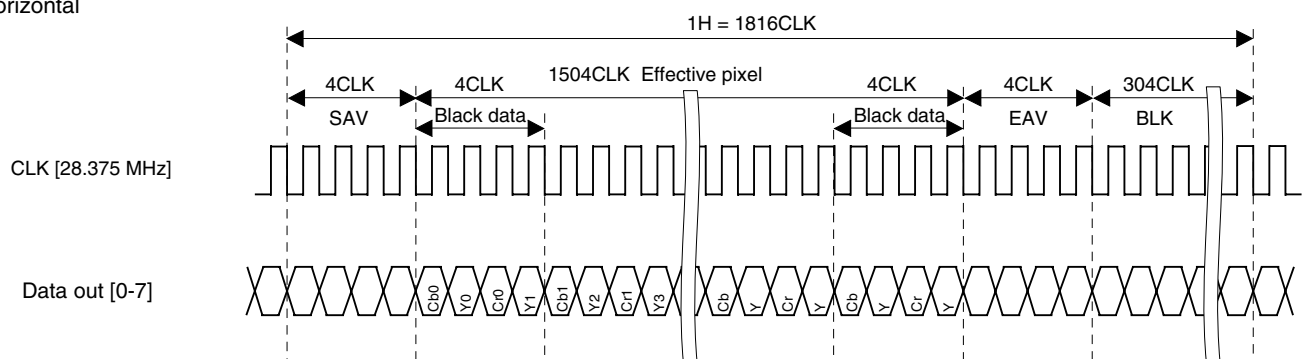
Vertical



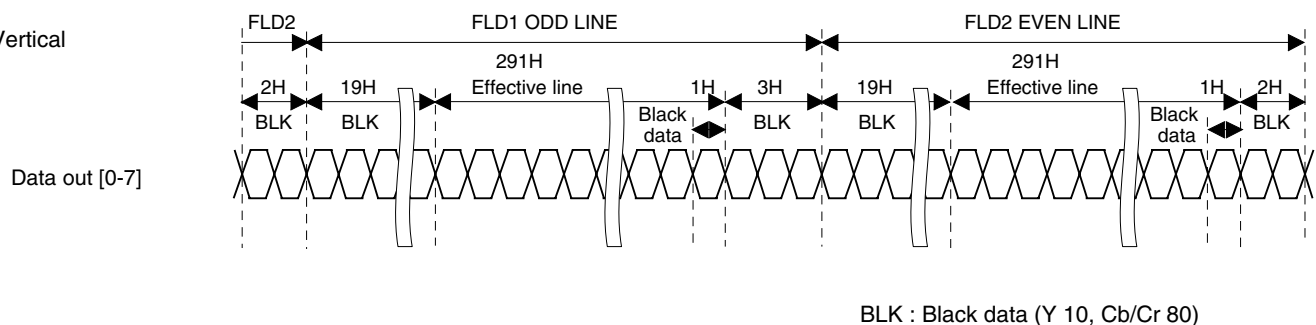
FCB-EX48EP

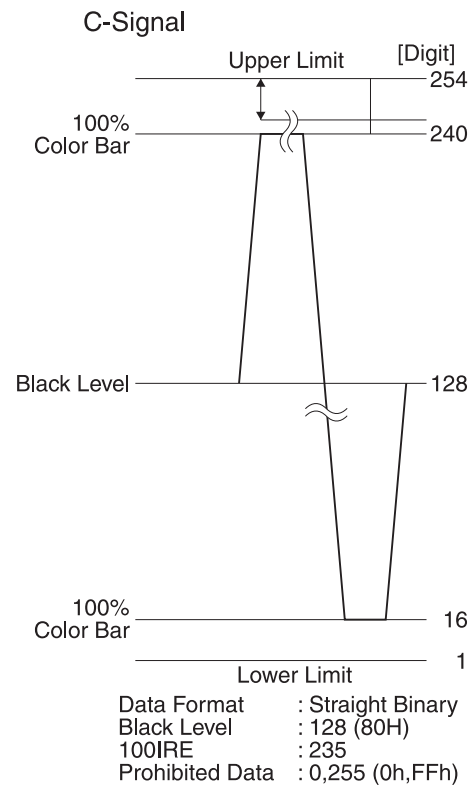
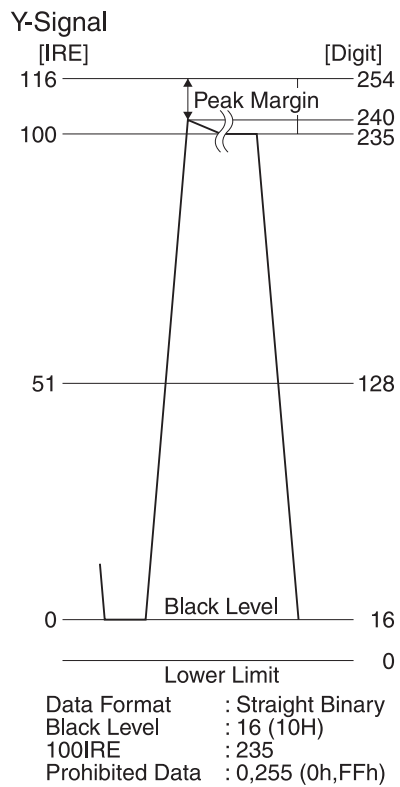
Digital Output Timing [50i mode]

