

**SONY**

**COLOR CAMERA MODULE**

**FCB-EX48L/EX48LP**  
**FCB-EX480L/EX480LP**



*Technical*  
*Manual*

(Ver. 1.0) —English—

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## — OUTLINE —

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The FCB-EX48L/48LP and FCB-EX480L/480LP are enhanced versions of the FCB-EX47L/47LP and FCB-EX470L/470LP. They are color camera modules which incorporate an 18× optical zoom lens, a 12× digital zoom 1/4 type Super HAD CCD™ and an external sync function.

With a field memory, the FCB-EX48L/48LP and FCB-EX480L/480LP can, in addition to a normal video mode, continuously output a still picture, achieve slow shutter speeds with increased sensitivity, mirror inversion and allow various 'Picture Effects' and 'Digital Effects', due to a newly developed Digital Signal Processor.

With the use of slow shutter and ICR (IR Cut filter Removable) functions, the FCB-EX480L/EX480LP achieves near-infrared sensitivity of 0.01 lux, which enables the cameras to display clear, recognizable images at night.

All models have a position preset function to save and recall up to 6 shooting conditions, and extensive control is possible.

\* "Super HAD CCD™" is a trademark of Sony Corporation.

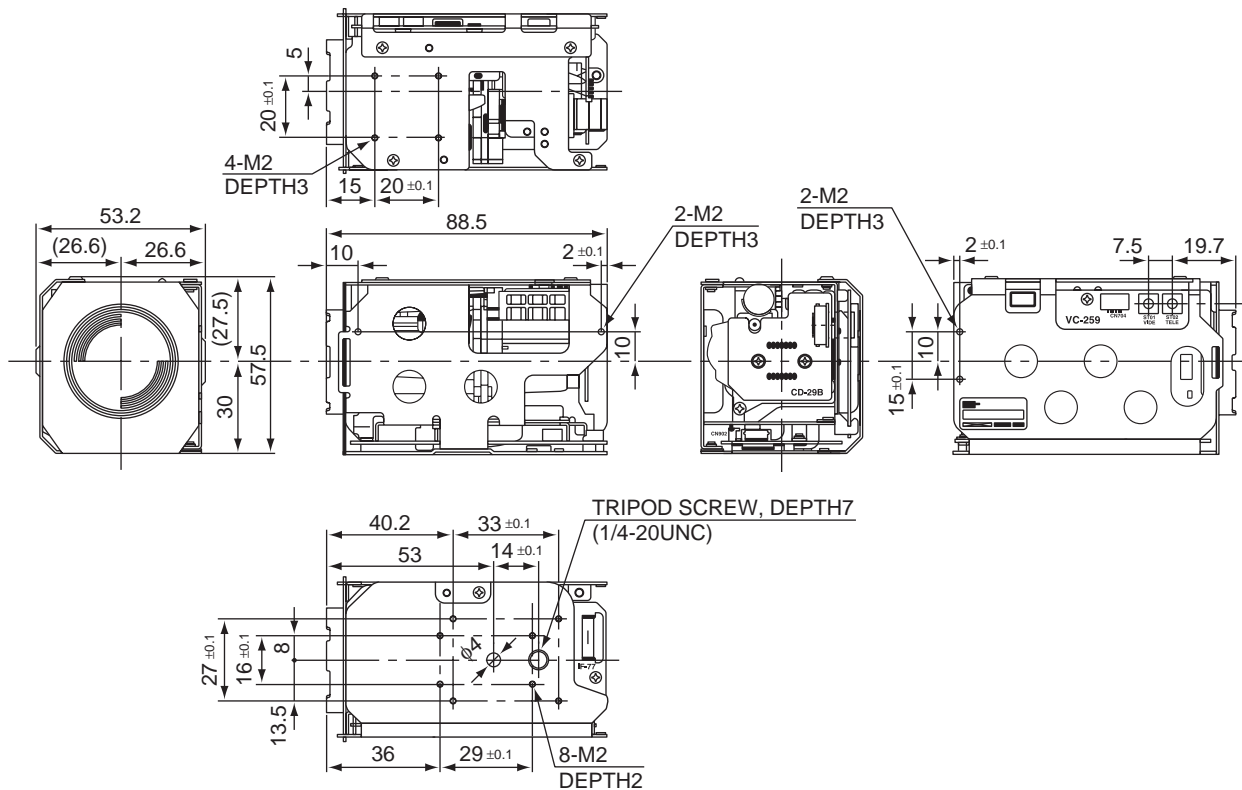
# SPECIFICATIONS

|                            | FCB-EX48L  | FCB-EX480L   | FCB-EX48LP   | FCB-EX480LP  |
|----------------------------|--|--|--|--|
| Image Sensor               | 1/4 type IT CCD  |  |  |  |
| Number of Effective Pixels | 768 (H) × 494 (V)  |  | 752 (H) × 582 (V)  |  |
| Horizontal Resolution      | more than 470 TV lines   |  | more than 460 TV lines                                     |  |
| Lens                       | 18× zoom f = 4.1 to 73.8 mm (F1.4 to F3.0)   |  |  |  |
| Digital Zoom               | 12× (216× with optical zoom)   |  |  |  |
| Horizontal Angle of View   | approx. 48 degree (wide end), approx. 2.7 degree (tele end)  |  |  |  |
| Min. Object Distance       | 10 mm (wide end), 800 mm (tele end)  |  |  |  |
| Sync. System               | Internal/External (V-Lock)   |  |  |  |
| Min. Illumination (typ.)   | 2.0 lx (F1.4, normal shutter speed)<br>0.15 lx (F1.4, 1/4s slow shutter)<br>0.1 lx (F1.4, IR cut filter: off, normal shutter speed: FCB-EX480L/EX480LP only)<br>0.01 lx (F1.4, IR cut filter: off, 1/4s slow shutter: FCB-EX480L/EX480LP only) |  |  |  |
| S/N Ratio                  | more than 50 dB  |  |  |  |
| Electronic Shutter         | 1/4 to 1/10,000s<br>20 steps   |  | 1/3 to 1/10,000s<br>20 steps                               |  |
| White Balance              | Auto, ATW, Indoor, Outdoor, One Push WB, Manual WB   |  |  |  |
| Gain                       | Auto/Manual (-3 to +18 dB, 3 dB steps)   |  |  |  |
| AE Control                 | Auto, Manual, Priority mode, Bright, EV compensation, Back light compensation  |  |  |  |
| EV Compensation            | -10.5 to +10.5 dB (1.5 dB steps)   |  |  |  |
| Back Light Compensation    | On/Off   |  |  |  |
| On Screen Display          | Mode display, Clock (Day/Time) display, Title display  |  |  |  |
| Flicker Cancel             | Auto   |  | —  |  |
| Focusing System            | Auto (Sensitivity: H, L), One Push AF, Manual, Infinity  |  |  |  |
| Picture/Digital Effect     | Pastel, Neg. Art, Sepia, Black & White, Solarize, Mosaic, Slim, Stretch, Still, Flash, Lumi, Trail   |  |  |  |
| Camera Operation Switch    | Zoom tele, Zoom wide   |  |  |  |
| Video Output               | VBS: 1.0 Vp-p (Sync Negative)  |  |  |  |
| Camera Control Interface   | VISCA™ (TTL signal level)  |  |  |  |
| Storage Temp.              | -20 to +60°C   |  |  |  |
| Operating Temp.            | 0 to +50°C   |  |  |  |
| Power Consumption          | 2.0 W typ. (inactive motors), 3.2 W typ. (active motors)/DC 6 to 12 V typ.   |  |  |  |
| Weight                     | approx.<br>215 g (7.6 oz)  | approx.<br>225 g (7.9 oz)                                  | approx.<br>215 g (7.6 oz)                                  | approx.<br>225 g (7.9 oz)                                  |
| Dimensions<br>(W × H × D)  | 53.2 × 57.5 × 88.5 mm<br>(2 1/8 × 2 3/8 × 3 1/2<br>inches)   | 53.6 × 57.5 × 88.5 mm<br>(2 1/8 × 2 3/8 × 3 1/2<br>inches) | 53.2 × 57.5 × 88.5 mm<br>(2 1/8 × 2 3/8 × 3 1/2<br>inches) | 53.6 × 57.5 × 88.5 mm<br>(2 1/8 × 2 3/8 × 3 1/2<br>inches) |

\* “VISCA™” is a trademark of Sony Corporation.

