epcom®

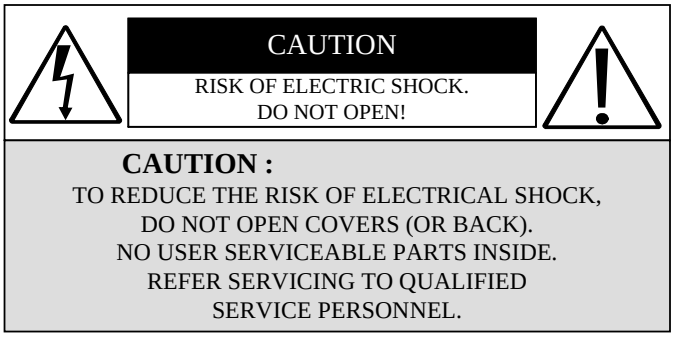
EFFIO-P
Wide Dynamic Range Infrared Dome Camera

U S E R M A N U A L

VER 1.0, P/N: R040195A

Contents

1. SAFETY PRECAUTIONS



It is advised to read the Safety Precaution Guide through carefully before operating the product, to prevent any possible danger.

WARNING: Alert the user to the presence of un-insulated "dangerous voltage".

CAUTION: Alert the user the presence of important operating and maintenance (Servicing) instructions in the literature accompanying the appliance.

Disposal of Old Electrical & Electronic Equipment (Applicable in the European Union and other European countries with separate collection systems).

This symbol indicates that this product shall not be treated as household waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health. For more detailed information about recycling of this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

Please be extra careful not to shake the product.

Please avoid places where frequent vibrations or shocks.

Do not install the product in extreme temperature conditions.
Only use the camera under conditions where temperatures are between -10℃ and +50℃. Be especially careful to provide ventilation when operating under high temperatures.

Do not install the product in an environment where the humidity is high.
Unless the product is waterproof or weatherproof, otherwise it can cause the image quality to be poor.

Do not expose to strong light (sun rays), as color filters will be discolored.

Do not spill liquid of any kind on the product.
If it gets wet, wipe it dry immediately. Alcohol or beverage can contain minerals that corrode the electronic components.

When any abnormal occurs, make sure to unplug the unit, and contact your local dealer.

2. INTRODUCTION

This WDR digital image camera uses a high sensitive color Sony 1/3” interline transfer Charge Coupled Device (CCD) image sensor, producing pictures reaching 650 lines of horizontal resolution.

Super Wide Dynamic Range technology, capturing both high-luminance and low luminance subjects under these type of shooting conditions. 3-D Noise Reduction technology, automatic reduce noise at low light environment, clear picture quality saving 90% hard disk storage space of DVR when using MPEG/ MPEG4/ H.264 compression after noise reduction. The camera-side initiatively provides mobile detection warnings offering more comprehensive monitoring of safety protection. Careful planed privacy zone enables monitoring more at ease.

3. FEATURES

High Resolution

CCD Sensor provides high resolution reaching 650 TVL with advanced and clear picture quality.

Excellent Sensitivity

High sensitivity, low smear, high anti-blooming and high S/N ratio.

Wide Dynamic Range (WDR) and Adaptive Tone Reproduction

High-quality WDR and ATR functions, perfectly shows the image details between dark and light. Newly added environment dynamic detection switch, enhancing WDR image efficiency.

Digital Noise Reduction (DNR)

2D/ 3D DNR, realize the clear image at low light environment, clear picture quality saving hard disk storage size of DVR when using MPEG/MPEG4/H.264 compression after noise reduction.

Day & Night

Mechanic IR cut-filter driving unit with AE provides change from color to B&W mode automatically for day and night 24-hour surveillance. Selectable between manual Day & Night control or from external input signal Day & Night control.

Digital Slow Shutter (DSS)

Improve the low light performance. When in low light, reducing the image frame refresh rate and increase the sensitivity of the camera.

Privacy Mask

Privacy image masking with free position, support up to 15 areas of privacy masking zone. Privacy area enlarges with digital zoom-in function.

Motion Detection

Camera-site takes the initiative in providing motion detection alert for a more comprehensive monitoring and careful editing of motion detection area. When there are changes within the detection area, the camera immediately issues a warning.

Lens (C/CS Mount)

Built-in DC-type Vari-Focal lens with ICR.

Extra Connection

Control the camera easy by keyboard/PT Driver via RS485 interface; Connect the extra Alarm out to combine with the Motion Detection function.

OSD

OSD (On Screen Display) Setup Menu. Camera tile setup of up to 16 alphanumeric letters.

Image Control

Performance: 16x digital zoom, freeze image, positive/ negative image, mirror function (left/ right), reverse turn (up/ down), and 180° rotation.

Application

All function can be operated from OSD: WDR (Wide Dynamic Range), ATR (Adaptive Tone Reproduction), IR OPT (IR Smart), AES (Automatic Electronic Shutter), AI (Auto Iris), AGC (Auto Gain Control), AWB (Auto White Balance), BLC (Back Light compensation), DSS (Digital Slow Shutter) and provides the flickerless mode, and line-lock function.

*****Optional**

DC 12V
AC 90~240V

4. PACKING LIST

Check and make sure all the items shown below are included in your product package. If something is missing, contact your dealer as soon as possible.

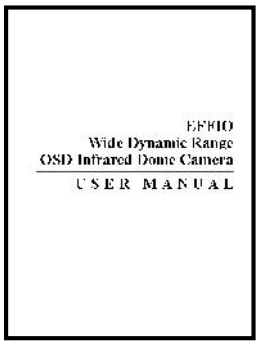
Dome (IR Type)

Indoor IR Dome

or

Outdoor IR Dome

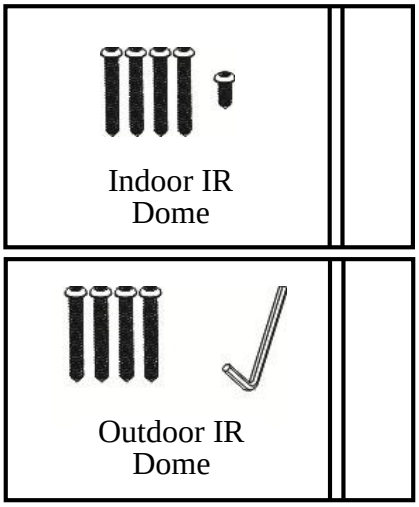
User's Manual



Power Adaptor (option)

L Type Bracket (option)

Accessories

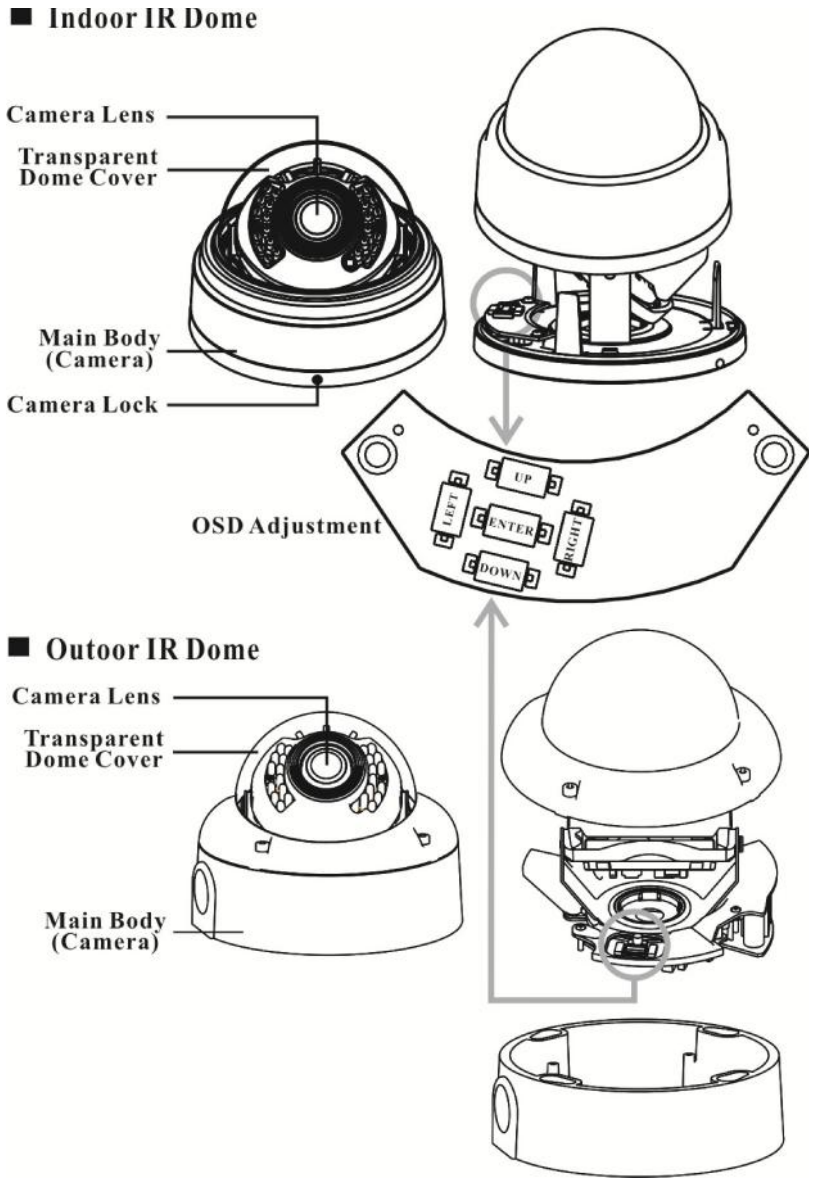


5. NAME and FUNCTION of EACH PART

5.1 OSD Button (Menu):

No.	Name	Function
1	UP	Digital Zoom-Out or Up direction button
2	DOWN	Digital Zoom-In or Down direction button
3	RIGHT	Increase Value (+)
4	LEFT	Decrease Value (−)
5	ENTER	Enter or Exit setup MENU

To adjust the OSD, remove the dome cover from the main body by gently turning the cover counter-clockwise to unlock and pull free from the main body. The OSD buttons can be found on the main body of the dome camera.



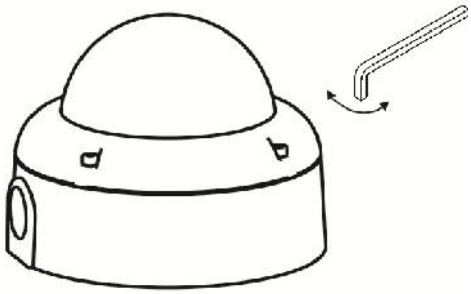
6. INSTALLATION

6.1 Camera Installation & Operation

1. **Removing the Dome Cover**
   - Remove the indoor dome cover from the main body by gently turning the cover counter-clockwise to unlock and pull free from the main body.
   - Remove the outdoor dome cover using the provided L-Wrench, loosen the screws securing the temper-resistant housing cover (with the screws still attached on the cover) to unlock the cover from the main body.