Horizontal



Vertical

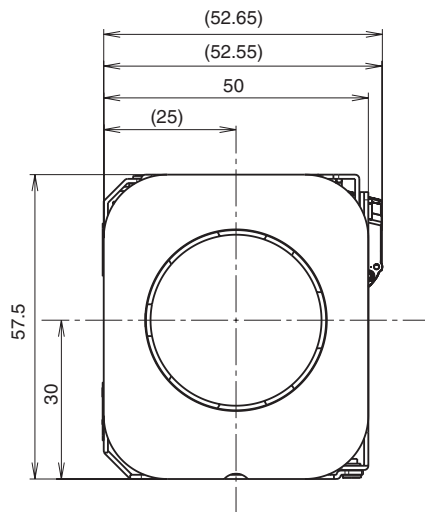


DIGITAL Image Output Y, Cr, Cb 4:2:2 FORMAT

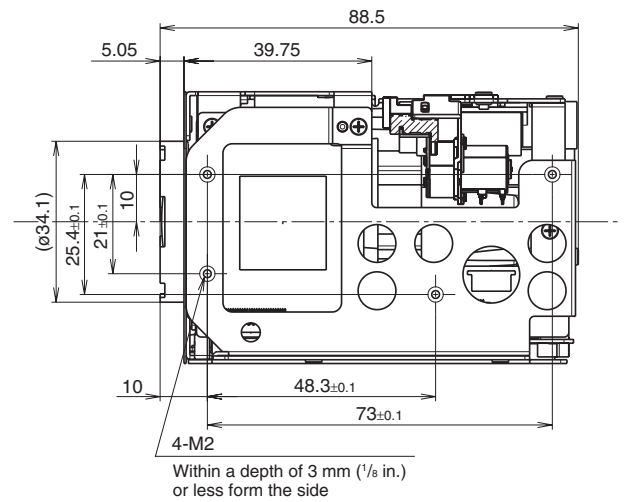
Dimensions

FCB-EX490E/P

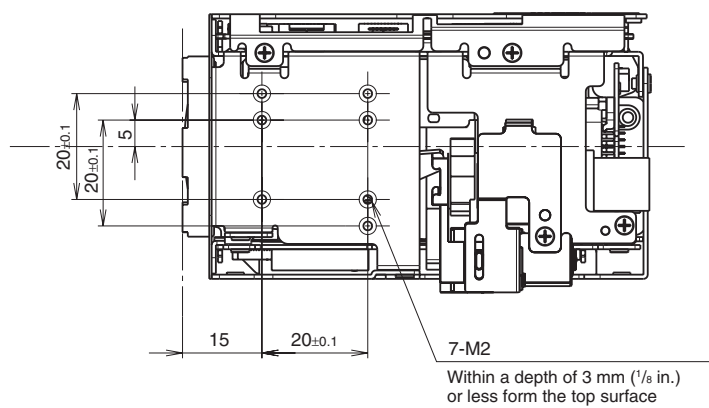
Front



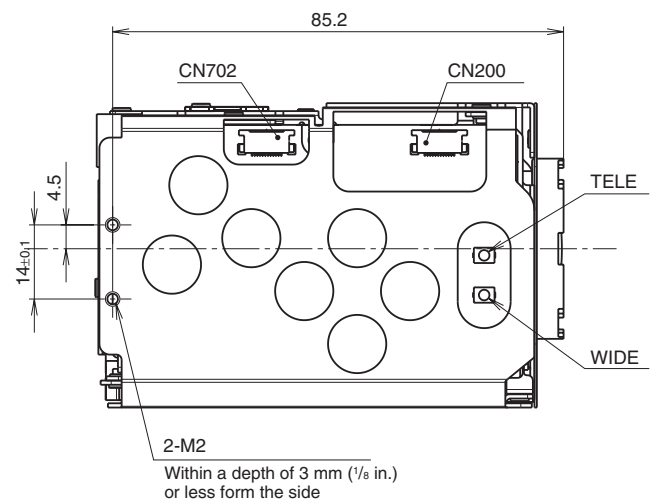