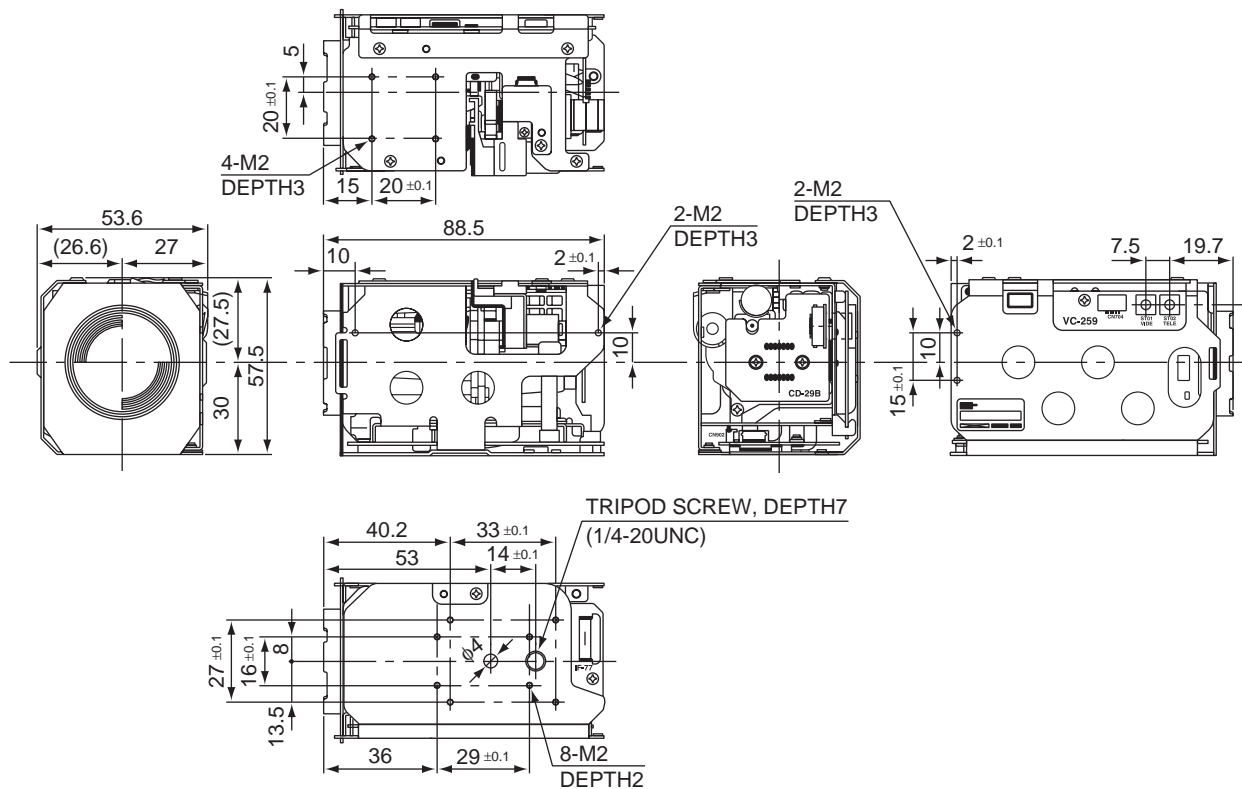
# DIMENSIONS

## FCB-EX48L/EX48LP



Unit: mm

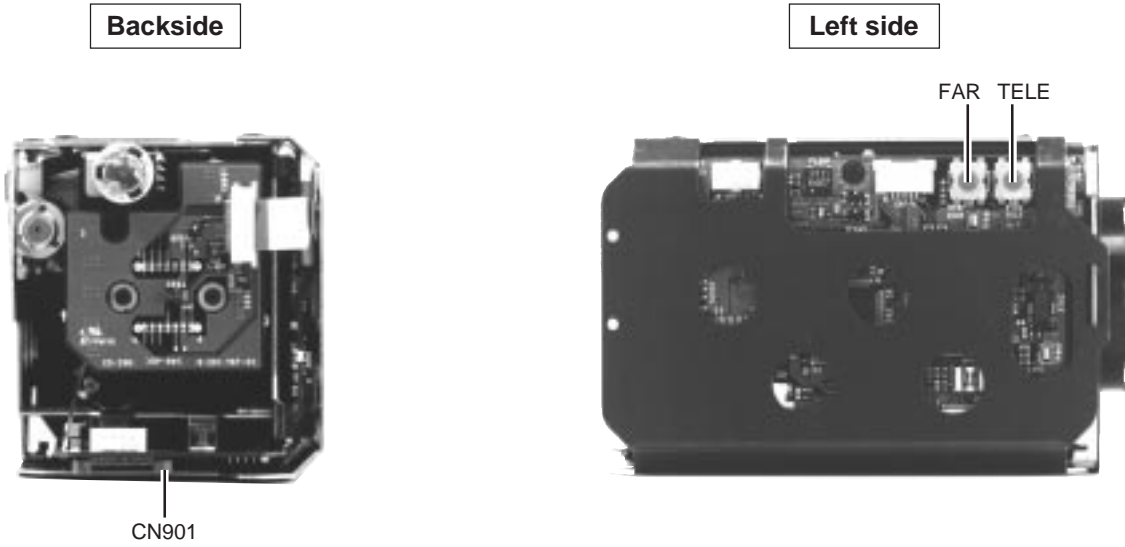
## FCB-EX480L/EX480LP



Unit: mm

# PIN ASSIGNMENT

## Connector Position and Pin Assignment



● Pin assignment (9 pins)  
CN901

| Pin No. | Name                | Level  |
|---------|---------------------|--|
| 1       | RXD IN              | CMOS 5 V (low: max 0.8 V, high: min 2.0 V)*                      |
| 2       | TXD OUT             | CMOS 5 V (low: max 0.1 V, high: min 4.4 V)*                      |
| 3       | GND (for RXD & TXD) |  |
| 4       | DC IN               | 9.0 ± 3 V  |
| 5       | GND (for DC IN)     |  |
| 6       | VBS OUT             | 1.0 ± 0.2 V  |
| 7       | GND (for VBS OUT)   |  |
| 8       | V LOCK PULSE        | External VD-Lock Pulse<br>3 V ± 0.5 V <sub>p-p</sub> , 60 ± 1 Hz |
| 9       | GND (VL PULSE)      |  |

Connector: PG-FPC9SM-T (ELCO)

Cable : Sumicard (FFC, 9 pins, 1.0 mm pitch)

\* When controlling from a PC, the PC must be changed from RS-232C to CMOS.  
Camera ↔ System connection cable not included.

# FUNCTIONS

## Synchronization Format

Synchronization format consists of internal and external sync, and can be switched using VISCA commands.

## Internal Synchronization

This synchronization signal is created by the camera's internal clock.

NTSC : 28.636363 MHz

PAL : 28.375 MHz

## External Sync (V-Lock Sync)

The camera may be synchronized with an external V-Lock pulse TTL level signal input. This signal must be input on CN451 pin 1 (GND pin 2), frequency must be  $60 \text{ Hz} \pm 1 \text{ Hz}$  (NTSC models) or  $50 \text{ Hz} \pm 1 \text{ Hz}$  (PAL models) and external synchronization mode must be selected by VISCA control. V-phase of the camera can be adjusted by VISCA control within  $\pm 90$  degrees referred to V-Lock pulse falling edge.

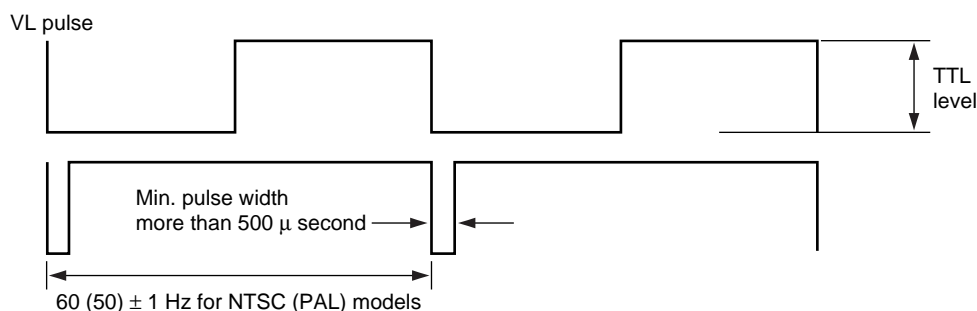
The minimum adjustment step is about 1.29 (1.26) degree for NTSC (PAL) models.

**NOTE** : As the V-Lock sync is a simple sync method and different from the VBS genlock, color signals cannot be synchronized.

### ◇ V-Lock sync

Making use of the fact that the V-Lock synchronization has more or less the same commercial power supply frequency (60 Hz) as the V period of the video signal (59.94 Hz, vertical sync signal), V-Lock pulses (VL-PULSE) synchronized with the commercial power supply are made and used as the external sync input signal of the camera.

The V-Lock sync is constantly automatically adjusted inside the camera so that the sync signal of the camera synchronizes with the VL-PULSE. (Note: Detection of odd or even fields cannot be specified.)



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## FUNCTIONS

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### Zoom

The FCB-EX48L/48LP and FCB-EX480L/480LP use an 18× zoom lens as well as a 12× digital zoom.

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

The horizontal angle of view is approximately 48° (wide end) to 2.7° (tele end).

The digital zoom is automatically switched ON at the tele end of 18× optical zoom range, with a progressive effect from 1 to 12, giving a total maximum 216× zoom ratio. Digital zoom increases the picture element size and reduces the resolution.

Extended control of zoom:

- Direct zoom position
- Zoom speed selection (8 speeds)
- Digital zoom can switched ON/OFF



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## FUNCTIONS

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### ■ Focus

Focus consists of the following modes, all of which are set by VISCA commands.

- (1) **Auto Focus Mode**
- (2) **Manual Focus Mode**
- (3) **One Push Trigger Mode**
- (4) **Infinity Mode**
- (5) **Near Limit Setting Mode**

#### (1) **Auto Focus Mode**

Auto Focus (AF) automatically adjusts the focus position to the high frequency content of the picture in a center measurement area, considering the high luminance and strong contrast components. The minimum focus distance is 10 mm at the optical wide end and 800 mm at the optical tele end, and is independent of digital zoom.

AF sensitivity can be set to HIGH and LOW.

- HIGH AF : High reaction speed of AF. Use this mode when shooting fast moving objects. This is recommended as the optimum mode for normal NON-CONTINUOUS use.
- LOW AF : Better focus stability. In low luminance conditions, AF stops operation even when the brightest changes, enabling stable images.

#### (2) **Manual Focus Mode**

Manual Focus includes standard speed mode and variable speed mode. Standard speed mode moves at a fixed speed. Variable speed mode has eight steps.

#### (3) **One Push Trigger Mode**

After a trigger command is sent, the lens focuses on the subject and holds that focus setting until the next trigger is sent. Settings are made with VISCA commands.

#### (4) **Infinity Mode**

Camera focuses to infinity.

#### (5) **Near Limit Setting Mode**

Setting from infinity to 1 cm is possible.

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## FUNCTIONS

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### ■ White Balance

- Auto : Auto Tracing White Balance with limitations on R and B gain (3200 to 6000 K), to avoid fixing single color scenes as 'white'
- ATW : Auto Tracing White Balance (2000 to 10000 K)
- Indoor : 3200 K
- Outdoor : 5800 K
- One Push WB : One Push White Balance\*
- Manual WB : Manual control of R and B gain, 256 steps each

\* The One Push White Balance mode is a fixed white balance mode that may be automatically readjusted only on 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.

Selecting the One Push White Balance mode recalls the white balance data computed at the latest One Push Trigger, if the camera has been left in the power ON state, or if the lithium backup battery has been switched ON in the charged condition.

## FUNCTIONS

### Automatic Exposure Mode

This mode is set to “Full Auto” at shipment. Altogether 9 modes including “Full Auto” can be set by VISCA commands.

- Full Auto : Auto Iris and Gain, Fixed Shutter (FCB-EX48L/480L: 1/60 sec., FCB-EX48LP/480LP: 1/50 sec.)
- Shutter Priority\*: Adjustable Shutter Speed, Auto Iris and Gain  
(1/4 or 1/3 to 1/10,000 sec., 20 steps, std. shutter 16 steps, slow shutter 4 steps)
- Iris Priority : Adjustable Iris (F1.4 to Close, 18 steps), Auto Gain and Shutter
- Gain Priority : Adjustable Gain (–3 dB to 18 dB, 18 steps), Auto Iris and Fixed Shutter
- Manual : Adjustable Shutter, Iris and Gain
- Bright : Adjustable Iris and Gain (Closed to F1.6, 17 steps at 0 dB: F1.4, 7 steps form 0 to 18 dB)
- Iris Auto : Adjustable Gain and Shutter
- Shutter Auto : Adjustable Iris and Gain
- Gain Auto : Adjustable Iris and Shutter

\* Flicker can be eliminated by setting the shutter to

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

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

#### ◇ AE – Shutter priority

The shutter settings are adjustable by the user to a total of 20 steps – 16 high speeds and 4 low speeds. The slow shutter is set, the speed can be 1/30s (1/25s), 1/15s (1/12s), 1/8s (1/6s), 1/4s (1/3s) for NTSC (PAL) models. The picture output is read at normal rate from the memory. The memory is updated at the low rate from the CCD. AF capability is low.

In the high speed mode, the shutter can be set up to 1/10000s.

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

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

## FUNCTIONS

### ◇ AE – Iris priority

The iris can be adjusted by the user in 18 steps between F1.4 and Close.

The gain and shutter 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 – Gain priority

The gain can be adjusted by the user in 8 steps between –3 dB and +18 dB.

The shutter speed is fixed and the iris is set automatically, according to the brightness of the subject.

| Data | Setting value |
|------|---------------|
| 07   | 18 dB         |
| 06   | 15 dB         |
| 05   | 12 dB         |
| 04   | 9 dB          |
| 03   | 6 dB          |
| 02   | 3 dB          |
| 01   | 0 dB          |
| 00   | –3 dB         |

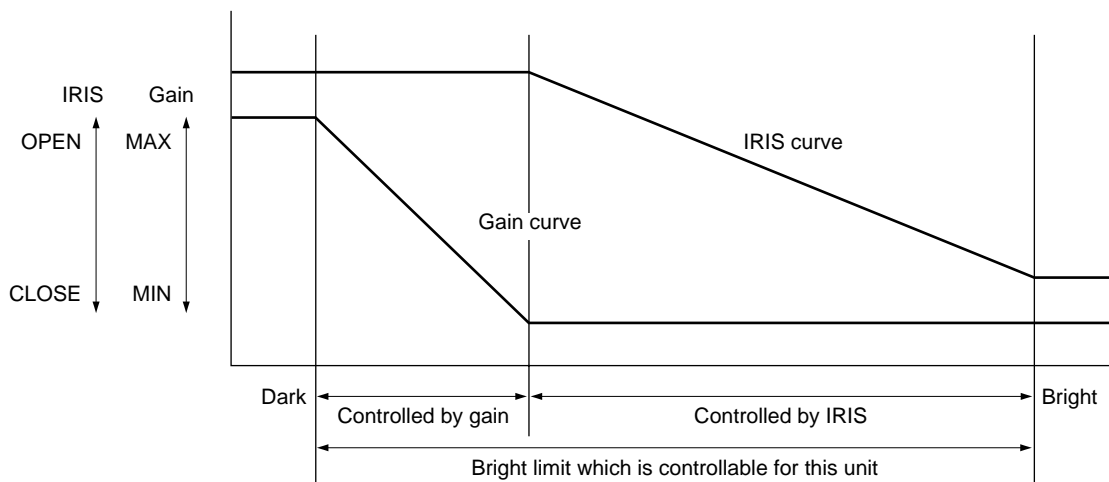
### ◇ AE – Manual

The shutter speed (20 steps), iris (18 steps) and gain (8 steps) can be adjusted by the user.

## FUNCTIONS

### ◇ AE – Bright

The bright control function provides control of brightness level in steps using gain and iris according to the chart below. Exposure is controlled by gain when illumination is dim and by iris when illumination is bright. When switching from the Automatic Exposure mode or AE Shutter Priority mode to the AE Bright mode, the latest setting before switching is used as the start value.



| Data | Iris | Gain  | Data | Iris  | Gain |
|------|------|-------|------|-------|------|
| 17   | F1.4 | 18 dB | 0B   | F4    | 0 dB |
| 16   | F1.4 | 15 dB | 0A   | F4.8  | 0 dB |
| 15   | F1.4 | 12 dB | 09   | F5.6  | 0 dB |
| 14   | F1.4 | 9 dB  | 08   | F6.8  | 0 dB |
| 13   | F1.4 | 6 dB  | 07   | F8    | 0 dB |
| 12   | F1.4 | 3 dB  | 06   | F9.6  | 0 dB |
| 11   | F1.4 | 0 dB  | 05   | F11   | 0 dB |
| 10   | F1.6 | 0 dB  | 04   | F14   | 0 dB |
| 0F   | F2   | 0 dB  | 03   | F16   | 0 dB |
| 0E   | F2.4 | 0 dB  | 02   | F19   | 0 dB |
| 0D   | F2.8 | 0 dB  | 01   | F22   | 0 dB |
| 0C   | F3.4 | 0 dB  | 00   | CLOSE | 0 dB |

When switching from the shutter priority automatic exposure mode to the bright mode, the bright mode control can be used while maintaining the shutter speed set in the shutter priority automatic exposure mode. When switched to the shutter priority automatic exposure mode, the automatic exposure is started at the maintained shutter speed (both iris and gain are automatic).