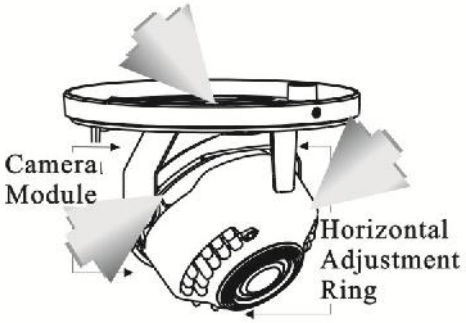
■ Indoor IR Dome

■ Outoor IR Dome

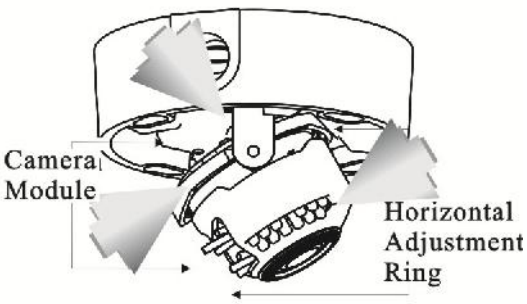


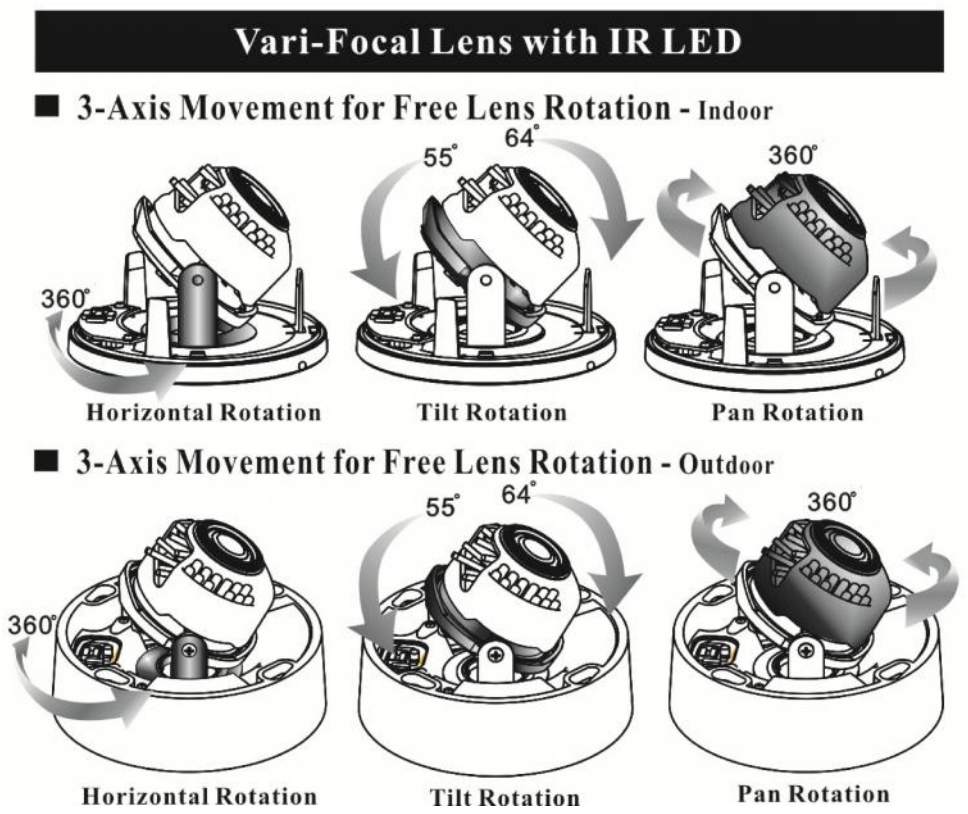
2. **Camera Image Adjustment**
   - You can adjust camera to any direction by using Pan, Tilt, and Rotate the mechanism.
   - Pan Base moves by 360° on the whole.
   - Tilt Base covers total 119° angle (64° to one side and 55° to the other side).
   - Angle range of Rotate Base is 360°.

■ Indoor IR Dome



■ Outoor IR Dome

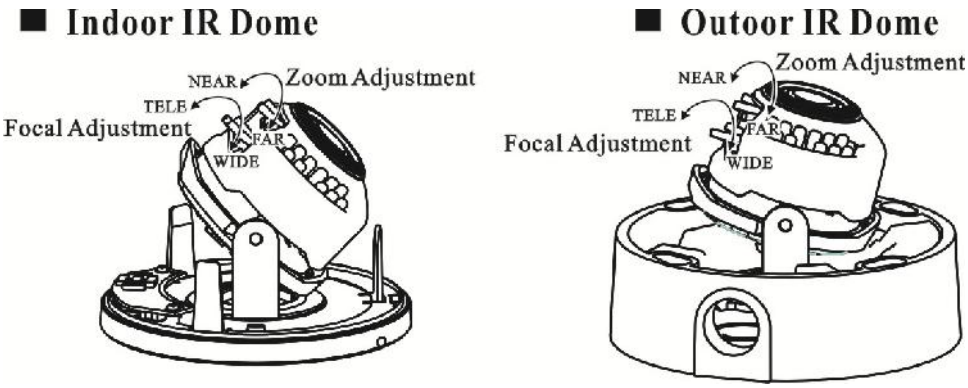




<**Note**> This product is not suitable for horizontal 360° continuous rotation.

3. Adjusting the Vari-Focal Lens

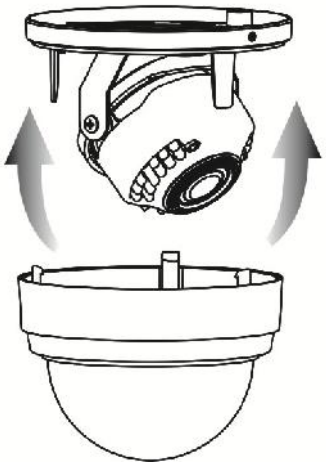
- Loosen the Zoom lever counter-clockwise a little, and then rotate the Zoom lever to obtain the best image view.
- Loosen the Focus lever counter-clockwise a little, and then rotate the Focus lever to obtain the optimum picture quality.
- Re-tighten the Zoom lever and Focus lever after adjustment.



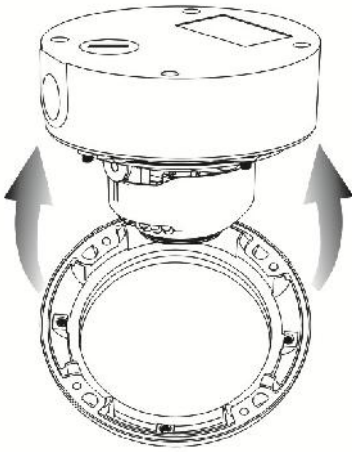
4. Attaching the Dome Cover

- After all necessary adjustment has been made reinstall the dome cover to the main body.

■ Indoor IR Dome

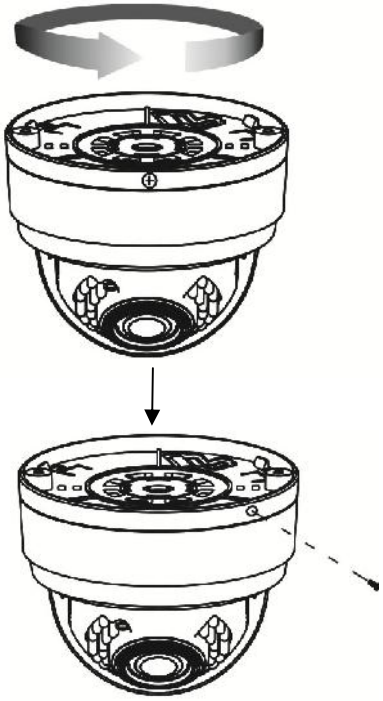


■ Outoor IR Dome

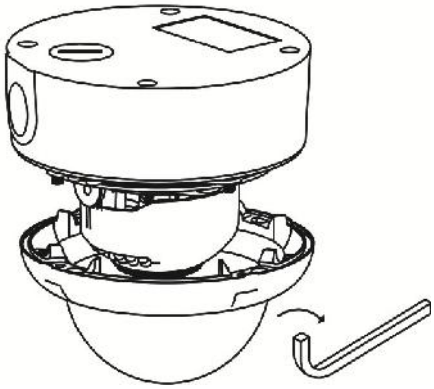


- Reinstall the indoor dome cover and the main body by turning the dome clockwise until it locks in place. To prevent unpredictable damage and burglary, lock-up the dome by using the countersunk head screw.
- Reinstall the outdoor dome cover and the main body by using the provided L-Wrench to fasten the cover to the main body.

■ Indoor IR Dome



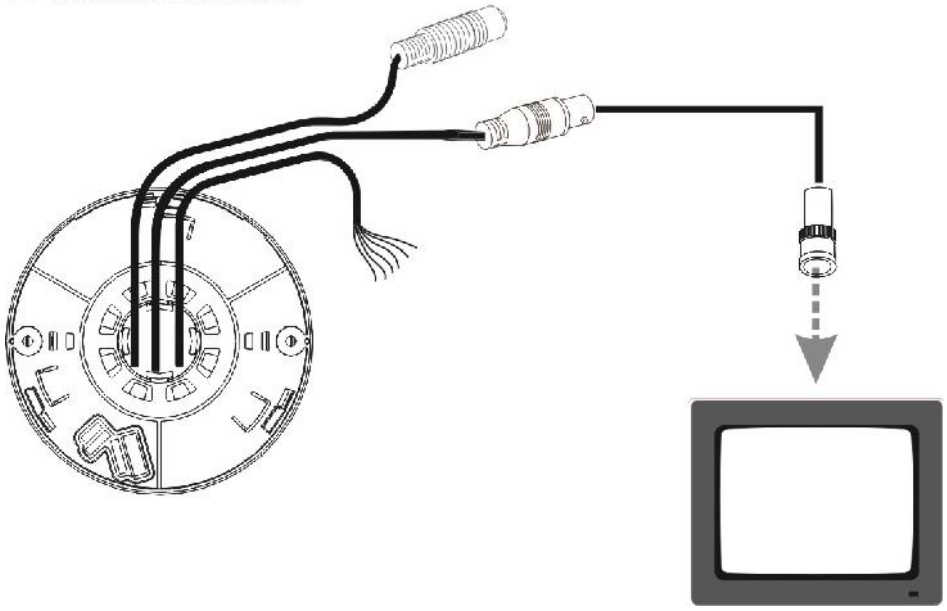
■ Outoor IR Dome



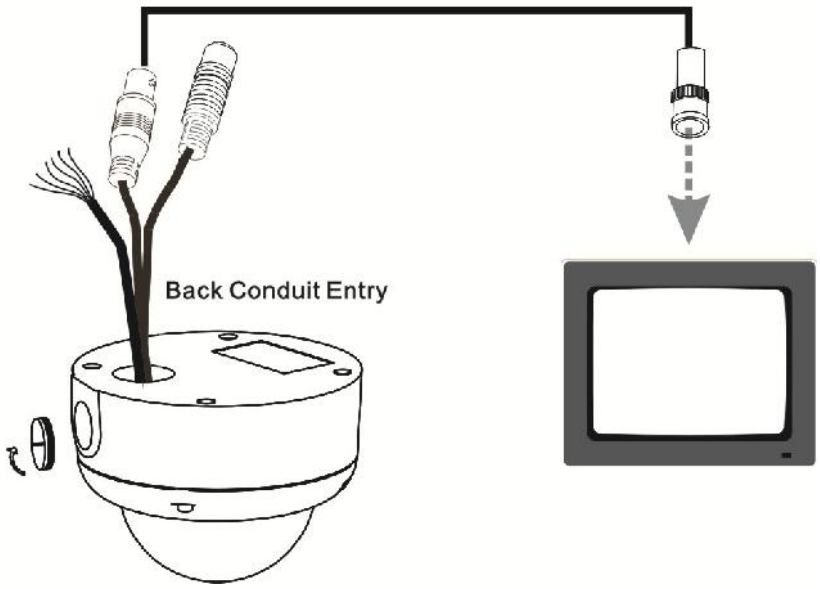
6.2 Connect to Monitor

Connect the Video-out port of the camera to a monitor. As the connecting method varies depending on the instrument, therefore refer to the manual supplied with the instrument for more information.