Right side



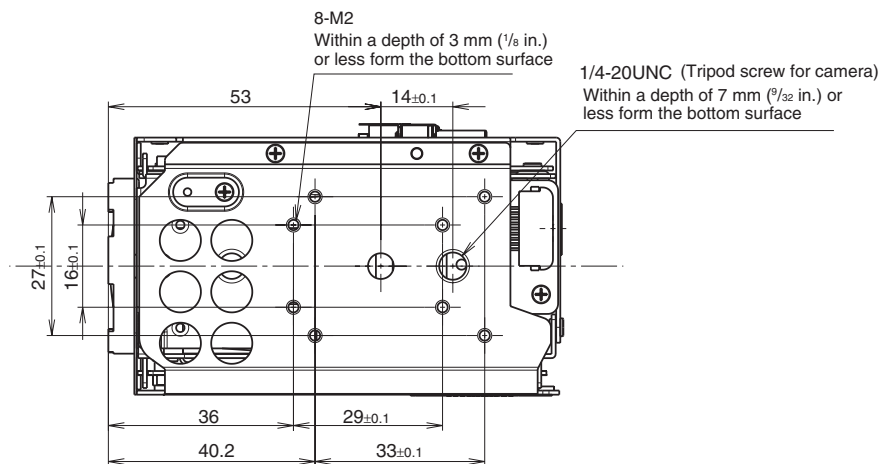
Top



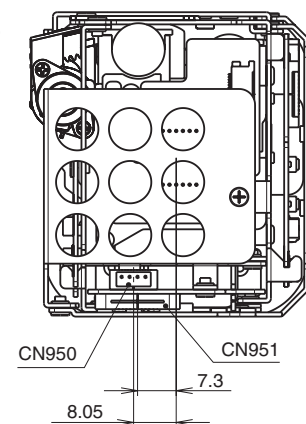
Left side



Bottom



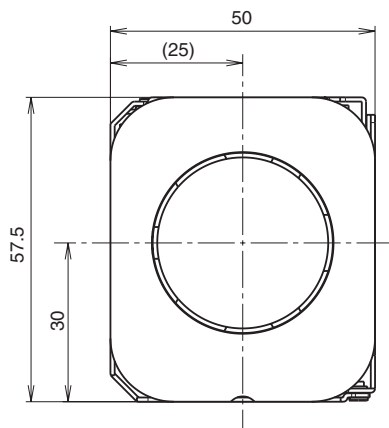
Back



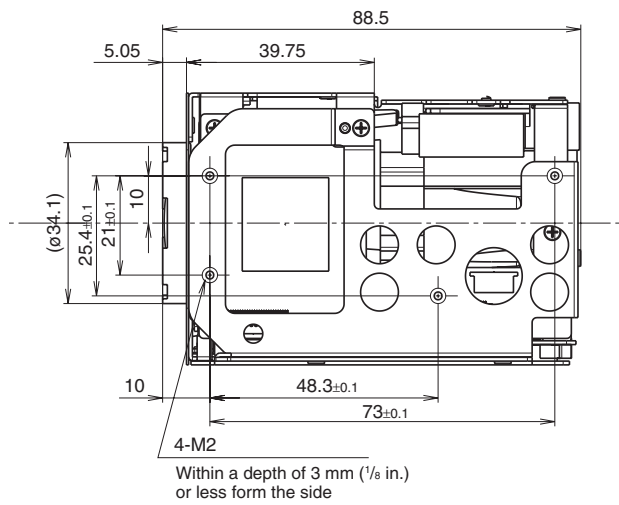
Unit: mm (inches)