### ◇ AE – Shutter Auto

The iris and gain are adjusted by the user, and the shutter speed changes automatically according to the brightness of the subject. Slow shutter is disabled.

### ◇ AE – Iris Auto

The gain and shutter are adjusted by the user, and the iris changes automatically according to the brightness of the subject.

### ◇ AE – Gain Auto

The iris and shutter are adjusted by the user, and the gain changes automatically according to the brightness of the subject.

## FUNCTIONS

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

### Aperture Control

Aperture control is a function which adjusts the enhancement of the edges of objects in the picture. There are 16 steps of adjustment, starting from “no enhancement”. When shooting small characters, this control may help make 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.

### Slow Shutter

Slow shutter setting of up to 1/4s is possible.

### Slow Shutter (Auto/Manual)

In Auto Mode, when the illumination level of the subject drops, slow shutter operation is activated automatically.

AE Mode must be set to Full Auto beforehand.

Manual slow shutter is the factory setting.

## FUNCTIONS

### Title Display

The camera can be given a title containing up to 20 characters such as “ENTRANCE” or “LOBBY”. The position of the first character (horizontal, vertical) of the title, blinking state, and color can also be changed.

|           |                    |        |
|-----------|--------------------|--------|
| Vposition | 00 to 0A           |        |
| Hposition | 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   |

Table of character codes

|    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|
| 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  | β  | Ä  | ï  | Ö  | Ü  |
| 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 |
| Å  | \$ | ₣  | ¥  | DM | £  | ¢  | i  |
| 48 | 49 | 4a | 4b | 4c | 4d | 4e | 4f |
| φ  | ”  | :  | ’  | .  | ,  | /  | —  |

### 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.

### Picture Effect

It consists of the following functions.

- Pastel : Pastel Image
- Neg. Art : Negative/Positive Reversal
- Sepia : Sepia Image
- Black White : Monochrome Image
- Solarize : Enhanced Contrast
- Mosaic : Mosaic Image
- Slim : Vertical Stretch
- Stretch : Horizontal Stretch

## FUNCTIONS

### Digital Effect

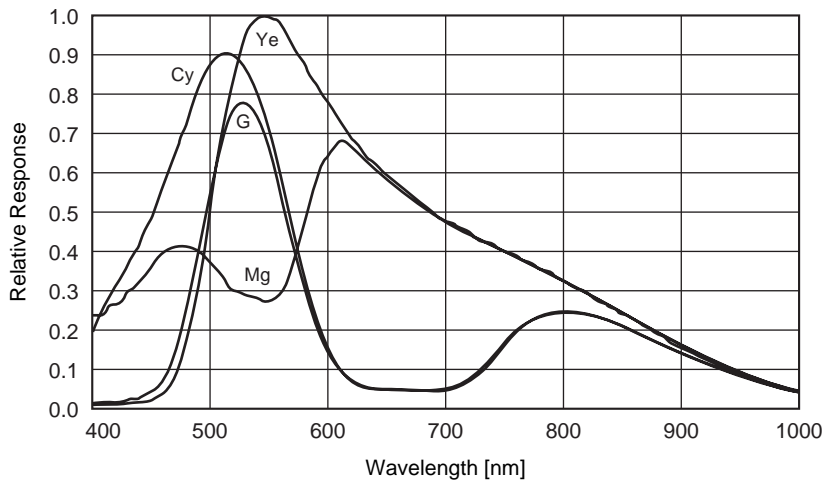
It consists of the following functions. They are all executed via the field memory.

- Still : Motion Image on Still Image
- Flash: Continuous Still Image
- Lumi : Motion Images on Binaried Still Image
- Trail : Afterimage Lag of Subject in Motion

Effect levels can be varied in steps ranging from 0 to 23. Level variation allows for the adjustment of flash intervals, image fade duration, and the duration of moving images superimposed onto a captured still image.

### ICR (IR Cut filter Removable) Shot (FCB-EX480L/EX480LP only)

The FCB-EX480L/EX480LP IR Cut filter can be switched ON/OFF via RS-232C remote control. If the IR Cut filter is turned off, the sensitivity increases to near-infrared levels. The combination of this function and slow shutter realizes a minimum illumination of 0.01 lux.



CCD Visible Spectral Response

### Others

#### ◇ Mirror image

The video output from the camera can be reversed left and right using this function.

#### ◇ Freeze

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

**NOTE** : After the command is sent, capture of the image occurs three to four fields later. Neither the number of EVEN/ODD fields, nor the interval from the time the trigger is sent can be specified.



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## FUNCTIONS

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### ◇ Memory (Position preset)

The Position Preset function allows 6 presets to be made. With this function the following preset parameters can be recalled instantly.

- Zoom position
- Electronic zoom On/Off
- Focus (Auto, Manual)
- Focus position
- AE mode
- Shutter control setting
- Bright control
- Iris control setting
- Gain control setting
- Exposure correction On/Off
- Exposure level
- Backlight compensation On/Off
- Slow shutter Auto/Manual
- White Balance Mode
- R/B Gain
- Aperture
- ICR shot On/Off

**NOTE** : External V-sync ON/OFF status and V-phase adjustment are not memorized.

### ◇ Date, Time display

When used together with the display command, the date and time will be displayed on the video monitor.  
Time difference is  $\pm 30$  seconds monthly.

### ◇ Backup

Backs up the contents memorized by the memory (position preset) function and the camera functions when the power is turned OFF.

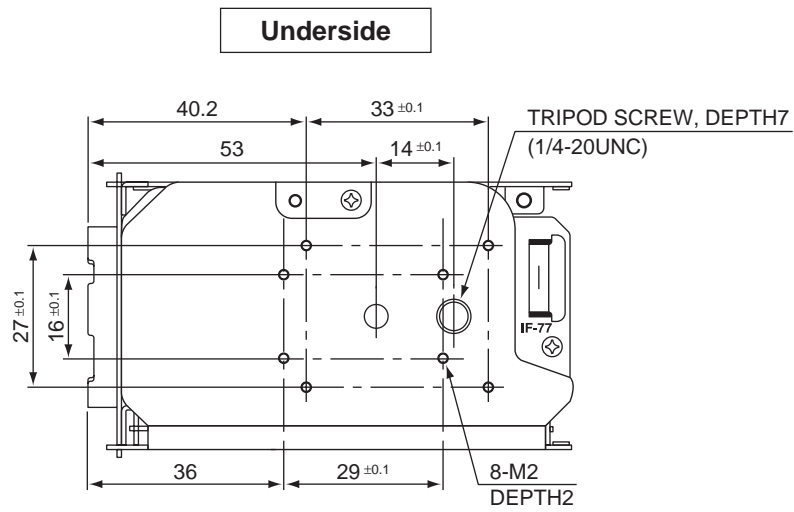
The backup switch can be switched as follows.

- INT side : Backs up for about 6 months when the internal battery is fully recharged.  
(Full recharge by waiting about 24 hours in power ON state.)
- OFF side : No back up. Set to this position at shipment.  
(This setting is set when the power is turned ON the next time.)
- EXT side : Backs up by the external power supply input to the CN705 connector.  
Power supply voltage: 3.1 V  $\pm$  0.2 V  
Current consumption : 6  $\mu$ A

**NOTE** : External V-sync ON/OFF status and V-phase adjustment are not backed up.

# INSTALLATION

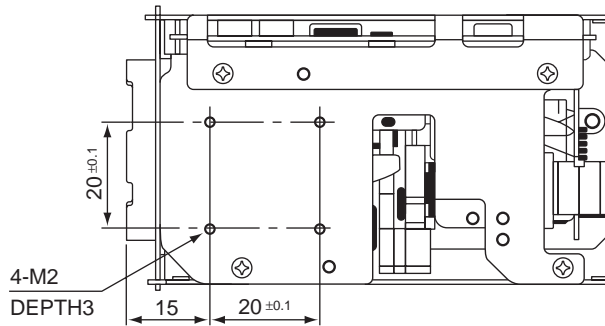
To fix the camera, 1/4-20UNC (for underside) or 4 of M2 (for underside or top side) is used.



Unit: mm

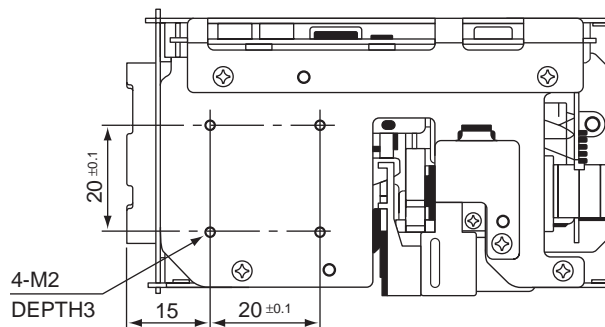
**Top side**

## FCB-EX48L/EX48LP



Unit: mm

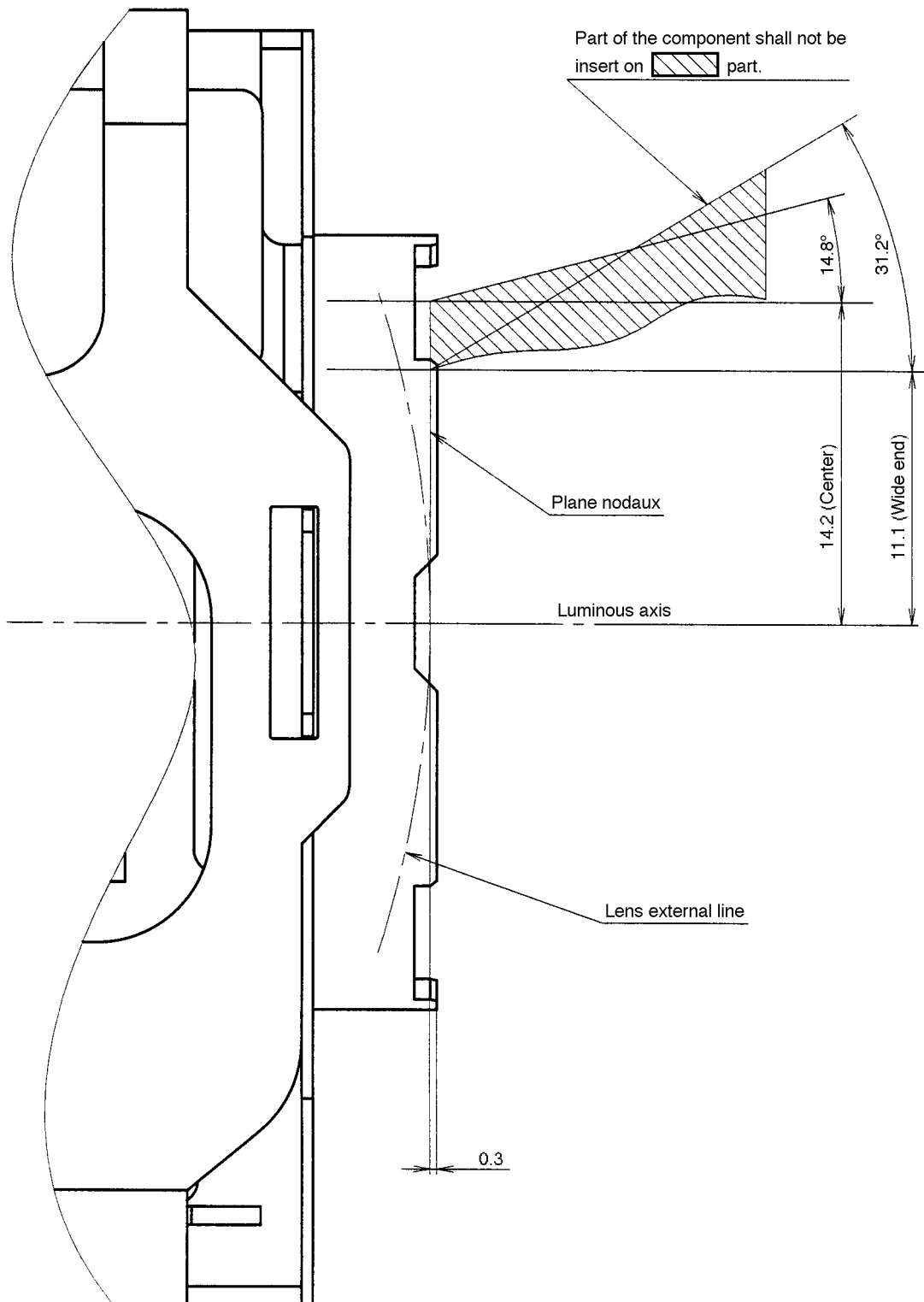
## FCB-EX480L/EX480LP



Unit: mm

# ECLIPSE

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



## HANDLING PRECAUTIONS

### ◇ Operation

Start the camera control software in your PC 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 source, 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 0°C to +50°C [32°F to 122°F])
- Damp or dusty places
- Where it is exposed to rain
- Where it is subject to strong vibration
- 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.