■ **Indoor IR Dome**

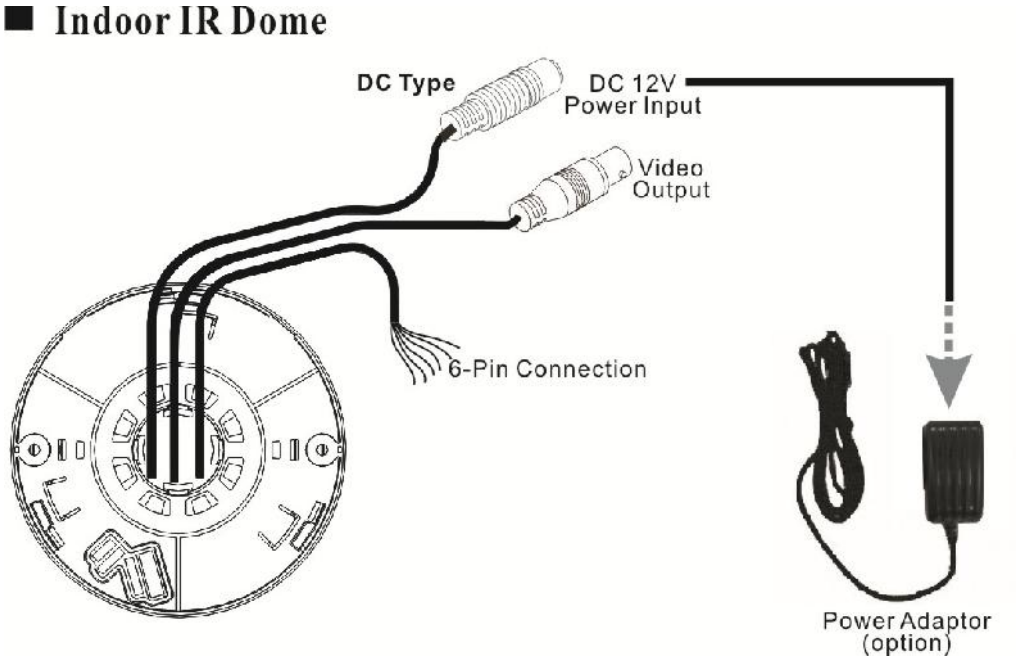


■ **Outoor IR Dome**



6.3 Connect the Power

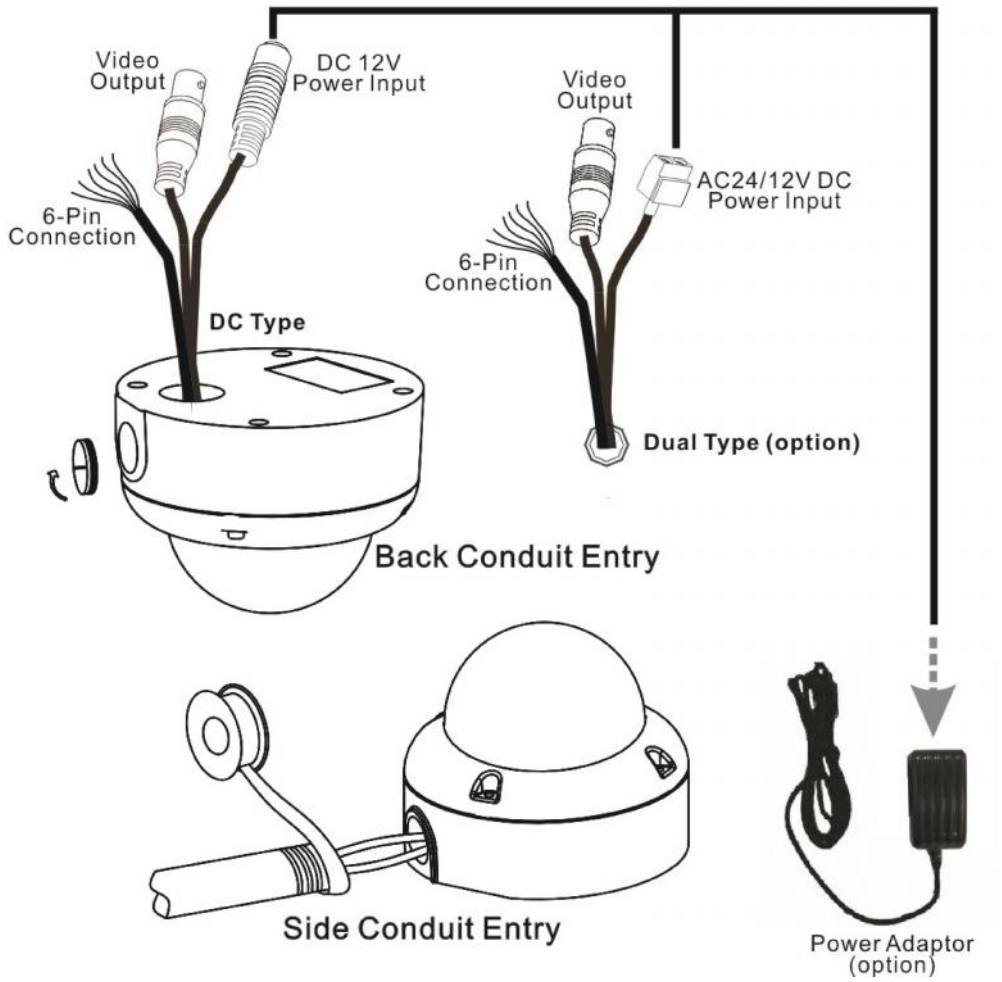
- Connect the indoor dome video output to a 75 Ohms type coaxial cable and the DC-Jack or AC/ DC-Terminator to the power source.



<**Note**> Power adapter is sold separately.

- Connect the outdoor dome video output to a 75 Ohms type coaxial cable and the DC-Jack or AC/ DC-Terminator to the power source. When using the side conduit cabling, it is suggested to use a metal to cover over the cables to prevent external damage and as weatherproof prevention, please wined the weatherproof adhesive tape (P.T.F.E. THREAD SEAL TAPE) onto the metal cover before installation.

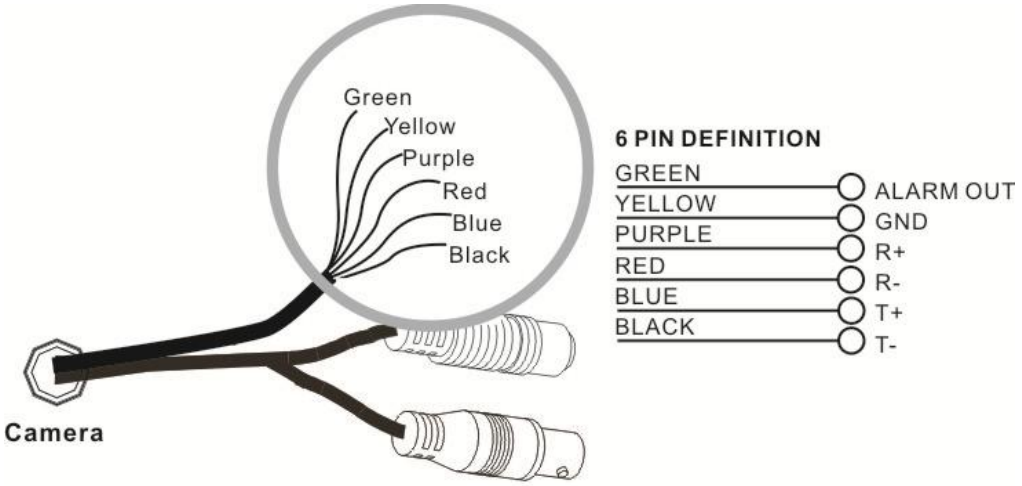
■ **Outoor IR Dome**



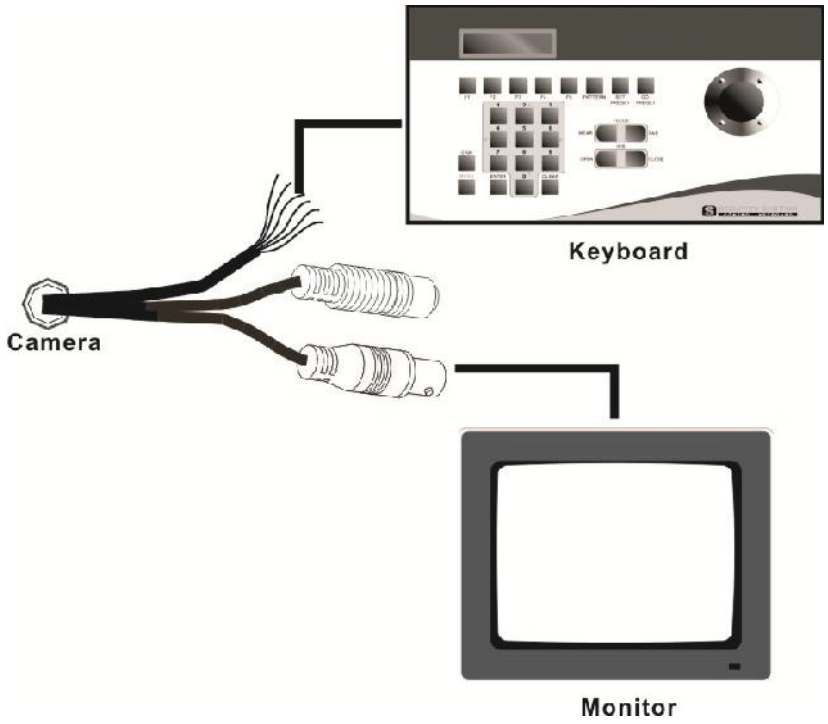
<**Note**> Power adapter is sold separately.