Dimensions FCB-EX48E/P

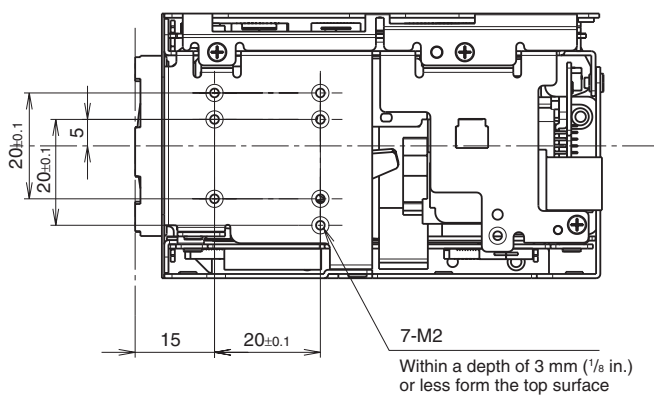
Front



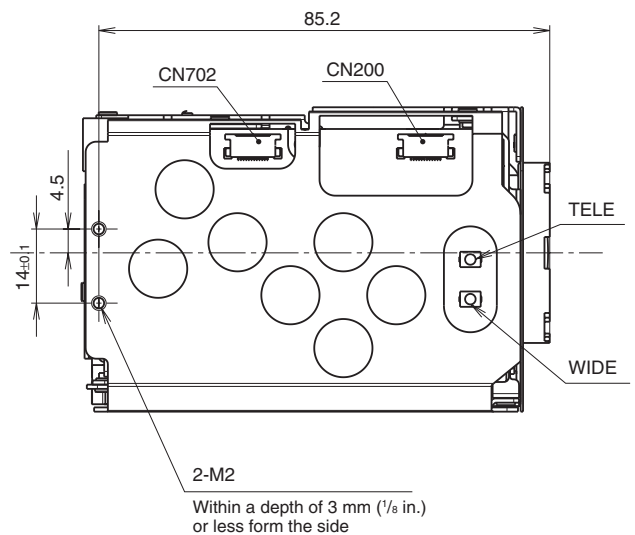
Right side



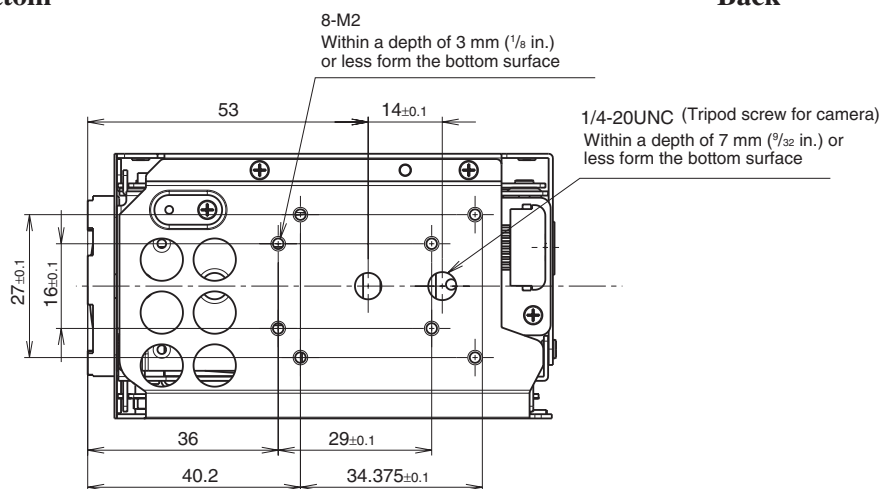
Top



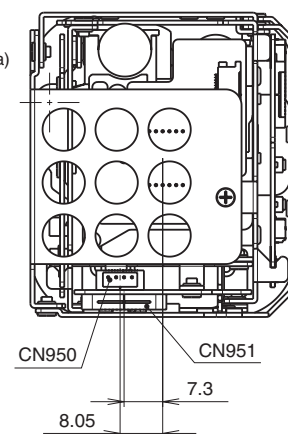
Left side



Bottom

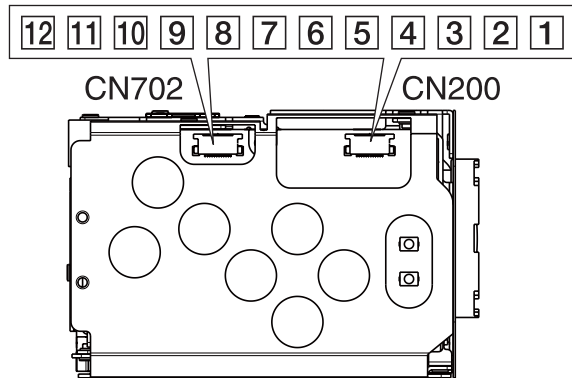
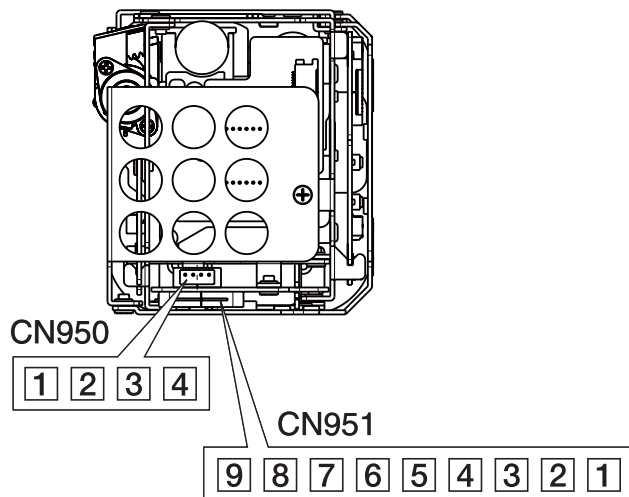


Back



Unit: mm (inches)

Pin assignment



CN950

J.S.T. Mfg Co. S4B-ZR-SM4A-TF(LF)

| Pin No. | Name | Level |
|---------|--------------------|-------|
| 1 | Y_Out | |
| 2 | GND (for Y signal) | |
| 3 | C_Out | |
| 4 | GND (for C signal) | |

CN951

KYOCERA ELCO Co. 00 6200 509 130 000+

| Pin No. | Name | Level |
|---------|-------------------|---|
| 1 | RxD | CMOS 5 V (low: max 0.8 V, high: min 2.0 V) Read Data |
| 2 | TxD | CMOS 5 V (low: max 0.1 V, high: min 4.4 V) Send Data |
| 3 | GND (for RxD&TxD) | |
| 4 | DC IN | 9.0 V \pm 3 V |
| 5 | GND (for DC IN) | |
| 6 | VBS OUT | 1.0 V \pm 0.2 V |
| 7 | GND (for VBS OUT) | |
| 8 | V LOCK PULSE | External VD-Lock Pulse (EX.FV: Negative, 3 V _{p-p} 50% duty) |
| 9 | GND (VL PULSE) | |

Frequency: 60 Hz \pm 1 Hz (FCB-EX490E/48E)

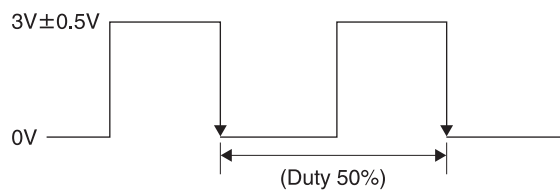