### ◇ Care of the unit

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

### ◇ Other

- Do not apply excessive force to the printed circuit board.
- Do not apply excessive voltage. (Use only the specified voltage.)
- Wear a wrist band when touching the printed circuit board. This will prevent static electricity that could damage the board. Use the supplied antistatic bag to package the board.

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

### ◇ Automatic focus

AutoFocus mode is not recommended for continuous 24-hour operation. For continuous 24-hour operation please use manual focus mode with One Push Trigger command.

### ◇ Software

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**NOTE** : This product contains a battery (secondary, lithium battery). After manufacturing the product, please provide, if necessary, a special note concerning the battery in user’s or service manual or separate documentation in compliance with the applicable laws or regulations of each country to which the product is exported.

## VIBRATIONAL 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.
- Using this vibrational specification test, the camera should operated properly.

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

### ◇ Shock test specifics

- Shock speed: 686 m/s<sup>2</sup> (70 G)
  - \* Test conducted on all six sides
  - \* Shock is applied in a single direction to each side.

## INITIAL VALUE AND BACKUP

### ◇ Control mode initial value and back up

| Mode/Position                       | Initial value                     | Back up in power failure | Back up at standby* |
|-------------------------------------|-----------------------------------|--------------------------|---------------------|
| VISCA Address                       | 1                                 | ×                        | ○                   |
| Power                               | On                                | —                        | —                   |
| Zoom Position                       | Wide end                          | ○                        | ○                   |
| D-Zoom                              | On                                | ○                        | ○                   |
| Focus Position                      | —                                 | ○                        | ○                   |
| Focus Mode                          | Auto                              | ○                        | ○                   |
| AF Sensibility                      | High                              | ○                        | ○                   |
| Near Limit                          | C000h                             | ○                        | ○                   |
| WB Mode                             | Auto                              | ○                        | ○                   |
| WB Data                             | —                                 | ○                        | ○                   |
| OnePush WB Data                     | —                                 | ○                        | ○                   |
| Manual WB Data                      | —                                 | ○                        | ○                   |
| AE Mode                             | Full Auto                         | ○                        | ○                   |
| Slow Shutter Mode                   | Manual                            | ○                        | ○                   |
| Shutter                             | 1/60 sec. (NTSC), 1/50 sec. (PAL) | ○                        | ○                   |
| Iris                                | —                                 | ○                        | ○                   |
| Gain                                | —                                 | ○                        | ○                   |
| Bright                              | —                                 | ○                        | ○                   |
| Exposure compensation               | Off                               | ○                        | ○                   |
| Exposure compensation amount        | ±0                                | ○                        | ○                   |
| BackLight (Back light compensation) | Off                               | ○                        | ○                   |
| Aperture                            | 5                                 | ○                        | ○                   |
| ICR Shot                            | Off                               | ○                        | ○                   |
| Wide Mode                           | Off                               | ○                        | ○                   |
| LR Reverse                          | Off                               | ○                        | ○                   |
| Freeze                              | Off                               | ×                        | ×                   |
| Picture Effect                      | Off                               | ×                        | ×                   |
| Digital Effect                      | Off                               | ×                        | ×                   |
| Digital Effect Level                | 0                                 | ○                        | ○                   |
| Camera Memory                       | Same as the initial value setting | ○                        | ○                   |
| Display (Data Screen)               | Off                               | ○                        | ○                   |
| Clock                               | —                                 | ○                        | ○                   |
| Date Display                        | Off                               | ○                        | ○                   |
| Time Display                        | Off                               | ○                        | ○                   |
| Title Display                       | Off                               | ○                        | ○                   |
| Key Lock                            | Off                               | ×                        | ○                   |
| Camera ID                           | 0000h                             | ○                        | ○                   |
| External Lock Mode                  | Off (Internal)                    | ×                        | ○                   |
| V-Phase                             | 0 (Vsync ↓ Edge position)         | ×                        | ○                   |

\* When CamPowerOff

## MODE CONDITIONS

### ◇ Mode transition conditions

| Mode           | Power Off | Initial-izing | Power On | Freeze On |
|----------------|-----------|---------------|----------|-----------|
| Address Set    | ○         | ○             | ○        | ○         |
| IF_Clear       | ○         | ○             | ○        | ○         |
| Command Cancel | ○         | ○             | ○        | ○         |
| Power On       | ○         | ○             | ○        | ○         |
| Power Off      | ○         | ×             | ○        | ○         |

| Mode                    | Power Off | Initial-izing | Power On | Freeze On | Focus Auto | Zoom Direct | Focus Direct | ZmFo Direct | Mem Recall |
|-------------------------|-----------|---------------|----------|-----------|------------|-------------|--------------|-------------|------------|
| Zoom Tele/Wide/Stop     | ×         | ×             | ○        | ×         | ○          | ×           | ○            | ×           | ×          |
| Zoom Direct             | ×         | ×             | ○        | ×         | ○          | ○           | ○            | ×           | ×          |
| D-Zoom On/Off           | ×         | ×             | ○        | ○         | ○          | ○           | ○            | ○           | ×          |
| Zoom Focus Direct       | ×         | ×             | ○        | ×         | ×          | ×           | ×            | ○           | ×          |
| Focus Far /Near/Stop    | ×         | ×             | ○        | ×         | ×          | ○           | ×            | ×           | ×          |
| Focus Direct            | ×         | ×             | ○        | ×         | ×          | ○           | ○            | ×           | ×          |
| Focus Auto/Manual       | ×         | ×             | ○        | ×         | ○          | ○           | ○            | ○           | ×          |
| One Push AF             | ×         | ×             | ○        | ×         | ×          | ○           | ×            | ×           | ×          |
| Focus Infinity          | ×         | ×             | ○        | ×         | ○          | ○           | ×            | ×           | ×          |
| AF Sensibility High/Low | ×         | ×             | ○        | ○         | ○          | ○           | ○            | ○           | ○          |
| Focus Near Limit        | ×         | ×             | ○        | ○         | ○          | ○           | ○            | ○           | ○          |
| Camera Memory Set/Reset | ×         | ×             | ○        | ○         | ○          | ○           | ○            | ○           | ○          |
| Camera Memory Recall    | ×         | ×             | ○        | ○         | ○          | ×           | ×            | ×           | ○*         |

\* × during recalling from key

| Mode              | Power Off | Initial-izing | Power On | Freeze On | Mem Recall | WB Auto | Indoor | Outdoor | One Push | ATW | Manual |
|-------------------|-----------|---------------|----------|-----------|------------|---------|--------|---------|----------|-----|--------|
| WB Mode switching | ×         | ×             | ○        | ×         | ×          | ○       | ○      | ○       | ○        | ○   | ○      |
| One Push WB       | ×         | ×             | ○        | ×         | ×          | ×       | ×      | ×       | ○        | ×   | ×      |
| RGain setting     | ×         | ×             | ○        | ×         | ×          | ×       | ×      | ×       | ×        | ×   | ○      |
| BGain setting     | ×         | ×             | ○        | ×         | ×          | ×       | ×      | ×       | ×        | ×   | ○      |

## MODE CONDITIONS

| Mode                            | Power Off | Initial-izing | Freeze On | Mem Recall | AE Full Auto | AE Manual | Shutter Pri | Iris Priority | Gain Priority | Shutter Auto | Iris Auto | Gain Auto | Bright |
|---------------------------------|-----------|---------------|-----------|------------|--------------|-----------|-------------|---------------|---------------|--------------|-----------|-----------|--------|
| AE Full Auto                    | ×         | ×             | ×         | ×          | ○            | ○         | ○           | ○             | ○             | ○            | ○         | ○         | ○      |
| AE Manual                       | ×         | ×             | ×         | ×          | ○            | ○         | ○           | ○             | ○             | ○            | ○         | ○         | ○      |
| Shutter Priority                | ×         | ×             | ×         | ×          | ○            | ○         | ○           | ○             | ○             | ○            | ○         | ○         | ○      |
| Iris Priority                   | ×         | ×             | ×         | ×          | ○            | ○         | ○           | ○             | ○             | ○            | ○         | ○         | ○      |
| Gain Priority                   | ×         | ×             | ×         | ×          | ○            | ○         | ○           | ○             | ○             | ○            | ○         | ○         | ○      |
| Shutter Auto                    | ×         | ×             | ×         | ×          | ○            | ○         | ○           | ○             | ○             | ○            | ○         | ○         | ○      |
| Iris Auto                       | ×         | ×             | ×         | ×          | ○            | ○         | ○           | ○             | ○             | ○            | ○         | ○         | ○      |
| Gain Auto                       | ×         | ×             | ×         | ×          | ○            | ○         | ○           | ○             | ○             | ○            | ○         | ○         | ○      |
| Bright                          | ×         | ×             | ×         | ×          | ○            | ×         | ○           | ×             | ×             | ×            | ×         | ×         | ×      |
| Shutter setting*2               | ×         | ×             | ×         | ×          | ×            | ○         | ○           | ×             | ×             | ×            | ○         | ○         | ×      |
| Iris setting                    | ×         | ×             | ×         | ×          | ×            | ○         | ×           | ○             | ×             | ○            | ×         | ○         | ×      |
| Gain setting                    | ×         | ×             | ×         | ×          | ×            | ○         | ×           | ×             | ○             | ○            | ○         | ×         | ×      |
| Bright setting                  | ×         | ×             | ×         | ×          | ×            | ×         | ×           | ×             | ×             | ×            | ×         | ×         | ○      |
| Slow Shutter Auto/Manual        | ×         | ×             | ○         | ×          | ○            | ○         | ○           | ○             | ○             | ○            | ○         | ○         | ○      |
| Exposure compensation On/Off    | ×         | ×             | ×         | ×          | ○            | ○         | ○           | ○             | ○             | ○            | ○         | ○         | ○      |
| Exposure compensation setting*3 | ×         | ×             | ×         | ×          | ○            | ○         | ○           | ○             | ○             | ○            | ○         | ○         | ○      |
| BackLight On/Off                | ×         | ×             | ×         | ×          | ○            | ×         | ×           | ×             | ×             | ×            | ×         | ×         | ×      |

\*1: ○ only when entering Bright mode from Shutter Priority

\*2: Cannot set Slow Shutter for Digital Effect

\*3: × when exposure compensation is Off

| Mode                   | Power Off | Initial-izing | Power On        | Freeze On | Mem Recall |
|------------------------|-----------|---------------|-----------------|-----------|------------|
| Aperture setting       | ×         | ×             | ○               | ×         | ×          |
| ICR Shot On/Off        | ×         | ×             | ○               | ×         | ○          |
| Wide Mode              | ×         | ×             | ○               | ×         | ○          |
| LR_Reverse On/Off      | ×         | ×             | ○               | ×         | ○          |
| Freeze On/Off          | ×         | ×             | ○ <sup>*1</sup> | ○         | ○          |
| Picture Effect setting | ×         | ×             | ○               | ×         | ○          |
| Digital Effect setting | ×         | ×             | ○ <sup>*2</sup> | ×         | ○          |
| Display On/Off         | ×         | ×             | ○               | ○         | ○          |
| Date/Time setting      | ×         | ×             | ○               | ○         | ○          |
| Date Display On/Off    | ×         | ×             | ○               | ○         | ○          |
| Time Display On/Off    | ×         | ×             | ○               | ○         | ○          |
| Title setting          | ×         | ×             | ○               | ○         | ○          |
| Key Lock On/Off        | ×         | ×             | ○               | ○         | ○          |
| ID Write               | ×         | ×             | ○               | ○         | ○          |

\*1: × when Digital Effect

\*2: × when Slow Shutter

| Mode                       | Power Off | Initial-izing | Power On |
|----------------------------|-----------|---------------|----------|
| External Lock Mode         | ×         | ×             | ○        |
| V-Phase Up/Down/Stop/Reset | ×         | ×             | ○        |
| V-Phase Direct             | ×         | ×             | ○        |



# *Command*

# *List*

(Ver. 1.0) — English —

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## CAUTION

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This Manual outlines an RS-232 control protocol and command list for certain Sony cameras from which control software can be developed. THIS CONTROL PROTOCOL AND COMMAND LIST IS PROVIDED BY SONY ON AN "AS-IS BASIS" WITHOUT WARRANTY OF ANY KIND. SONY DOES NOT WARRANT ANY PARTICULAR RESULT FROM THE USE OF THIS CONTROL PROTOCOL AND COMMAND LIST AND DISCLAIMS AND EXCLUDES ALL WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO THAT CONTROL PROTOCOL AND COMMAND LIST, INCLUDING, BUT NOT LIMITED TO, ANY OR ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN FACT, SONY SPECIFICALLY ACKNOWLEDGES THAT SOFTWARE DEVELOPED BASED ON THIS CONTROL PROTOCOL AND COMMAND LIST MAY CAUSE MALFUNCTION OR DAMAGE TO HARDWARE AND SOFTWARE USED WITH IT (INCLUDING SONY HARDWARE AND SOFTWARE) AND SPECIFICALLY DISCLAIMS ANY LIABILITY FOR ANY SUCH MALFUNCTION OR DAMAGE. THIS CONTROL PROTOCOL AND COMMAND LIST SHOULD BE USED WITH CAUTION.