6.4 Connection Layout

To connect the keyboard and alarm, please follow the setup guide shown below:



6.4.1 Connecting the Keyboard



PELCO Keyboard (or compatible) Installation

RS-422 interface is used for communicating PELCO keyboard. Refer to Fig. 1; connect R+ of the camera to T+ of the PELCO keyboard. Connect R- of the camera to T- of the PELCO keyboard.

User could adjust Camera ID via rear panel keys or via remote commands. Protocol, Speed and Parity should only be adjusted via rear panel keys.

Communication	Setting
CAMERA ID	0 ~ 253 for P protocol
	1 ~ 255 for D protocol
PROTOCOL	PELCO
SPEED	2400, 4800, 9600, 19200
PARITY	NONE

The speed of camera should be the same as the speed of the keyboard. Adjusted function is only effective, after exiting the OSD setup menu.

<**Note**>

Maximum cable distance for RS-485 communication over 24-gauge wire is 4,000 feet (1,219 m). Recommend using shielded twisted pair cable that meets the basic requirements for EIA RS-485 applications.

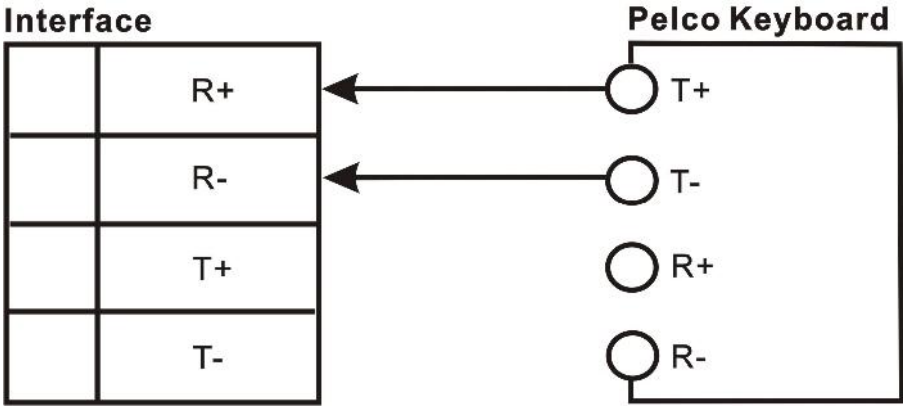
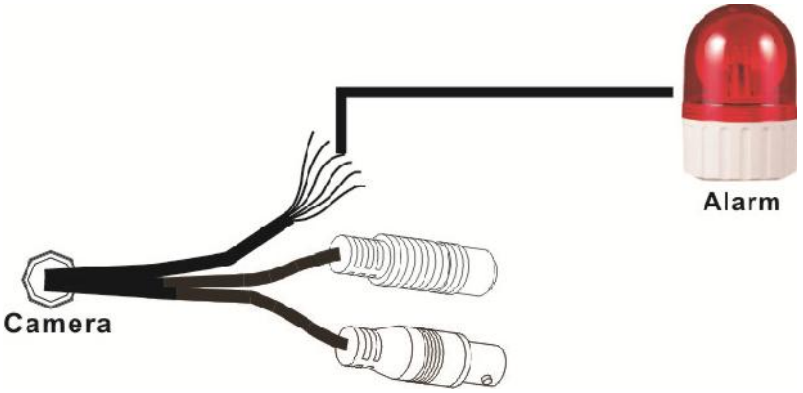


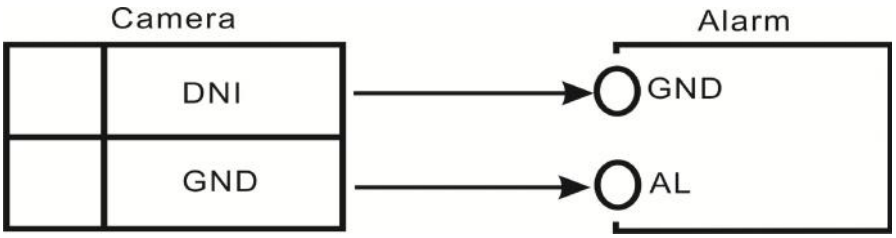
Fig.1

6.4.2 Connecting the Alarm



Alarm Installation

Connect GND and AL of the camera to the GND and AL of the alarm.



<**Note**> The alarm is triggered by motion detection.

7. OPERATION

1. Mount the camera on the mounting bracket by using the hole on the top or bottom of the camera, and by using the enclosed mounting block, secured by 2 screws.
2. Connect the video output to the monitor or other video device via a 75 Ohms type coaxial cable.
3. Power Input Terminal (Dual Power): the camera accepts both AC 24V and DC 12 V power sources (non-polarity).

7.1 PELCO Keyboard (or compatible) Operation

Normal Display Mode

PELCO Keyboard	Camera Function
OPEN	LEVEL +
CLOSE	LEVEL -
Twist Joystick clockwise or Zoom In	Zoom Tele
Twist Joystick counterclockwise or Zoom Out	Zoom Wide
NEAR	None
FAR	None
Move Joystick Left	None
Move Joystick Right	None
Move Joystick Up	None
Move Joystick Down	None
Enter 95; Hold the PRESET key (approximately five seconds) until the main menu appears on the screen.	Accessing OSD Main Menu

<**Note**>

CLOSE / OPEN adjustments are required to meet the EXPOSURE MODE settings, size LEVEL is only adjustable when the option is under [WDR], [BLC USER], and [NORMAL].

OSD Setup Menu Mode

PELCO Keyboard	Camera Function
OPEN	Sub Menu Enter
CLOSE	Sub Menu Exit
NEAR	Cursor Up
FAR	Cursor Down
Move Joystick Left	Decrease (-)
Move Joystick Right	Increase (+)
Move Joystick Up	Cursor Up
Move Joystick Down	Cursor Down
Twist Joystick clockwise or Zoom In	None
Twist Joystick counterclockwise or Zoom Out	None

<**Note**>

Please refer to PELCO Keyboard (or compatible) manual for more information.

8. SYSTEM SETUP

8.1 Digital Zoom Operation:

Under normal display (before entering the OSD menu), use ▲(T)/ ▼(W) button to control the digital zoom (zoom range: 1 x ~ 16 xs).

8.2 OSD (On Screen Display)

Main Menu Display

MAIN MENU	VERSION
EXPOSURE	◊
DAY/NIGHT	AUTO⁄
WHITE BALANCE	⁄
PRIVACY	⁄
EFFECT	⁄
MOTION DETECT	OFF
COMMUNICATION	⁄
EXIT SAVEALL DEFAULT	

Main Menu Setup

- In order to display the setup menu on the screen, set the menu command or press the button panel.
- Use ▲(T)/ ▼(W) control buttons to select each item.
- Use ◄(－)/ ►(＋) control buttons to change the data.
- Use MENU control button to ENTER/ EXIT the menu display.

8.3 Sub Menu Description

8.3.1 EXPOSURE Setup

EXPOSURE

WDR	◊
SHUTTER	MANUAL/
BACKLIGHT	OFF
SHUTTER AGC	LOW
NOISE REDUCTION	/
IRIS SPEED	031
DIS	OFF
DEFAULT	
RETURN/	

(1) WDR:

- This function is used for changing the AE mode.
- Set the mode to Normal, ATR-EX, WDR
  CONTRAST
  This function is used for ATR-EX & WDR mode setting.
  Set contrast to Low/ Mid. Low/ Middle/ Mid. High/ High.
  LEVEL
  This function is used for ATR-EX & WDR mode setting.
  Set contrast to Low/ Mid. Low/ Middle/ Mid. High/ High.

(2) SHUTTER:

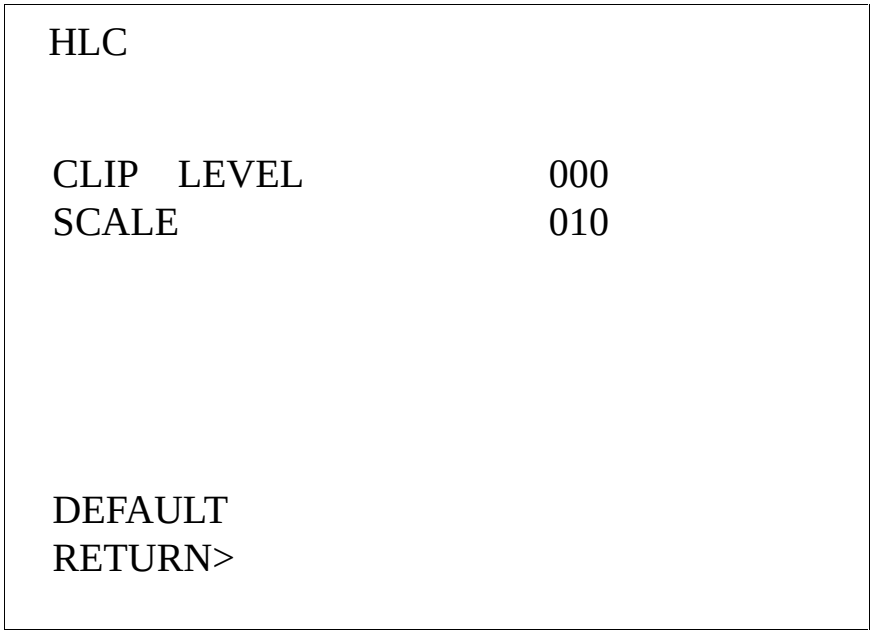
- AUTO SHUTTER MODE:
  HIGHT LUMINANCE
  Set the Brightness to 0 ~15 (Default Setup: 3).
  LOW LUMINANCE
  Set the DSS to **OFF**, 2~20FLD, 40FLD, 80FLD, 160FLD, 256FLD, 512FLD (Default Setup: OFF).
- Manual SHUTTER SPEED MODE:
  Set the speed **(NTSC: 1/60, PAL: 1/50)**, (NTSC: 1/100FLK, PAL: 1/120FLK), 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, 1/20000, 1/50000, 1/100000 sec.
  HIGH LUMINANCE
  Set the brightness to 0 ~15 (Default Setup: 3).

(3) HLC/ BLC:

- This function could be enabled when WDR function is off.
- Set the mode to **OFF/** BLC MANUAL/ BLC SMART/ HLC.