50 Hz \pm 1 Hz (FCB-EX490EP/48EP)

Amplitude: 3 V \pm 0.5 V square wave (50% duty)

CMOS level

V Phase Adjustment Range: 0° to 360° from V SYNC falling edge

Recommended Input Waveform



CN702

KYOCERA ELCO Co. 086222012101848+

| Pin No. | Name | Level |
|---------|---------|-------|
| 1 | GND | |
| 2 | GND | |
| 3 | KEY AD0 | |
| 4 | KEY AD1 | |
| 5 | KEY AD2 | |
| 6 | KEY AD3 | |
| 7 | KEY AD4 | |
| 8 | KEY AD5 | |
| 9 | KEY AD6 | |
| 10 | KEY AD7 | |
| 11 | NC | |
| 12 | Strobe | |

CN200

KYOCERA ELCO Co. 086222012101848+

| Pin No. | Name | Level |
|---------|---------------|--------------|
| 1 | GND | |
| 2 | Digital Out 0 | 0 - 3.3 Vp-p |
| 3 | Digital Out 1 | 0 - 3.3 Vp-p |
| 4 | Digital Out 2 | 0 - 3.3 Vp-p |
| 5 | Digital Out 3 | 0 - 3.3 Vp-p |
| 6 | Digital Out 4 | 0 - 3.3 Vp-p |
| 7 | Digital Out 5 | 0 - 3.3 Vp-p |
| 8 | Digital Out 6 | 0 - 3.3 Vp-p |
| 9 | Digital Out 7 | 0 - 3.3 Vp-p |
| 10 | GND | |
| 11 | CLOCK | 0 - 3.3 Vp-p |
| 12 | GND | |

Note

Image noise may occur when using digital output. Take measures such as attaching a ferrite core to the FFC as needed. The recommended maximum FFC length is 150 mm.

Strobe signal specifications