# VISCA PROTOCOL

VISCA developed by Sony is an acronym of Video System Control Architecture. VISCA is a communications protocol designed to interface a wide variety of equipment to computer. The VISCA commands in this manual are specific to the FCB-EX series camera and may differ from commands for other Sony products.

## Outline of VISCA

In the VISCA protocol the side outputting commands such as the computer is called the controller, while the receiver of the commands such as the FCB camera is called the peripheral device. The FCB camera serves as a peripheral device of the VISCA protocol. The parameters of RS-232C are as follows.

- Communication speed: 9600 bps
- Data bits : 8
- Start bit : 1
- Stop bit : 1
- Non parity
- MSB first

Flow control using XON/XOFF and RTS/CTS, etc. is not supported.

## VISCA Protocol Communication Specifications

### ◇ VISCA packet structure

The basic unit of VISCA communication is called a packet (**Fig. 1**). The first byte of the packet is called a header and is comprised of the sender's and receiver's addresses. For example, the header of the packet sent to the FCB camera of address 1 from the controller of address 0 is hexadecimal 81H. The packet sent to the FCB camera of address 2 is 82H. In the command list, as the header is 8X, input the address of the FCB camera at X. The header of the reply packet from the FCB camera of address 1 is 90H. The packet from the FCB camera of address 2 is A0H.

Some of the commands for setting the FCB camera can be sent to all devices at one time (broadcast). In the case of broadcasting, the header should be hexadecimal and 88H.

When the terminator is FFH, it signifies the end of the packet.

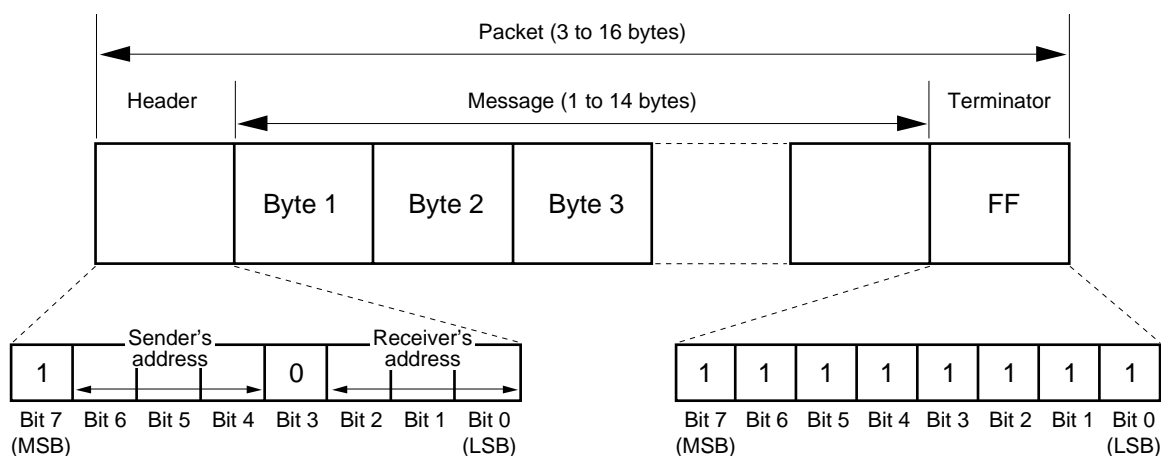


Fig. 1 Packet structure

## VISCA PROTOCOL

### ◇ Command and inquiry

- **Command**: Commands operations to the FCB camera.
- **Inquiry** : Used for examining the state of the FCB camera.

|         | <b>Command Packet</b>   | <b>Note</b>                               |
|---------|---|---|
| Inquiry | 8X QQ RR ... FF   | QQ = Command/Inquiry, RR = category code* |
|         | *QQ = 01 (Command), 09 (Inquiry)                                    |   |
|         | *RR = 00 (Interface), 04 (camera 1), 06 (Pan/Tilter), 07 (Camera 2) |   |
|         | *X = 1 to 7: FCB camera address                                     |   |

### ◇ Response for command and inquiry

- **ACK message** : Returned by the FCB camera when it receives the command. No ACK message is returned for inquiries.
- **Completion message**: Returned by the FCB camera when execution of commands and 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 a 0.

|                        | <b>Reply Packet</b>                | <b>Note</b>       |
|------------------------|------------------------------------|-------------------|
| 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 to be executed, the error message is returned instead of the completion message.

| <b>Error Packet</b> | <b>Description</b>                                    |
|---------------------|---|
| 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 |

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**VISCA PROTOCOL**

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**◇ 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 being executed can be received. When the FCB camera receives commands, it notifies 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 used, the command for FCB camera management 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.

**◇ Command execution cancel**

The IF\_Clear command is sent to cancel a command after sending it. Use the cancel message to cancel one of the two commands sent.

|   | <b>Cancel Packet</b> | <b>Note</b>       |
|---|----------------------|-------------------|
| Cancel  | 8X 2Y FF             | Y = socket number |
| X = 1 to 7: FCB camera address, Y = socket number |                      |                   |

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

## VISCA PROTOCOL

### VISCA Device Setting Command

Before starting the controls of the FCB camera, be sure to send the Address command and IF\_Clear command in broadcasting.

#### ◇ For VISCA network administration

- Address : Sets the address of the 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 the device is removed or added from or 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 being executed.

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

#### ◇ VISCA interface and inquiry

- IF\_DeviceTypeInq: Returns information on the VISCA interface.

| Inquiry          | Inquiry Packet | Reply Packet                  | Description   |
|------------------|----------------|-------------------------------|---|
| IF_DeviceTypeInq | 8X 09 00 02 FF | Y0 50 GG GG HH HH JJ JJ KK FF | GGGG = Vender ID (0020: Sony)<br>HHHH = Model ID 0402: FCB-EX series<br>JJJJ = ROM revision<br>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)

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**VISCA PROTOCOL**


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**VISCA Command/ACK Protocol**

| Command              | Command Message                | Reply Message  | Comments   |
|----------------------|--------------------------------|--|--|
| General Command      | 81 01 04 38 02 FF<br>(Example) | 90 41 FF (ACK) + 90 51 FF<br>(Completion)<br>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<br>(Example)    | 90 60 02 FF (Syntax Error)                                     | Accepted a command lacking parameters.   |
|                      | 81 01 04 38 02 FF<br>(Example) | 90 60 03 FF<br>(Command Buffer Full)                           | There are two commands being executed, and the command could not be accepted.  |
|                      | 81 01 04 08 02 FF<br>(Example) | 90 61 41 FF<br>(Command Not Executable)<br>90 62 41 FF         | Could not execute the command in the current mode.   |
| Inquiry Command      | 81 09 04 38 FF<br>(Example)    | 90 50 02 FF (Completion)                                       | ACK is not returned for the inquiry command.   |
|                      | 81 09 05 38 FF<br>(Example)    | 90 60 02 FF (Syntax Error)                                     | Accepted non-corresponding 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<br>(Command Canceled)                              | Returned when the command of the socket specified is canceled. Completion of 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 PROTOCOL

### VISCA Camera Issue Message

#### ◇ ACK/Completion Message

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

z = Device address + 8

#### ◇ Error Message

|                        | Command Message                | 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<br>(y: Socket No.) | Returned when the command executed by the specified socket is canceled by the cancel command. The completion message being executed is not returned.                 |
| No Socket              | z0 6y 05 FF<br>(y: Socket No.) | Returned when no command is executed by the specified socket due to the cancel command, or when an invalid socket number is specified.                               |
| Command Not Executable | z0 6y 41 FF<br>(y: Socket No.) | Returned when an unoperable command is received due to certain 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 to the camera is conducted, when the VISCA device is connected to or disconnected from the VISCA OUT terminal. |



# COMMAND LIST

## FCB-EX Series Command List (1/4)

| Command Set   | Command          | Command Packet                            | Comments   |
|---------------|------------------|---|--|
| AddressSet    | Broadcast        | 88 30 01 FF                               | Send Address Set command and IF_Clear command using broadcast before starting communication.             |
| IF_Clear      | Broadcast        | 88 01 00 01 FF                            |  |
| CommandCancel |                  | 8x 2p FF                                  | p: Socket No. (= 1 or 2)   |
| CAM_Power     | On               | 8x 01 04 00 02 FF                         | Power ON/OFF   |
|               | Off (Standby)    | 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 = Speed parameter, 0 (Low) to 7 (High), 8 steps  |
|               | Wide (Variable)  | 8x 01 04 07 3p FF                         |  |
|               | Direct           | 8x 01 04 47 0p 0q 0r 0s FF                | pqrs: Zoom Position<br>Optical zoom: 0000 (wide) to 4000 (tele)<br>Digital zoom: 4000 (×1) to 7AC0 (×12) |
|               | D-Zoom On        | 8x 01 04 06 02 FF                         | Digital zoom ON/OFF  |
|               | D-Zoom Off       | 8x 01 04 06 03 FF                         |  |
| CAM_ZoomFocus | Direct           | 8x 01 04 47 0p 0q 0r 0s<br>0t 0u 0v 0w FF | pqrs: Zoom Position<br>tuvw: Focus Position  |
| CAM_Focus     | Stop             | 8x 01 04 08 00 FF                         | Focus control  |
|               | 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 = Speed parameter, 0 (Low) to 7 (High), 8 steps  |
|               | Near (Variable)  | 8x 01 04 08 3p FF                         |  |
|               | Direct           | 8x 01 04 48 0p 0q 0r 0s FF                | pqrs: Focus Position 1000 (∞) to C000 (1 cm)   |
|               | 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  |
|               | AF Sens High     | 8x 01 04 58 02 FF                         | AF sensitivity High/Low  |
|               | AF Sens Low      | 8x 01 04 58 03 FF                         |  |
|               | Near Limit       | 8x 01 04 28 0p 0q 0r 0s FF                | pqrs: Focus Near Limit Position 1000 (∞) to C000 (1 cm)  |
| 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  |
| 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 0p 0q 0r 0s FF                | pqrs: R Gain 0000 to 00FF, 256 steps   |
| 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 0p 0q 0r 0s FF                | pqrs: B Gain 0000 to 00FF, 256 steps   |