- Back Light Compensation (BLC) is ON:
  BLC could emphasize the luminance of the BLC Area according to the BLC Level.
- Manual/ SMART BLC:
  MANUAL
  The Manual BLC function enables manually setup of BLC on parts of image or the whole image.
  SMART
  The Smart BLC function through DSP, according to the backlight environment auto calculates the backlight compensation to assure explicit and accurate image both in dark or strong backlight environment.
  HLC SET
  The High Light Compensation (HLC) function enhances the visibility of license plates and other objects by performing suppression processing and mask processing on strong light sources (automobile headlights, etc.) in dark locations.

EXPOSURE HLC



HLC CLIP LEVEL

- Sets the clip level used for luminance mask.
- Adjust the level from **0** MIN to 50 MAX., lower the value darker the luminance mask (grey) and higher the value lighter the luminance mask (white).

HLC SCALE

- Sets the AE exposure correction in HLC mode.
- Adjust the level from 0 MIN to 15 MAX (Default Value: **13**).

EXPOSURE/**BLC**

BLC

LEVEL	000
AREA SELECT	CENTER
TOP	NA
BOTTOM	NA
LEFT	NA
RIGHT	NA

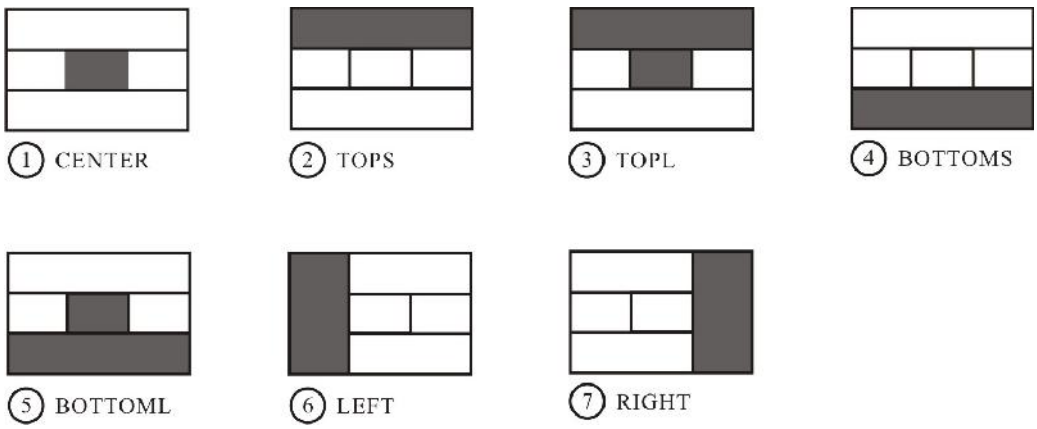
DEFAULT
RETURN>

BLC LEVEL SET

- This function is valid to BLC MANUAL mode.
- Adjust the level from **0** MIN to 15 MAX.

BLC AREA SET

- This function is valid to BLC MANUAL mode.
- Define the main object area that is under exposure based on the average luminance of the whole image.
- AREA：Setup to “BLC”, the area is set as BLC area and under manual mode ①CENTER ②TOPS ③TOPL ④BOTTOMS ⑤BOTTOML ⑥LEFT ⑦RIGHT
- Set BLC area to USER to manually setup the BLC area.



(4) SHUTTER AGC:

Adjust the level from **LOW*/** MIDDLE/ HIGH.

(5) NOISE REDUCTION:

- Set the 2D-NR to **OFF/** LOW/ MID-LOW/ **MIDDLE*/** MID.HIGH/ HIGH.
- Set the 3D-NR to **OFF/** LOW/ MID-LOW/ **MIDDLE*/** MID.HIGH/ HIGH.

(7) IRIS SPEED:

- Set the IRIS SPEED from 0 ~ **31*** ~ 255.
- When aperture blinking occurs, adjust the IRIS SPEED to improve the blinking result.

(6) DIS:

Set the digital image stabilizer mode to **OFF*** or ON.

(7) DEFAULT:

If default is entered, all exposure functions will be changed to the factory default setting.

(8) RETURN:

Exit the Exposure setup menu and return to the main menu.

8.3.3 DAY/NIGHT Setup:

DAY/ NIGHT

DAY/ NIGHT AUTO

DEFAULT
RETURN

(1) DAY/ NIGHT:

- This function is used for Day & Night control mode setting.
- Set the mode to **EXTERNAL >***, DAY, NIGHT or AUTO mode.
- IR OPT function is applicable only under EXTERNAL mode.
- Sub menu of AE mode could be set to the following parameters.

AUTO／DAY TO NIGHT

- Adjust the threshold level from 156 to 895 to switch mode from day to night (Default Setup: **500***).
- When SHUTTER AGC is set to LOW, the threshold level will be from 349~895
- When SHUTTER AGC is set to MID, the threshold level will be from 253~895
- When SHUTTER AGC is set to HIGH, the threshold level will be from 156~895

AUTO／NIGHT TO DAY

- Adjust the threshold level from 156 to **895*** to switch mode from night to day (Default Setup: **700***).
- When SHUTTER AGC is set to LOW, the threshold level will be from 349~895
- When SHUTTER AGC is set to MID, the threshold level will be from 253~895
- When SHUTTER AGC is set to HIGH, the threshold level will be from 156~895

AUTO／DELAY CNT

- Adjustable level from 0 to 60 seconds (Default Setup: **5***).
- Delay time is used for turning the filter.

AUTO／BURST

Adjust the mode to OFF or **ON***.

EXTERNAL／IR OPT

- Adjust the mode to OFF* or ON (Set to ON to select between CENTER or AUTO mode).
- Adjustable level from 1 to 31 (Default Setup: **3***).
- Setup ATR-EX to ON or **OFF***.

<**Note**>

EXTERNAL mode must be switched to NIGHT mode to enable IR OPT function.

(2) DEFAULT:

If default is entered, all DAY/ NIGHT functions will be changed to the factory default setting.

(3) RETURN:

Exit the DAY/ NIGHT setup menu and return to the main menu.

8.3.4 AUTO WHITE BALANCE Setup:

AUTO WHITE BALANCE

MODE ATW

DEFAULT
RETURN

(1) AWB MODE:

- This function is used for changing the WB mode.
- Set the mode to **ATW***, Indoor, Outdoor, Manual, Push Lock, Anti-CR.
- ATW: WB color temperature range = 2500°K ~ 8000°K.
- Manual WB: Adjust Red and Blue gain to perform a desired White Balance.
- PUSH LOCK Set the WB mode to Push Lock
- Anti-CR: Set the WB mode to Anti-CR. WB color temperature range = 3800°K~6000°K.
- Sub menu of Manual> mode could be set the following parameters.

R GAIN (Red Gain)

- This function is valid only when WB MODE is set to MANUAL.
- Adjust the level from 0 to 255 (Default Setup: **0***).

B GAIN (Blue Gain)

- This function is valid only when WB MODE is set to MANUAL.
- Adjust the level from 0 to 255 (Default Setup: **0***).

(2) PUSH LOCK:

- This function is valid only when WB MODE is set to PUSH LOCK.
- Enable this mode to perform auto tracing action. Disable this mode to preserve the final auto tracing action.

(3) DEFAULT:

If default is entered, all AWB function will be changed to the factory default setting.

(4) RETURN:

Exit the AWB setup menu and return to the main menu.

8.3.5 PRIVACY Setup:

PRIVACY

AREA SELECT	1/15
MODE	OFF
POSITION	NA
COLOR	NA
TRANSP.	NA
MOSAIC	NA

DEFAULT
RETURN

(1) AREA SELECT:

- Select the mask from 1 to 15.
- The number is which current setting of mask.

(2) MODE:

Adjust the mode to **OFF* o**r ON.

(3) POSITION:

- Adjust the position of the mask area by top, bottom, left and right fields.
- This function is available only when mask function is enabled.

(4) COLOR:

- Set the color to WHITE, **BLACK***, RED, GREEN, BLUE, YELLOW, CYAN or MAGENTA.
- This function is available only when mask function is enabled.

(5) TRANSP.:

- Set the transparency to 0.00, 0.5, 0.75 or **1.0***.
- This function is available only when mask function is enabled.

(6) MOSAIC:

- Set mosaic effect to ON or **OFF*.**
- This function is available only when mask function is enabled and transparency ≠ 1.0.

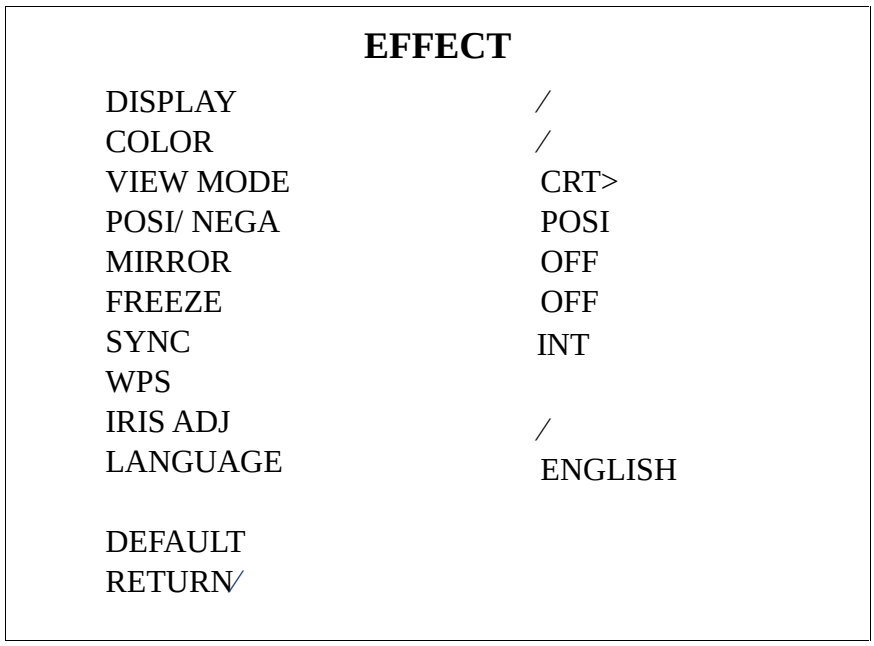
(7) DEFALUT:

If default is entered, all PRIVACY functions will be changed to the factory default setting.