## COMMAND LIST

### FCB-EX Series Command List (2/4)

| Command Set     | Command          | Command Packet             | Comments   |
|-----------------|------------------|----------------------------|--|
| 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  |
|                 | Gain Priority    | 8x 01 04 39 0C FF          | Gain priority automatic exposure mode  |
|                 | Bright           | 8x 01 04 39 0D FF          | Bright mode (Manual control)   |
|                 | Shutter Auto     | 8x 01 04 39 1A FF          | Automatic shutter mode   |
|                 | Iris Auto        | 8x 01 04 39 1B FF          | Automatic iris mode  |
|                 | Gain Auto        | 8x 01 04 39 1C FF          | Automatic gain mode  |
| CAM_SlowShutter | Auto             | 8x 01 04 5A 02 FF          | Slow shutter Auto/Manual   |
|                 | 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 0p 0q 0r 0s FF | pqrs: Shutter Position<br>0000 (NTSC 1/4, PAL 1/3) to 0013 (1/10000 sec.), 20 steps  |
| 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 0p 0q 0r 0s FF | pqrs: Iris Position 0000 (close) to 0011 (F1.4), 18 steps                            |
| 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 0p 0q 0r 0s FF | pqrs: Gain Position<br>0000 (-3 dB) to 0007 (+18 dB), 8 steps                        |
| 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 0p 0q 0r 0s FF | pqrs: Bright Position<br>0000 (close, 0 dB) to 0017 (F1.4, +18 dB), 24 steps at 3 dB |
| 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 0p 0q 0r 0s FF |  |
| CAM_BackLight   | On               | 8x 01 04 33 02 FF          | Back light compensation ON/OFF   |
|                 | Off              | 8x 01 04 33 03 FF          |  |
| 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 0p 0q 0r 0s FF | pqrs: Aperture Gain 0000 to 000F, 16 steps, Initial value: 5                         |
| CAM_ICRShot     | On               | 8x 01 04 01 02 FF          | ICR shot ON/OFF  |
|                 | Off              | 8x 01 04 01 03 FF          |  |

## COMMAND LIST

### FCB-EX Series Command List (3/4)

| Command Set       | Command      | Command Packet   | Comments   |                           |
|-------------------|--------------|--|--|---------------------------|
| CAM_Wide          | Off          | 8x 01 04 60 00 FF  | Wide mode setting  |                           |
|                   | Cinema       | 8x 01 04 60 01 FF  |  |                           |
|                   | 16 : 9 Full  | 8x 01 04 60 02 FF  |  |                           |
| 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   |                           |
|                   | Pastel       | 8x 01 04 63 01 FF  |  |                           |
|                   | Neg.Art      | 8x 01 04 63 02 FF  |  |                           |
|                   | Sepia        | 8x 01 04 63 03 FF  |  |                           |
|                   | B&W          | 8x 01 04 63 04 FF  |  |                           |
|                   | Solarize     | 8x 01 04 63 05 FF  |  |                           |
|                   | Mosaic       | 8x 01 04 63 06 FF  |  |                           |
|                   | SLIM         | 8x 01 04 63 07 FF  |  |                           |
|                   | Stretch      | 8x 01 04 63 08 FF  |  |                           |
| CAM_DigitalEffect | Off          | 8x 01 04 64 00 FF  | Digital effect setting   |                           |
|                   | Still        | 8x 01 04 64 01 FF  |  |                           |
|                   | Flash        | 8x 01 04 64 02 FF  |  |                           |
|                   | Lumi.        | 8x 01 04 64 03 FF  |  |                           |
|                   | Trail        | 8x 01 04 64 04 FF  |  |                           |
|                   | Effect Level | 8x 01 04 65 pp FF  |  | pp: Effect level 00 to 18 |
|                   | CAM_Memory   | Reset  |  | 8x 01 04 3F 00 0p FF      |
| 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<br>(8x 01 06 06 02 FF)   | Display ON/OFF   |                           |
|                   | Off          | 8x 01 04 15 03 FF<br>(8x 01 06 06 03 FF)   |  |                           |
|                   | On/Off       | 8x 01 04 15 10 FF<br>(8x 01 06 06 10 FF)   |  |                           |
| CAM_Date/TimeSet  |              | 8x 01 04 70 0m 0n 0p 0q<br>0r 0s 0t 0u 0v 0w FF<br>(8x 01 07 29 0m 0n 0p 0q<br>0r 0s 0t 0u 0v 0w FF) | mn: Year (19mn, 20mn), pq: Month, rs: Day, tu: Hour,<br>vw: Minute |                           |
| CAM_DateDisplay   | On           | 8x 01 04 71 02 FF<br>(8x 01 07 2A 02 FF)   | Date display ON/OFF  |                           |
|                   | Off          | 8x 01 04 71 03 FF<br>(8x 01 07 2A 03 FF)   |  |                           |
| CAM_TimeDisplay   | On           | 8x 01 04 72 02 FF<br>(8x 01 07 2B 02 FF)   | Time display ON/OFF  |                           |
|                   | Off          | 8x 01 04 72 03 FF<br>(8x 01 07 2B 03 FF)   |  |                           |

## COMMAND LIST

### FCB-EX Series Command List (4/4)

| Command Set      | Command     | Command Packet                                     | Comments   |
|------------------|-------------|--|--|
| CAM_Title        | Title Set1  | 8x 01 04 73 00 mm nn pp<br>qq 00 00 00 00 00 FF    | mm: Vposition 00 to 0A, nn: Hposition 00 to 17<br>pp: Color 00 to 06, qq: Blink 00 or 01 |
|                  | Title Set2  | 8x 01 04 73 01 mm nn pp<br>qq rr ss tt uu vv ww FF | mnpqrstuvw: Setting of display characters<br>(1st to 10th character)                     |
|                  | Title Set3  | 8x 01 04 73 02 mm nn pp<br>qq rr ss tt uu vv ww FF | mnpqrstuvw: Setting of display characters<br>(11th to 20th character)                    |
|                  | Title Clear | 8x 01 04 74 00 FF                                  | Title setting clear  |
|                  | On          | 8x 01 04 74 02 FF                                  | Title display ON/OFF   |
|                  | Off         | 8x 01 04 74 03 FF                                  |  |
| CAM_KeyLock      | Off         | 8x 01 04 17 00 FF                                  | Key lock ON/OFF  |
|                  | On          | 8x 01 04 17 02 FF                                  |  |
| CAM_IDWrite      |             | 8x 01 04 22 0p 0q 0r 0s FF                         | pqrs: Camera ID (= 0000 to FFFF)   |
| ExternalLockMode | Internal    | 8x 01 04 55 00 FF                                  | Internal mode  |
|                  | V-Lock      | 8x 01 04 55 01 FF                                  | V-Lock mode  |
| V-Phase          | 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 to 7)  |
|                  | Down (Step) | 8x 01 04 05 3p FF                                  | 1 step is about 1.29 (1.26) degree.  |
|                  | Reset       | 8x 01 04 05 40 FF                                  | Set back to factory settings.  |
|                  | Direct      | 8x 01 04 45 00 00 0p 0q FF                         | pq: V-Phase (= 00 to FF)*  |

\* 00 to FF is valid interval for command pq parameter syntax, not for camera V-sync operation.

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**COMMAND LIST**


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**FCB-EX Series Inquiry Command List (1/2)**

| Inquiry Command         | Command Packet | Inquiry Packet       | Comments                        |
|-------------------------|----------------|----------------------|---------------------------------|
| CAM_PowerInq            | 8x 09 04 00 FF | y0 50 02 FF          | On                              |
|                         |                | y0 50 03 FF          | Off (Standby)                   |
| CAM_DZoomModelInq       | 8x 09 04 06 FF | y0 50 02 FF          | D-Zoom On                       |
|                         |                | y0 50 03 FF          | D-Zoom Off                      |
| CAM_ZoomPositionInq     | 8x 09 04 47 FF | y0 50 0p 0q 0r 0s FF | pqrs: Zoom Position             |
| CAM_FocusModelInq       | 8x 09 04 38 FF | y0 50 02 FF          | Auto Focus                      |
|                         |                | y0 50 03 FF          | Manual Focus                    |
| CAM_FocusPositionInq    | 8x 09 04 48 FF | y0 50 0p 0q 0r 0s FF | pqrs: Focus Position            |
| CAM_AFModelInq          | 8x 09 04 58 FF | y0 50 02 FF          | AF Sens High                    |
|                         |                | y0 50 03 FF          | AF Sens Low                     |
| CAM_FocusNearLimitInq   | 8x 09 04 28 FF | y0 50 0p 0q 0r 0s FF | pqrs: Focus Near Limit Position |
| CAM_WBModelInq          | 8x 09 04 35 FF | y0 50 00 FF          | Auto                            |
|                         |                | y0 50 01 FF          | Indoor                          |
|                         |                | y0 50 02 FF          | Outdoor                         |
|                         |                | y0 50 03 FF          | One Push WB                     |
|                         |                | y0 50 04 FF          | ATW                             |
|                         |                | y0 50 05 FF          | Manual                          |
| CAM_RGainInq            | 8x 09 04 43 FF | y0 50 0p 0q 0r 0s FF | pqrs: R Gain                    |
| CAM_BGainInq            | 8x 09 04 44 FF | y0 50 0p 0q 0r 0s FF | pqrs: B Gain                    |
| CAM_AEModelInq          | 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 0C FF          | Gain Priority                   |
|                         |                | y0 50 0D FF          | Bright                          |
|                         |                | y0 50 1A FF          | Shutter Auto                    |
|                         |                | y0 50 1B FF          | Iris Auto                       |
|                         |                | y0 50 1C FF          | Gain Auto                       |
| CAM_SlowShutterModelInq | 8x 09 04 5A FF | y0 50 02 FF          | Auto                            |
|                         |                | y0 50 03 FF          | Manual                          |
| CAM_ShutterPositionInq  | 8x 09 04 4A FF | y0 50 0p 0q 0r 0s FF | pqrs: Shutter Position          |
| CAM_IrisPositionInq     | 8x 09 04 4B FF | y0 50 0p 0q 0r 0s FF | pqrs: Iris Position             |
| CAM_GainPositionInq     | 8x 09 04 4C FF | y0 50 0p 0q 0r 0s FF | pqrs: Gain Position             |
| CAM_BrightPositionInq   | 8x 09 04 4D FF | y0 50 0p 0q 0r 0s FF | pqrs: Bright Position           |
| CAM_ExpCompModelInq     | 8x 09 04 3E FF | y0 50 02 FF          | On                              |
|                         |                | y0 50 03 FF          | Off                             |
| CAM_ExpCompPositionInq  | 8x 09 04 4E FF | y0 50 0p 0q 0r 0s FF | pqrs: ExpComp Position          |
| CAM_BackLightModelInq   | 8x 09 04 33 FF | y0 50 02 FF          | On                              |
|                         |                | y0 50 03 FF          | Off                             |
| CAM_ApertureInq         | 8x 09 04 42 FF | y0 50 0p 0q 0r 0s FF | pqrs: Aperture Gain             |
| CAM_ICRShotModelInq     | 8x 09 04 01 FF | y0 50 02 FF          | On                              |
|                         |                | y0 50 03 FF          | Off                             |
| CAM_WideModelInq        | 8x 09 04 60 FF | y0 50 00 FF          | Off                             |
|                         |                | y0 50 01 FF          | Cinema                          |
|                         |                | y0 50 02 FF          | 16:9 Full                       |
| CAM_LR_ReverseModelInq  | 8x 09 04 61 FF | y0 50 02 FF          | On                              |
|                         |                | y0 50 03 FF          | Off                             |

## COMMAND LIST

### FCB-EX Series Inquiry Command List (2/2)

| Inquiry Command           | Command Packet                     | Inquiry Packet                   | Comments   |
|---------------------------|------------------------------------|----------------------------------|--|
| CAM_FreezeModelInq        | 8x 09 04 62 FF                     | y0 50 02 FF                      | On   |
|                           |                                    | y0 50 03 FF                      | Off  |
| CAM_PictureEffectModelInq | 8x 09 04 63 FF                     | y0 50 00 FF                      | Off  |
|                           |                                    | y0 50 01 FF                      | Pastel   |
|                           |                                    | y0 50 02 FF                      | Neg. Art   |
|                           |                                    | y0 50 03 FF                      | Sepia  |
|                           |                                    | y0 50 04 FF                      | B & W  |
|                           |                                    | y0 50 05 FF                      | Solarize   |
|                           |                                    | y0 50 06 FF                      | Mosaic   |
|                           |                                    | y0 50 07 FF                      | SLIM   |
| CAM_DigitalEffectModelInq | 8x 09 04 64 FF                     | y0 50 08 FF                      | Stretch  |
|                           |                                    | y0 50 00 FF                      | Off  |
|                           |                                    | y0 50 01 FF                      | Still  |
|                           |                                    | y0 50 02 FF                      | Flash  |
|                           |                                    | y0 50 03 FF                      | Lumi.  |
| CAM_DigitalEffectLevelInq | 8x 09 04 65 FF                     | y0 50 04 FF                      | Trail  |
|                           |                                    | y0 50 pp FF                      | pp: Effect Level   |
| CAM_Memorizing            | 8x 09 04 3F FF                     | y0 50 0p FF                      | p: Memory number last operated                                     |
| CAM_DisplayModelInq       | 8x 09 04 15 FF<br>(8x 09 06 06 FF) | y0 50 02 FF                      | On   |
|                           |                                    | y0 50 03 FF                      | Off  |
| 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_DeviceTypeInq         | 8x 09 00 02 FF                     | y0 50 00 20<br>mn pq rs tu vw FF | mnpq: Model Code*<br>rstu: ROM version<br>vw: Socket Number (= 02) |
| ExternalLockModelInq      | 8x 09 04 55 FF                     | y0 50 00 FF                      | Internal mode  |
|                           |                                    | y0 50 01 FF                      | V-Lock mode  |
| V-PhasePositionInq        | 8x 09 04 45 FF                     | y0 50 00 00 0p 0q FF             | pq: V-Phase Position   |

\* Model Code: FCB-EX Series = 0402

**COMMAND LIST**

**FCB-EX Series Block Inquiry Command List**

◇ Lens control system inquiry command (1/2) ..... Command Packet 8x 09 7E 7E 00 FF

<Inquiry Packet>

|        |   |   |                          |
|--------|---|---|--------------------------|
|        | 7 | ↑ | Destination Address      |
|        | 6 |   |                          |
|        | 5 |   |                          |
| Packet | 4 | ↓ |                          |
| 0      | 3 | ↑ | Source Address           |
|        | 2 |   |                          |
|        | 1 |   |                          |
|        | 0 | ↓ |                          |
|        | 7 | 0 | Completion Message (50h) |
|        | 6 | 1 |                          |
|        | 5 | 0 |                          |
| Packet | 4 | 1 |                          |
| 1      | 3 | 0 |                          |
|        | 2 | 0 |                          |
|        | 1 | 0 |                          |
|        | 0 | 0 |                          |
|        | 7 | 0 |                          |
|        | 6 | 0 |                          |
|        | 5 | 0 |                          |
| Packet | 4 | 0 |                          |
| 2      | 3 | ↑ | Zoom Position (HH)       |
|        | 2 |   |                          |
|        | 1 |   |                          |
|        | 0 | ↓ |                          |
|        | 7 | 0 |                          |
|        | 6 | 0 |                          |
|        | 5 | 0 |                          |
| Packet | 4 | 0 |                          |
| 3      | 3 | ↑ | Zoom Position (HL)       |
|        | 2 |   |                          |
|        | 1 |   |                          |
|        | 0 | ↓ |                          |
|        | 7 | 0 |                          |
|        | 6 | 0 |                          |
|        | 5 | 0 |                          |
| Packet | 4 | 0 |                          |
| 4      | 3 | ↑ | Zoom Position (LH)       |
|        | 2 |   |                          |
|        | 1 |   |                          |
|        | 0 | ↓ |                          |

|        |   |   |                      |
|--------|---|---|----------------------|
|        | 7 | 0 |                      |
|        | 6 | 0 |                      |
|        | 5 | 0 |                      |
| Packet | 4 | 0 |                      |
| 5      | 3 | ↑ | Zoom Position (LL)   |
|        | 2 |   |                      |
|        | 1 |   |                      |
|        | 0 | ↓ |                      |
|        | 7 | 0 |                      |
|        | 6 | 0 |                      |
|        | 5 | 0 |                      |
| Packet | 4 | 0 |                      |
| 6      | 3 | ↑ | Focus Near Limit (H) |
|        | 2 |   |                      |
|        | 1 |   |                      |
|        | 0 | ↓ |                      |
|        | 7 | 0 |                      |
|        | 6 | 0 |                      |
|        | 5 | 0 |                      |
| Packet | 4 | 0 |                      |
| 7      | 3 | ↑ | Focus Near Limit (L) |
|        | 2 |   |                      |
|        | 1 |   |                      |
|        | 0 | ↓ |                      |
|        | 7 | 0 |                      |
|        | 6 | 0 |                      |
|        | 5 | 0 |                      |
| Packet | 4 | 0 |                      |
| 8      | 3 | ↑ | Focus Position (HH)  |
|        | 2 |   |                      |
|        | 1 |   |                      |
|        | 0 | ↓ |                      |
|        | 7 | 0 |                      |
|        | 6 | 0 |                      |
|        | 5 | 0 |                      |
| Packet | 4 | 0 |                      |
| 9      | 3 | ↑ | Focus Position (HL)  |
|        | 2 |   |                      |
|        | 1 |   |                      |
|        | 0 | ↓ |                      |

## COMMAND LIST

### ◇ Lens control system inquiry command (2/2) ..... Command Packet 8x 09 7E 7E 00 FF

#### <Inquiry Packet>

|        |   |   |
|--------|---|---|
|        | 7 | 0   |
|        | 6 | 0   |
|        | 5 | 0   |
| Packet | 4 | 0   |
| 10     | 3 | ↑ Focus Position (LH)                           |
|        | 2 | ↑   |
|        | 1 | ↑   |
|        | 0 | ↓   |
|        | 7 | 0   |
|        | 6 | 0   |
|        | 5 | 0   |
| Packet | 4 | 0   |
| 11     | 3 | ↑ Focus Position (LL)                           |
|        | 2 | ↑   |
|        | 1 | ↑   |
|        | 0 | ↓   |
|        | 7 | 0   |
|        | 6 | 0   |
|        | 5 | 0   |
| Packet | 4 | 0   |
| 12     | 3 | 0   |
|        | 2 | ↑ Camera Memory Last Access Position            |
|        | 1 | ↑   |
|        | 0 | ↓   |
|        | 7 | 0   |
|        | 6 | 0   |
|        | 5 | 0   |
| Packet | 4 | 0   |
| 13     | 3 | 0   |
|        | 2 | AF Mode (1: Fast, 0: Slow)                      |
|        | 1 | Digital Zoom (1: On, 0: Off)                    |
|        | 0 | Focus Mode (1: Auto, 0: Manual)                 |
|        | 7 | 0   |
|        | 6 | 0   |
|        | 5 | 0   |
| Packet | 4 | 0   |
| 14     | 3 | 0   |
|        | 2 | Camera Memory Recall (1: Executing, 0: Stopped) |
|        | 1 | Focus Command (1: Executing, 0: Stopped)        |
|        | 0 | Zoom Command (1: Executing, 0: Stopped)         |

|        |   |                    |
|--------|---|--------------------|
|        | 7 | 1 Terminator (FFh) |
|        | 6 | 1                  |
|        | 5 | 1                  |
| Packet | 4 | 1                  |
| 15     | 3 | 1                  |
|        | 2 | 1                  |
|        | 1 | 1                  |
|        | 0 | 1                  |



## COMMAND LIST

### ◇ Camera control system inquiry command (1/2) ..... Command Packet 8x 09 7E 7E 01 FF

#### <Inquiry Packet>

|        |   |   |                          |
|--------|---|---|--------------------------|
|        | 7 | ↑ | Destination Address      |
|        | 6 |   |                          |
|        | 5 |   |                          |
| Packet | 4 | ↓ |                          |
| 0      | 3 | ↑ | Source Address           |
|        | 2 |   |                          |
|        | 1 |   |                          |
|        | 0 | ↓ |                          |
|        | 7 | 0 | Completion Message (50h) |
|        | 6 | 1 |                          |
|        | 5 | 0 |                          |
| Packet | 4 | 1 |                          |
| 1      | 3 | 0 |                          |
|        | 2 | 0 |                          |
|        | 1 | 0 |                          |
|        | 0 | 0 |                          |
|        | 7 | 0 |                          |
|        | 6 | 0 |                          |
|        | 5 | 0 |                          |
| Packet | 4 | 0 |                          |
| 2      | 3 | ↑ | R Gain (H)               |
|        | 2 |   |                          |
|        | 1 |   |                          |
|        | 0 | ↓ |                          |
|        | 7 | 0 |                          |
|        | 6 | 0 |                          |
|        | 5 | 0 |                          |
| Packet | 4 | 0 |                          |
| 3      | 3 | ↑ | R Gain (L)               |
|        | 2 |   |                          |
|        | 1 |   |                          |
|        | 0 | ↓ |                          |
|        | 7 | 0 |                          |
|        | 6 | 0 |                          |
|        | 5 | 0 |                          |
| Packet | 4 | 0 |                          |
| 4      | 3 | ↑ | B Gain (H)               |
|        | 2 |   |                          |
|        | 1 |   |                          |
|        | 0 | ↓ |                          |

|        |   |   |  |
|--------|---|---|--|
|        | 7 | 0 |  |
|        | 6 | 0 |  |
|        | 5 | 0 |  |
| Packet | 4 | 0 |  |
| 5      | 3 | ↑ | B Gain (L)                             |
|        | 2 |   |  |
|        | 1 |   |  |
|        | 0 | ↓ |  |
|        | 7 | 0 |  |
|        | 6 | 0 |  |
|        | 5 | 0 |  |
| Packet | 4 | 0 |  |
| 6      | 3 | 0 |  |
|        | 2 | ↑ | WB Mode                                |
|        | 1 |   |  |
|        | 0 | ↓ |  |
|        | 7 | 0 |  |
|        | 6 | 0 |  |
|        | 5 | 0 |  |
| Packet | 4 | 0 |  |
| 7      | 3 | ↑ | Aperture Gain                          |
|        | 2 |   |  |
|        | 1 |   |  |
|        | 0 | ↓ |  |
|        | 7 | 0 |  |
|        | 6 | 0 |  |
|        | 5 | 0 |  |
| Packet | 4 | ↑ | Exposure Mode                          |
| 8      | 3 |   |  |
|        | 2 |   |  |
|        | 1 |   |  |
|        | 0 | ↓ |  |
|        | 7 | 0 |  |
|        | 6 |   | Gain Command (1: Valid, 0: Invalid)    |
|        | 5 |   | Iris Command (1: Valid, 0: Invalid)    |
| Packet | 4 |   | Shutter Command (1: Valid, 0: Invalid) |
| 9      | 3 |   | Bright Command (1: Valid, 0: Invalid)  |
|        | 2 |   | Back Light (1: On, 0: Off)             |
|        | 1 |   | Exposure Comp. (1: On, 0: Off)         |
|        | 0 |   | Slow Shutter (1: Auto, 0: Manual)      |

## COMMAND LIST

### ◇ Camera control system inquiry command (2/2) ..... Command Packet 8x 09 7E 7E 01 FF

#### <Inquiry Packet>

|        |   |                           |
|--------|---|---------------------------|
|        | 7 | 0                         |
|        | 6 | 0                         |
|        | 5 | 0                         |
| Packet | 4 | ▲ Shutter Position        |
| 10     | 3 | ↓                         |
|        | 2 |                           |
|        | 1 |                           |
|        | 0 | ▼                         |
|        | 7 | 0                         |
|        | 6 | 0                         |
|        | 5 | 0                         |
| Packet | 4 | 0                         |
| 11     | 3 | ▲ Iris Position           |
|        | 2 | ↓                         |
|        | 1 |                           |
|        | 0 | ▼                         |
|        | 7 | 0                         |
|        | 6 | 0                         |
|        | 5 | 0                         |
| Packet | 4 | 0                         |
| 12     | 3 | 0                         |
|        | 2 | ▲ Gain Position           |
|        | 1 | ↓                         |
|        | 0 | ▼                         |
|        | 7 | 0                         |
|        | 6 | 0                         |
|        | 5 | 0                         |
| Packet | 4 | ▲ Bright Position         |
| 13     | 3 | ↓                         |
|        | 2 |                           |
|        | 1 |                           |
|        | 0 | ▼                         |
|        | 7 | 0                         |
|        | 6 | 0                         |
|        | 5 | 0                         |
| Packet | 4 | 0                         |
| 14     | 3 | ▲ Exposure Comp. Position |
|        | 2 | ↓                         |
|        | 1 |                           |
|        | 0 | ▼                         |

|        |   |                    |
|--------|---|--------------------|
|        | 7 | 1 Terminator (FFh) |
|        | 6 | 1                  |
|        | 5 | 1                  |
| Packet | 4 | 1                  |
| 15     | 3 | 1                  |
|        | 2 | 1                  |
|        | 1 | 1                  |
|        | 0 | 1                  |