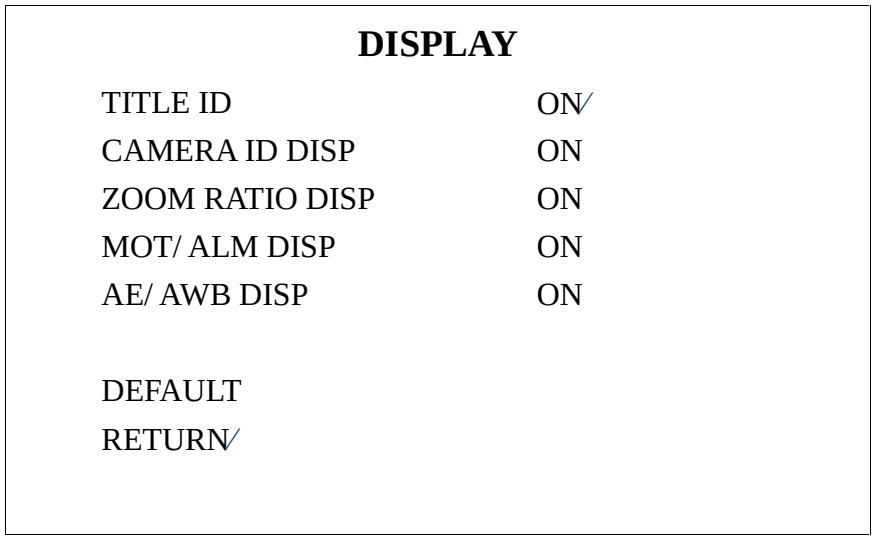
(8) RETURN:

Exit the PRIVACY setup menu and return to the main menu.

8.3.6 EFFECT Setup:



EFFECT→ [DISPLAY]



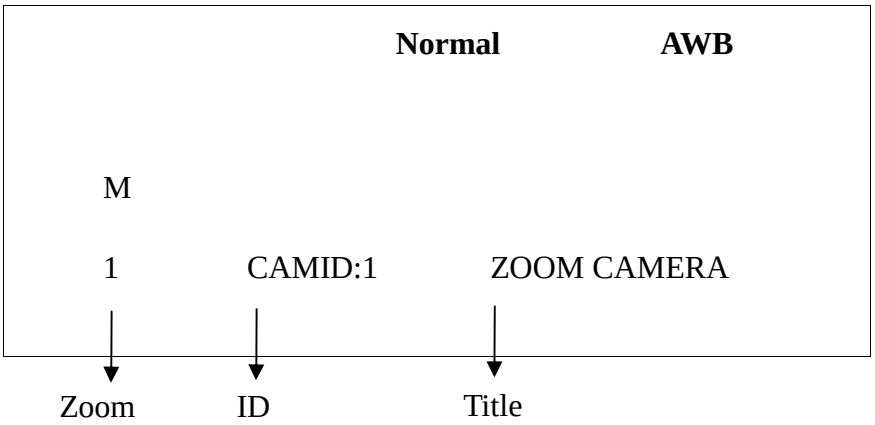
(1) DASPLAY:

This function is used for on screen display settings.

- TITLE ID SET
  - Select the mode **ON***/ OFF.
  - The Title ID can be edited (Please avoid the following display locations: CAMERA ID/ZOOM RATIO/MOT ALARM/AE AWB DISP.)
- CAMERA ID DISP SET

  Select the mode **ON***/ OFF.

- ZOOM RATIO DISP SET
  Select the mode **ON***/ OFF.
- MOT/ ALM DISP SET
  Select the mode **ON***/ OFF.
- AE/ AWB DISP SET
  Select the mode **ON***/ OFF.
- DEFAULT
  Return to default setup.
- RETURN
  Return to previous status.



(2) COLOR:

- BRIGHTNESS ADJUST SET
  Adjust the level from 0 ~**100***~ 255.
- CONTRAST ADJUST SET
  Adjust the level from 0 ~**32***~63.
- SHARPNESS ADJUST SET
  Adjust the level from 0 ~**8***~15.
- HUE ADJUST SET
  Adjust the level from 0 ~**75***~255.
- STATUARATION SET
  Adjust the level from 0 ~**3*** to 10.
- DEFAULT
  Return to default setup.
- RETURN
  Return to previous status.

(3) VIEW MODE

- This function is used for adjusting the display setting of LCD or **CRT***.
- Set the grammar profile for your monitor.

(4) POSI/ NEGA

- This mode is used for changing the color and luminance to negative.
- Select the mode NEGA or **POSI***.

(5) MIRROR

- This function allows mirroring the image vertically, horizontally, or both.
- Select the mode **OFF*,** V-FLIP, H-FLIP, or HV-FLIP.

(6) FREEZE

- This function allows freezing the screen.
- Select the mode ON, **OFF*.**

(7) SYNC:

- Under the LL mode, the AC power supply and VD signals of the camera are synchronized (V-PLL). The frequency of the power supply which can be used by the LL mode is 60Hz applying NTSC system and 50 Hz applying PAL system.
- Select the mode LL/ **INT*.**

<**Note**>

1. When the power is DC 12V, the SYNC menu is fixed to the INT mode (cannot be switched to Line Lock mode.).
2. When switched to Line Lock mode, use “SHIFT UP” and “SHIFT DOWN” to adjust the phase of the VD, and after adjusting to the new VD phase it will be switched to OFF.

(8) WPC

- This function detects during normal shooting the white pixels which arise after shipment from the factory and which have not been registered by the static detection function, and it provides compensation with no limits set on the number of white pixels.
- Select the mode ON, **OFF*.**

(9) IRIS ADJ

When replacing the lens, face the camera toward the light, and then start the option “ADJ”. Message “Wait…” means that adjustment is in progress, about 40 seconds afterward a message “Success!!” appears indicates that the adjustment has been completed. When the message “Time Out” or “ADJ ERR” appears indicates that the adjustment has failed.

(10) LANGUAGE:

- This function allows changing the language of OSD.
- Select the mode ENGLISH, 简体中文, or 繁體中文.

(11) DEFAULT:

If default is entered, all EFFECT functions will be changed to the factory default setting.

(12) RETURN:

Exit the EFFECT setup menu and return to the main menu.

<Note>

Do not precede IRIS ADJ function when replacing Manual Lens.

8.3.7 MOTION DETECT setup:

MOTION DETECT

BLOCK DISP	OFF
DETECT SENE	100
DURATION	5 S
ALARM OUT	OFF
DEFAULT	
RETURN	

(1) BLOCK DISP:

Select the motion block display ON/ **OFF***.

(3) DETECT SENSE:

Adjust the sensitivity level from 1~**100***~127 MAX.

(4) DURATION:

Adjust the duration time of alarm output from **5S***, 10S, 15S, 20S, 30S, 1M, 2M, 3M, 4M, and 5M,.

(5) ALARM OUT:

Select the alarm output ON/ **OFF*** when motion is detected.

(7) DEFALUT:

If default is entered, all MOTION DETECT functions will be changed to the factory default setting.

(8) RETURN:

Exit the MOTION DECTECT setup menu and return to the main menu.

8.3.8 COMMUNICATION setup:

COMMUNICATION	
CAMERA ID	001
BAUD RATE	9600
PARITY	NONE
DEFAULT	
RETURN	

(1) CAMERA ID:

- To connect large amount of cameras, identification number is assigned to each camera for camera control (000 ~ 255: total numbers of ID are 256).
- This function can only be setup by using the ID commands (Please refer to 7. Camera Control Command Protocol).

(2) BAUD RATE:

This function allows speed of serial interface setup.

(3) PARITY:

This function allows parity of serial interface setup.

(4) DEFALUT:

If default is entered, all COMMUNICATION functions will be changed to the factory default setting.

(5) RETURN:

Exit the PRIVACY setup menu and return to the main menu.

<**Note**>

Communication function is effective only when the above (1) ~ (3) function item setups has been completed.

8.3.9 EXIT Setup:

Exit the OSD menu and enter the normal display.

8.3.10 SAVE ALL Setup:

- Saving the current configuration to flash.
- Set this function to OFF and nothing will be written.

8.3.11 DEFAULT Setup:

If default is entered, all functions will be changed to factory default settings.

* Letters in BOLD: Default Mode

9. Camera Control Command Protocol

(For RS-232, RS-422, and RS-485)

9.1 Communication Format

Communication specification (Default)

Communication speed: 9600 BPS

Start bit: 1

Data bits: 8

Parity: None

Stop bit: 1

The communication data format from PC to Camera

Data of total 6 bytes is transmitted from PC to camera.

Format:

Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
0xC5	Code1	Code2	Code3	CAM_ID	C.S.

Description: (Refer to 7.2 PC Command)

(a) Byte 1: Camera realizes the protocol comes from the PC.

(b) Byte 2: The data is changeable according to the PC Command.

(c) Byte 3: The data is changeable according to the PC Command.

(d) Byte 4: The data is changeable according to the PC Command.

(e) Byte 5: Camera's ID (Identification) number to communicate (0 ~ 255).
It will be impossible to communicate when there's a difference between the value of CAM_ID and the given value of the Camera's ID.

(f) Byte 6: The value of Check Sum from 'Byte 1' to 'Byte 5'.
Ex.: In case of transmission, '0xC5, 0x5F, 0x0C, 0x00, 0x00'
0xC5 + 0x5F + 0x0C + 0x00 + 0x00 = 0x130
Therefore, C.S. = 0x30

The communication data format from Camera to PC

Data of total 9 bytes is transmitted from Camera to PC.

Format:

Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8	Byte9
0xC5	Code1	Code2	Code3	Data1	Data2	Data3	Data4	C.S.

Description: (Refer to 7.2 PC Command)

(a) Byte 1: Camera is realized the protocol comes from PC.

(b) Byte 2: Byte 1 data is received from PC.

(c) Byte 3: Byte 2 data is received from PC.

(d) Byte 4: Byte 3 data is received from PC.

(e) Byte 5: The data is changeable according to the PC Command.

(f) Byte 6: The data is changeable according to the PC Command.

(g) Byte 7: The data is changeable according to the PC Command.

(h) Byte 8: The data is changeable according to the PC Command.

(i) Byte 9: The value of Check Sum from ‘Byte 1’ to ‘Byte 8’.

The computing method is the same as “Byte6 of the communication from PC to Camera“.

9.2 PC Command

Exposure Mode Setting

Set the mode of Exposure according to AEmodeCNT.

PC → Camera

0xC5 0xAA 0x60 AEmodeCNT CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x60 AEmodeCNT 0x60 0xXX 0xXX 0xXX C.S.

AEmodeCNT: The counter for setting Exposure mode

1. In case of AEmodeCNT = 0x00, the Exposure mode becomes an “Normal” mode.
2. In case of AEmodeCNT = 0x01, the Exposure mode becomes an “ATR-EX” mode.
3. In case of AEmodeCNT = every other value, the Exposure mode remains unchanged.

BACKLIGHT Level Read

Read the current BACKLIGHT level of Camera.

PC → Camera

0xC5 0xAA 0x61 0x00 CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x61 0x00 BL_level 0xXX 0xXX 0xXX C.S.

BL_level: This is a value of the camera for controlling BACKLIGHT level.

Adjust BACKLIGHT level

Adjust current BACKLIGHT level of Camera.

PC → Camera

0xC5 0xAA 0x62 BL_level CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x62 BL_level 0x62 0xXX 0xXX 0xXX C.S.

BL_level: This is a value to adjust BACKLIGHT level of camera.

White Balance Mode Setting

Set the mode of White Balance according to WB_CNT.