## COMMAND LIST

### ◇ Other inquiry commands (1/2).....Command Packet 8x 09 7E 7E 02 FF

#### <Inquiry Packet>

|        |   |                                |                          |
|--------|---|--------------------------------|--------------------------|
|        | 7 | ↑                              | Destination Address      |
|        | 6 |                                |                          |
|        | 5 |                                |                          |
| Packet | 4 | ↓                              |                          |
| 0      | 3 | ↑                              | Source Address           |
|        | 2 |                                |                          |
|        | 1 |                                |                          |
|        | 0 | ↓                              |                          |
|        | 7 | 0                              | Completion Message (50h) |
|        | 6 | 1                              |                          |
|        | 5 | 0                              |                          |
| Packet | 4 | 1                              |                          |
| 1      | 3 | 0                              |                          |
|        | 2 | 0                              |                          |
|        | 1 | 0                              |                          |
|        | 0 | 0                              |                          |
|        | 7 | 0                              |                          |
|        | 6 | 0                              |                          |
|        | 5 | 0                              |                          |
| Packet | 4 | 0                              |                          |
| 2      | 3 | 0                              |                          |
|        | 2 | 0                              |                          |
|        | 1 | Key Lock (1: On, 0: Off)       |                          |
|        | 0 | Power (1: On, 0: Off)          |                          |
|        | 7 | 0                              |                          |
|        | 6 | 0                              |                          |
|        | 5 | 0                              |                          |
| Packet | 4 | ICR Shot (1: On, 0: Off)       |                          |
| 3      | 3 | Freeze (1: On, 0: Off)         |                          |
|        | 2 | LR Reverse (1: On, 0: Off)     |                          |
|        | 1 | Wide 16:9 Full (1: On, 0: Off) |                          |
|        | 0 | Wide Cinema (1: On, 0: Off)    |                          |
|        | 7 | 0                              |                          |
|        | 6 | 0                              |                          |
|        | 5 | 0                              |                          |
| Packet | 4 | 0                              |                          |
| 4      | 3 | Title Display (1: On, 0: Off)  |                          |
|        | 2 | Display (1: On, 0: Off)        |                          |
|        | 1 | Time Display (1: On, 0: Off)   |                          |
|        | 0 | Date Display (1: On, 0: Off)   |                          |

|        |   |   |                      |
|--------|---|---|----------------------|
|        | 7 | 0 |                      |
|        | 6 | 0 |                      |
|        | 5 | 0 |                      |
| Packet | 4 | 0 |                      |
| 5      | 3 | 0 |                      |
|        | 2 | ↑ | Picture Effect Mode  |
|        | 1 |   |                      |
|        | 0 | ↓ |                      |
|        | 7 | 0 |                      |
|        | 6 | 0 |                      |
|        | 5 | 0 |                      |
| Packet | 4 | 0 |                      |
| 6      | 3 | 0 |                      |
|        | 2 | ↑ | Digital Effect Mode  |
|        | 1 |   |                      |
|        | 0 | ↓ |                      |
|        | 7 | 0 |                      |
|        | 6 | 0 |                      |
|        | 5 | 0 |                      |
| Packet | 4 | ↑ | Digital Effect Level |
| 7      | 3 |   |                      |
|        | 2 |   |                      |
|        | 1 |   |                      |
|        | 0 | ↓ |                      |
|        | 7 | 0 |                      |
|        | 6 | 0 |                      |
|        | 5 | 0 |                      |
| Packet | 4 | 0 |                      |
| 8      | 3 | ↑ | Camera ID (HH)       |
|        | 2 |   |                      |
|        | 1 |   |                      |
|        | 0 | ↓ |                      |
|        | 7 | 0 |                      |
|        | 6 | 0 |                      |
|        | 5 | 0 |                      |
| Packet | 4 | 0 |                      |
| 9      | 3 | ↑ | Camera ID (HL)       |
|        | 2 |   |                      |
|        | 1 |   |                      |
|        | 0 | ↓ |                      |

## COMMAND LIST

### ◇ Other inquiry commands (2/2).....Command Packet 8x 09 7E 7E 02 FF

#### <Inquiry Packet>

|        |   |   |
|--------|---|---|
|        | 7 | 0   |
|        | 6 | 0   |
|        | 5 | 0   |
| Packet | 4 | 0   |
| 10     | 3 | ▲ Camera ID (LH)                            |
|        | 2 | ↑   |
|        | 1 | ↓   |
|        | 0 | ▼   |
|        | 7 | 0   |
|        | 6 | 0   |
|        | 5 | 0   |
| Packet | 4 | 0   |
| 11     | 3 | ▲ Camera ID (LL)                            |
|        | 2 | ↑   |
|        | 1 | ↓   |
|        | 0 | ▼   |
|        | 7 | 0   |
|        | 6 | 0   |
|        | 5 | 0   |
| Packet | 4 | 0   |
| 12     | 3 | 0   |
|        | 2 | ICR Shot (1: Provided, 0: Not provided)     |
|        | 1 | 0   |
|        | 0 | System (1: PAL, 0: NTSC)                    |
|        | 7 | 0   |
|        | 6 | 0   |
|        | 5 | 0   |
| Packet | 4 | External Lock Mode (1: V-Lock, 0: Internal) |
| 13     | 3 | ▲ V-Phase (H)                               |
|        | 2 | ↑   |
|        | 1 | ↓   |
|        | 0 | ▼   |
|        | 7 | 0   |
|        | 6 | 0   |
|        | 5 | 0   |
| Packet | 4 | 0   |
| 14     | 3 | ▲ V-Phase (L)                               |
|        | 2 | ↑   |
|        | 1 | ↓   |
|        | 0 | ▼   |

|        |   |                    |
|--------|---|--------------------|
|        | 7 | 1 Terminator (FFh) |
|        | 6 | 1                  |
|        | 5 | 1                  |
| Packet | 4 | 1                  |
| 15     | 3 | 1                  |
|        | 2 | 1                  |
|        | 1 | 1                  |
|        | 0 | 1                  |

## COMMAND LIST

### VISCA Command Setting Value

#### ◇ Exposure control

|               |       | NTSC  | PAL   |                |       |       |          |
|---------------|-------|-------|-------|----------------|-------|-------|----------|
| Shutter Speed | 13    | 10000 | 10000 | Bright         | 17    | F1.4  | 18 dB    |
|               | 12    | 6000  | 6000  |                | 16    | F1.4  | 15 dB    |
|               | 11    | 4000  | 3500  |                | 15    | F1.4  | 12 dB    |
|               | 10    | 3000  | 2500  |                | 14    | F1.4  | 9 dB     |
|               | 0F    | 2000  | 1750  |                | 13    | F1.4  | 6 dB     |
|               | 0E    | 1500  | 1250  |                | 12    | F1.4  | 3 dB     |
|               | 0D    | 1000  | 1000  |                | 11    | F1.4  | 0 dB     |
|               | 0C    | 725   | 600   |                | 10    | F1.6  | 0 dB     |
|               | 0B    | 500   | 425   |                | 0F    | F2    | 0 dB     |
|               | 0A    | 350   | 300   |                | 0E    | F2.4  | 0 dB     |
|               | 09    | 250   | 215   |                | 0D    | F2.8  | 0 dB     |
|               | 08    | 180   | 150   |                | 0C    | F3.4  | 0 dB     |
|               | 07    | 125   | 120   |                | 0B    | F4    | 0 dB     |
|               | 06    | 100   | 100   |                | 0A    | F4.8  | 0 dB     |
|               | 05    | 90    | 75    |                | 09    | F5.6  | 0 dB     |
|               | 04    | 60    | 50    |                | 08    | F6.8  | 0 dB     |
|               | 03    | 30    | 25    |                | 07    | F8    | 0 dB     |
|               | 02    | 15    | 12    |                | 06    | F9.6  | 0 dB     |
|               | 01    | 8     | 6     |                | 05    | F11   | 0 dB     |
| 00            | 4     | 3     | 04    | F14            | 0 dB  |       |          |
| Iris          | 11    | F1.4  |       | 03             | F16   | 0 dB  |          |
|               | 10    | F1.6  |       | 02             | F19   | 0 dB  |          |
|               | 0F    | F2    |       | 01             | F22   | 0 dB  |          |
|               | 0E    | F2.4  |       | 00             | CLOSE | 0 dB  |          |
|               | 0D    | F2.8  |       | Exposure Comp. | 0E    | 7     | 10.5 dB  |
|               | 0C    | F3.4  |       |                | 0D    | 6     | 9 dB     |
|               | 0B    | F4    |       |                | 0C    | 5     | 7.5 dB   |
|               | 0A    | F4.8  |       |                | 0B    | 4     | 6 dB     |
|               | 09    | F5.6  |       |                | 0A    | 3     | 4.5 dB   |
|               | 08    | F6.8  |       |                | 09    | 2     | 3 dB     |
|               | 07    | F8    |       |                | 08    | 1     | 1.5 dB   |
|               | 06    | F9.6  |       |                | 07    | 0     | 0 dB     |
|               | 05    | F11   |       |                | 06    | -1    | -1.5 dB  |
|               | 04    | F14   |       |                | 05    | -2    | -3 dB    |
|               | 03    | F16   |       |                | 04    | -3    | -4.5 dB  |
|               | 02    | F19   |       |                | 03    | -4    | -6 dB    |
|               | 01    | F22   |       |                | 02    | -5    | -7.5 dB  |
| 00            | CLOSE |       | 01    |                | -6    | -9 dB |          |
| Gain          | 07    | 18 dB |       |                | 00    | -7    | -10.5 dB |
|               | 06    | 15 dB |       |                |       |       |          |
|               | 05    | 12 dB |       |                |       |       |          |
|               | 04    | 9 dB  |       |                |       |       |          |
|               | 03    | 6 dB  |       |                |       |       |          |
|               | 02    | 3 dB  |       |                |       |       |          |
|               | 01    | 0 dB  |       |                |       |       |          |
|               | 00    | -3 dB |       |                |       |       |          |

## COMMAND LIST

### ◇ Lens control

|                  |                            |    |                            |
|------------------|----------------------------|----|----------------------------|
| Zoom             | 0000<br>(Optical Wide end) | to | 4000<br>(Optical Tele end) |
|                  | 4000<br>(Digital zoom ×1)  | to | 7AC0<br>(Digital zoom ×12) |
| Focus            | 1000<br>(Far)              | to | C000<br>(Near)             |
| Focus Near Limit | 1000<br>(Far)              | to | C000<br>(Near)             |

NOTE) The lower 1 byte is fixed at 00.

### ◇ Others

|           |          |
|-----------|----------|
| R, B Gain | 00 to FF |
| Aperture  | 00 to 0F |
| V-Phase   | 00 to FF |

### ◇ Title setting

|           |                    |        |
|-----------|--------------------|--------|
| Vposition | 00 to 0A           |        |
| Hposition | 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   |

### ◇ Title characters

Table of character codes

|    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|
| 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  | É  | ì  | Ò  | Ù  | Á  | É  | Í  |
| 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 |
| Ó  | Ú  | Â  | Ê  | Ë  | AE | OE | Ã  |
| 38 | 39 | 3a | 3b | 3c | 3d | 3e | 3f |
| Ö  | Ñ  | Ç  | β  | Ä  | ï  | Ö  | Ü  |
| 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 |
| Å  | \$ | ₣  | ¥  | DM | £  | ¢  | i  |
| 48 | 49 | 4a | 4b | 4c | 4d | 4e | 4f |
| φ  | ”  | :  | ’  | .  | ,  | /  | -  |



**Sales Office :****Japan**<http://www.sony.co.jp/ISP/>

Sony Corporation (JAPAN)

4-14-1, Asahi-cho, Atsugi-shi, Kanagawa-ken,  
243-0014 Japan

Tel: +81-46-230-5873 Fax: +81-46-230-6243

**USA**<http://www.sony.com/videocameras>

Sony Electronics Inc.

HQ

1 Sony Drive, Park Ridge, NJ 07656

Tel: +1-800-686-7669

**Canada**

Sony of Canada Ltd.

115 Gordon Baker Rd, Toronto, Ontario M2H 3R6

Tel: +1-416-499-1414 Fax: +1-416-497-1774

**FCB-EX48L/EX48LP**  
**FCB-EX480L/EX480LP****Europe**<http://www.pro.sony-europe.com/isp/>

Sony Broadcast &amp; Professional

HQ

Schipholweg 275, 1171 PK Badhoevedorp, The Netherlands

Tel: +31-20-44-99-351 Fax: +31-20-44-99-333

Germany

Hugo-Eckener-Str. 20, D-50829 Koln

Tel: +49-221-5378-923 Fax: +49-221-537-491

France

16-26, rue Morel 92110 Clichy

Tel: +33-1-55-90-41-58 Fax: +33-1-55-90-42-20

UK

The Heights, Brooklands, Weybridge, Surrey KT13 0XW

Tel: +44-990-331122 Fax: +44-1932-817011

Nordic

Per Albin Hanssons vag 20 S-214 32 Malmo Sweden

Tel: +46-40-190-800 Fax: +46-40-190-450

Italy

Via Galileo Galilei 40 I-20092 Cinisello Balsamo, Milano

Tel: +39-02-618-38-431 Fax: +39-02-618-38-402