PC → Camera

0xC5 0xAA 0x65 WB_CNT CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x65 WB_CNT 0x65 0xXX 0xXX 0xXX C.S.

WB_CNT: This is an index counter to change the mode of White Balance

1. In case of WB_CNT = 0, the mode of White Balance becomes “AUTO” mode.
2. In case of WB_CNT = 1, the mode of White Balance becomes “Anti-CR” mode.
3. In case of WB_CNT = 2, the mode of White Balance becomes “INDOOR” mode.
4. In case of WB_CNT = 3, the mode of White Balance becomes “OUTDOOR” mode.
5. In case of WB_CNT = 4, the mode of White Balance becomes “MANUAL” mode.
6. In case of WB_CNT = 5, the mode of White Balance becomes “PUSH AUTO” mode.
7. In case of WB_CNT = every other value, the mode of White Balance remains unchanged.

Camera ID Display Mode ON/ OFF Toggle control

Switch the display mode of camera ID (ON/ OFF).

PC → Camera

0xC5 0xAA 0x6A 0x00 CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x6A 0x00 0x6A 0xXX 0xXX 0xXX C.S.

Caution: If the Camera ID is “OFF” mode, then the Camera ID is not displayed.

Zoom Lens Position Read

Read the current position value of Zoom lens & Digital Zoom MAG data.

PC → Camera

0xC5 0x36 0x00 0x00 CAM_ID C.S.

Camera → PC

0xC5 0x36 0x00 0x00 ZP_CNT+1 ZP_CNT V_MAG 0xXX C.S.

1. ZP_CNT+1: Upper byte of Zoom lens position.
2. ZP_CNT: Lower byte of Zoom lens position.
3. V_MAG: Digital zoom data.

Ex. In case of Zoom lens Position = 0x12A & Digital zoom data = 0x10,

a. ZP_CNT+1 = 0x01
b. ZP_CNT = 0x2A
c. V_MAG = 0x10

Caution: This command is used to set the PRESET mode control.

Focus Lens Position Read

Read the current value of Focus lens.

PC → Camera

0xC5 0x37 0x00 0x00 CAM_ID C.S.

Camera → PC

0xC5 0x37 0x00 0x00 FP_CNT+1 FP_CNT 0xXX 0xXX C.S.

1. FP_CNT+1: Upper byte of Focus lens position.
2. FP_CNT: Lower byte of Focus lens position.

Ex. In case of Focus lens Position = 0x1A2,

1. FP_CNT+1 = 0x01
2. FP_CNT = 0xA2

Caution: This command is used to set the PRESET mode.

Camera Power ON

Turn on the power of Camera.

PC → Camera

0xC5 0x3A 0x00 0x00 CAM_ID C.S.

Camera → PC

0xC5 0x3A 0x00 0x00 0x00 0x00 0xXX 0xXX C.S.

Camera Power OFF

Turn off the power of Camera.

PC → Camera

0xC5 0x3E 0x00 0x00 CAM_ID C.S.

Camera → PC

0xC5 0x3E 0x00 0x00 0x00 0x00 0xXX 0xXX C.S.

Memorize Zoom Lens Position for External PRESET control

Memorize the Zoom lens position into the volatile “Buffer RAM” designated “Buffer RAM Index” for the external PRESET Move control.

PC → Camera

0xC5 0x49 PRE_I_ZH ZPL CAM_ID C.S.

Camera → PC

0xC5 0x49 PRE_I_ZH ZPL PRE_I_ZH 0xXX 0xXX 0xXX C.S.

1. PRE_I_ZH: The index value of the Buffer RAM to store the position of the Zoom lens for the PRESET mode, and the upper data of position value for Zoom lens.

Bit No.	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Description	Buffer RAM Index (0 ~ 7)				Upper data of Zoom lens position			

2. ZPL: Lower data of position value for the Zoom lens.

Ex. The position of Zoom Lens to memorize = 0x126 &

The index of Buffer RAM for PRESET = 2

0xC5 0x49 PRE_I_ZH ZPL CAM_ID C.S.

0xC5 0x49 0x21 0x26 CAM_ID C.S.

Memorize Focus Lens Position for External PRESET control

Memorize the Focus lens position into the volatile “Buffer RAM” designated “Buffer RAM Index” for the external PRESET Move control.

PC → Camera

0xC5 0x4A PRE_I_FH FPL CAM_ID C.S.

Camera → PC

0xC5 0x4A PRE_I_FH FPL PRE_I_FH 0xXX 0xXX 0xXX C.S.

1. PRE_I_FH: The index value of Buffer RAM to store the position of the Focus lens for the PRESET mode, and the upper data of position value for the Focus lens.

Bit No.	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Description	Buffer RAM Index (0 ~ 7)				Upper data of Focus lens position			

2. FPL: Lower data of position value for the Focus lens.

Ex. Memorize 0x21F to the Focus Lens Position in PRESET 3.

0xC5 0x4A PRE_I_FH FPL CAM_ID C.S.

0xC5 0x4A 0x32 0x1F CAM_ID C.S.

Memorize Digital Zoom Position for External PRESET control

Memorize the Digital Zoom position into the volatile "Buffer RAM" designated "Buffer RAM Index" for the external PRESET Move control.

PC → Camera

0xC5 0x4B PRE_I DZP CAM_ID C.S.

Camera → PC

0xC5 0x4B PRE_I DZP PRE_I 0xXX 0xXX 0xXX C.S.

1. PRE_I: The index value of Buffer RAM to store the position of the Digital Zoom for the PRESET mode.

Bit No.	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Description	Buffer RAM Index (0 ~ 7)							

2. DZP: Digital Zoom position.

Ex. Memorize 0x20 to the Digital Zoom Position in PRESET 0.

0xC5 0x4B PRE_I DZP CAM_ID C.S.

0xC5 0x4B 0x00 0x20 CAM_ID C.S.

Non Zoom Tracking External PRESET Move Control

Move the Zoom and Focus lens to each position and set the Digital Zoom ratio according to data memorized in PRESET "Buffer RAM" designated ' INDEX'.

PC → Camera

0xC5 0x4D INDEX 0x00 CAM_ID C.S.

Camera → PC

0xC5 0x4D INDEX 0x00 INDEX 0xXX 0xXX 0xXX C.S.

INDEX: Position setting index of the PRESET Buffer RAM to change Zoom, Focus & Digital Zoom position.

Caution: The range of INDEX is from 0x00 to 0x07.

Camera RESTART

Restart the Camera's micro controller (u-COM).

PC → Camera

0xC5 0x4F 0x00 0x00 CAM_ID C.S.

Camera → PC

0xC5 0x4F 0x00 0x00 0x00 0xXX 0xXX 0xXX C.S.

Digital Zoom Power Adjust

Adjust Digital Zoom Max Power.

PC → Camera

0xC5 0x52 INDEX 0x00 CAM_ID C.S.

Camera → PC

0xC5 0x52 INDEX 0x00 INDEX 0xXX 0xXX 0xXX C.S.

INDEX: Index value for setting up Max Power Digital Zoom.

1. In case of INDEX = 0, the Max Power Digital Zoom = 2X. Therefore, Total Zoom = 70X.
2. In case of INDEX = 1, the Max Power Digital Zoom = 3X. Therefore, Total Zoom = 105X.
3. In case of INDEX = 2, the Max Power Digital Zoom = 4X. Therefore, Total Zoom = 140X.
4. In case of INDEX = 3, the Max Power Digital Zoom = 5X. Therefore, Total Zoom = 175X.
5. In case of INDEX = 4, the Max Power Digital Zoom = 6X, Therefore, Total Zoom = 210X.
6. In case of INDEX = 5, the Max Power Digital Zoom = 7X. Therefore, Total Zoom = 245X.
7. In case of INDEX = 6, the Max Power Digital Zoom = 8X. Therefore, Total Zoom = 280X.
8. In case of INDEX = 7, the Max Power Digital Zoom = 9X. Therefore, Total Zoom = 315X.
9. In case of INDEX = 8, the Max Power Digital Zoom = 10X. Therefore, Total Zoom = 350X.
10. In case of INDEX = 9, the Max Power Digital Zoom = 11X. Therefore, Total Zoom = 385X.
11. In case of INDEX = 10, the Max Power Digital Zoom = 12X. Therefore, Total Zoom = 420X.
12. In case of INDEX = 11, the Max Power Digital Zoom = 13X. Therefore, Total Zoom = 455X.
13. In case of INDEX = 12, the Max Power Digital Zoom = 14X. Therefore, Total Zoom = 490X.
14. In case of INDEX = 13, the Max Power Digital Zoom = 15X. Therefore, Total Zoom = 525X.
15. In case of INDEX = 14, the Max Power Digital Zoom = 16X. Therefore, Total Zoom = 560X.
16. In case of INDEX = every other value, the Max Power Digital Zoom remains unchanged.

Key Action

Perform the Key action according to the data of "KEY_NUM".

Caution: After using the Key action, the camera has to be notified by the key action code KEY_NUM = “KN_STOP“.

PC → Camera

0xC5 0x5F KEY_NUM 0x00 CAM_ID C.S.

Camera → PC

0xC5 0x5F KEY_NUM 0x00 KEY_NUM 0xXX 0xXX 0xXX C.S.

KEY_NUM: This is a Key code value for operation (Refer to 7.3 Key Code Table).

Changing CAM ID

Change the data of CAM_ID to “NEW_C_ID“ and Camera ID mode.

PC → Camera

0xC5 0x78 NEW_C_ID On/Off CAM_ID C.S.

Camera → PC

0xC5 0x78 NEW_C_ID On/Off NEW_C_ID 0xXX 0xXX 0xXX C.S.

1. NEW_C_ID: New data to change Camera ID.
2. On/Off: Setting the Camera ID mode to “On” or “Off”.
   If On/Off = “0x00”, the Camera ID mode becomes “OFF” mode. In this case, we may ignore “CAM_ID” value. Otherwise, the Camera ID mode becomes “ON” mode. Then, the value of CAM_ID is changed to “NEW_C_ID”.

CAM ID Read

Read the data of Camera ‘s ID.

Caution: This command may only be used in condition of one by one connection (PC vs. CAMERA).

PC → Camera

0xC5 0xCC 0x00 0x00 CAM_ID C.S.

Camera → PC

0xC5 0xCC 0x00 0x00 CAM_ID On/Off 0xXX 0xXX C.S.

1. CAM_ID: The Camera ID data of a CAMERA.
2. On/Off: The On/Off mode of the camera ID.
   0x00: Camera ID is “OFF” mode.
   0xFF: Camera ID is “ON” mode.

Auto Back Light Mode ON/ OFF control

Change the Auto Back Light Mode of the camera.

PC → Camera

0xC5 0xAA 0x6D MODE CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x6D MODE 0x6D 0xXX 0xXX 0xXX C.S.

1. In case of MODE = 0x00, the Auto Back Light Mode of camera becomes OFF mode. In this case, the camera key controls Back Light ON/OFF manually.
2. In case of MODE = 0x01, the Auto Back Light Mode of the camera becomes BLC USER mode. Then, Back Light ON/OFF is controlled automatically depending on the status of the scene.
3. In case of MODE = every other value, the Auto Back Light Mode of camera remains unchanged.

BACKLIGHT ON/ OFF control

Switch the BACKLIGHT mode to On/Off according to the data of "MODE".

PC → Camera

0xC5 0xAA 0x70 MODE CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x70 MODE 0x70 0xXX 0xXX 0xXX C.S.

1. In case of MODE = 0x01, The BACKLIGHT mode becomes BLC USER mode.
2. In case of MODE = 0x00, The BACKLIGHT mode becomes OFF mode. Otherwise, The BACKLIGHT mode is not changed.

Caution: In this case, the Auto Back Light mode is released automatically.

100% NEGATIVE ON/ OFF control

Switch the 100% NEGATIVE mode to On/Off according to the data of "MODE".

PC → Camera

0xC5 0xAA 0x72 MODE CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x72 MODE 0x72 0xXX 0xXX 0xXX C.S.

1. In case of MODE = 0x01, the 100% NEGATIVE mode becomes ON mode.
2. In case of MODE = 0x00, the 100% NEGATIVE mode becomes OFF mode.
3. Otherwise, the 100% NEGATIVE mode remains unchanged.

FOCUS Mode Setting

Switch the FOCUS mode to AUTO, MANUAL or PUSH_AUTO according to the data of “MODE”.

PC → Camera

0xC5 0xAA 0x73 MODE CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x73 MODE 0x73 0xXX 0xXX 0xXX C.S.

1. In case of MODE = 0x00, the FOCUS mode becomes “AUTO” mode.
2. In case of MODE = 0x01, the FOCUS mode becomes “MANUAL” mode.
3. In case of MODE = 0x02, the FOCUS mode becomes “PUSH AUTO” mode.
4. Otherwise, the FOCUS mode remains unchanged.

FLICKERLESS Mode ON/ OFF Setting

Switch the FLICKERLESS mode to ON or OFF according to the data of the “MODE”.

PC → Camera

0xC5 0xAA 0x74 MODE CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x74 MODE 0x74 0xXX 0xXX 0xXX C.S.

1. In case of MODE = 0x01, the FLICKERLESS mode becomes “ON” mode.
2. In case of MODE = 0x00, the FLICKERLESS mode becomes “OFF” mode.
3. Otherwise, the FLICKERLESS mode remains unchanged.

White Balance PUSH_AUTO ON/ OFF Setting

Switch the PUSH AUTO White Balance state to ON or OFF at PUSH AUTO White Balance mode according to the data of “MODE”.

PC → Camera

0xC5 0xAA 0x78 MODE CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x78 MODE 0x78 0xXX 0xXX 0xXX C.S.

1. If MODE = 0x01, the PUSH AUTO White Balance state becomes to ON. In this case, White Balance Tracking is activated.
2. If MODE = 0x00, the PUSH AUTO White Balance state becomes to OFF. In this case, White Balance Tracking is stopped.
3. Otherwise, the PUSH AUTO White Balance state remains unchanged.

Caution: This mode will not be saved when the power of a camera turns OFF/ON. Default mode is “OFF” mode. This command is valid when the White Balance Mode is “PUSH AUTO” mode.

SHARPNESS Data Setting

Set the sharpness level of the camera according to the data of “Sharpness”.

PC → Camera

0xC5 0xAA 0x79 Sharpness CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x79 Sharpness 0x79 0xXX 0xXX 0xXX C.S.

1. The data for adjusting sharpness level of the camera.
2. Data value range: 0x00 ~ 0x0F

BRIGHTNESS Data Setting

Set the brightness level of the camera according to the data of “Brightness”.

PC → Camera

0xC5 0xAA 0x7A Brightness CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x7A Brightness 0x7A 0xXX 0xXX 0xXX C.S.

Brightness: The data for adjusting the brightness level of the camera.

MENU OSD Display ON/ OFF Setting

Set the MENU OSD Display mode of the camera to ON or OFF according to the data of “MODE”.

PC → Camera

0xC5 0xAA 0x63 MODE CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x63 MODE 0x63 0xXX 0xXX 0xXX C.S.

1. In case of MODE = 0x01, “Main Menu” OSD is displayed on the screen.
2. In case of MODE = 0x00, MENU OSD is erased on the screen.
3. Otherwise, no action is performed.

SHUTTER Speed Setting

Set the shutter speed of the camera according to the data of “SSC_CNT”.

PC → Camera

0xC5 0xAA 0x7B SSC_CNT CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x7B SSC_CNT 0x7B 0xXX 0xXX 0xXX C.S.

SSC_CNT	NTSC	PAL
0	1/60	1/50
1	1/1120	1/100
2	1/250	1/250
3	1/500	1/500
4	1/1000	1/1000
5	1/2000	1/2000
6	1/4000	1/4000
7	1/10000	1/10000
8	1/20000	1/20000
9	1/50000	1/50000
10	1/100000	1/100000

IRIS OPEN Level Setting

Set the IRIS OPEN Level of the camera according to the data of “IRIS_CTL”.

PC → Camera

0xC5 0xAA 0x7C IRIS_CTL CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x7C IRIS_CTL 0x7C 0xXX 0xXX 0xXX C.S.

IRIS_CTL: The data for adjusting IRIS level of the camera.
Data value range from 0x4A (Full Close) to 0xB3 (Full Open)

Caution: This Command is valid when the Exposure Mode is “IRIS MAN” or “MANUAL”.

AGC Level Setting

Set the AGC Level of the camera according to the data of “AGC_CTL”.

PC → Camera

0xC5 0xAA 0x7D AGC_CTL CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x7D AGC_CTL 0x7D 0xXX 0xXX 0xXX C.S.

AGC_CTL: The data for adjusting the AGC level of the camera.
Data value range from 0x1C (Minimum AGC Level) to 0xDC (Maximum AGC Level).

Caution: This command is valid when the Exposure Mode is “AGC MAN” or “MANUAL”.

Function OSD Display Mode Change

Change the Function OSD Display Mode of the camera according to the data of “OSD_DISP”.

PC → Camera

0xC5 0xAA 0x64 OSD_DISP CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x64 OSD_DISP 0x64 0xXX 0xXX 0xXX C.S.

OSD_DISP

Bit	Explanation
7	Reserved, Fix to “0”.
6	Reserved, Fix to “0”.
5	0: OFF 1: General Function OSD Display ON (Focus Auto/Manual OSD, Back Light OSD, Shutter Speed OSD, White Balance Mode OSD)
4	Reserved, Fix to “0”.
3	0: OFF. 1: Camera ID OSD Display ON.
2	0: OFF. 1: Zoom Magnitude OSD Display ON.
1	0: OFF. 1: User Title OSD Display ON.
0	0: OFF. 1: Power ON Initial Title OSD Display ON.

Digital Zoom Mode ON/ OFF Setting

Switch the Digital Zoom mode to ON or OFF according to the data of “MODE”.

PC → Camera

0xC5 0xAA 0x6E MODE CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x6E MODE 0x6E 0xXX 0xXX 0xXX C.S.

1. In case of MODE = 0x01, the Digital Zoom Mode is changed to “ON” mode.
2. In case of MODE = 0x00, the Digital Zoom Mode is changed to “OFF” mode.
3. Otherwise, the Digital Zoom Mode remains unchanged.

SCREEN INVERSION (FULL MIRROR) ON/OFF Setting

Switch the SCREEN INVERSION mode to ON or OFF according to the data of “MODE”. The function is for high resolution only.

PC → Camera

0xC5 0xAA 0x7F MODE CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x7F MODE 0x7F 0xXX 0xXX 0xXX C.S.

1. In case of MODE = 0x01, The SCREEN INVERSION Mode is changed to “ON” mode. In this case, The Screen is reversed.
2. In case of MODE = 0x00, The SCREEN INVERSION Mode is changed to “OFF” mode.
4. Otherwise, the SCREEN INVERSION Mode remains unchanged.

Caution: This command is valid when the Digital Zoom Mode is OFF.

Slow Speed Zoom Tracking External PRESET Move Control

Performs Zoom Tracking PRESET action to the targeted zoom position, memorized in the volatile PRESET Buffer RAM indicated by the “INDEX” value. In this case, the Zoom Tracking is performed slowly.

PC → Camera

0xC5 0x7B INDEX 0x00 CAM_ID C.S.

Camera → PC

0xC5 0x7B INDEX 0x00 INDEX 0xXX 0xXX 0xXX C.S.

INDEX: The index value of the PRESET Buffer RAM taking the target Zoom position .

Caution: The range of the INDEX is from 0x00 to 0x07.

High Speed Zoom Tracking External PRESET Move Control

Performs Zoom Tracking PRESET action to the targeted zoom position, memorized in the volatile PRESET Buffer RAM indicated by the “INDEX” value. In this case, the Zoom Tracking is performed quickly.

PC → Camera

0xC5 0x7C INDEX 0x00 CAM_ID C.S.

Camera → PC

0xC5 0x7C INDEX 0x00 INDEX 0xXX 0xXX 0xXX C.S.

INDEX: The index value of the PRESET Buffer RAM taking the target Zoom position.

Caution: The range of INDEX is from 0x00 to 0x07.

Zoom Tracking PRESET status Read

Read the status of the Zoom Tracking PRESET action to judge whether the PRESET action has been completed or performed.

PC → Camera

0xC5 0x7F 0x00 0x00 CAM_ID C.S.

Camera → PC

0xC5 0x7F 0x00 0x00 Status 0xXX 0xXX 0xXX C.S.

1. In case of Status = 0x00, the Zoom Tracking PRESET action is complete.
2. In case of Status = 0x01, the Zoom Tracking PRESET action is currently performing.

CAMERA status Read Command 1

Read the current status of the camera. The data is “CAM_CON1”.

PC → Camera

0xC5 0xAA 0x80 0x00 CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x80 0x00 CAM_CON1 0xXX 0xXX 0xXX C.S.

Construction of CAM_CON1 data

Bit	Explanation
7	0: Focus Auto state. 1: Focus Manual state.
6	0: Camera ID OFF mode. 1: Camera ID ON mode.
5	0: WB Push_Auto OFF state. 1: WB Push_Auto ON state.
4	0: BACKLIGHT OFF state. 1: BACKLIGHT ON state.
3	0: FLICKERLESS OFF state. 1: FLICKERLESS ON state.
2	0: Focus AUTO/MANUAL mode. 1: Focus PUSH_AUTO mode.
1	0: Digital Zoom OFF mode. 1: Digital Zoom ON mode.
0	Reserved.

CAMERA status Read Command 2

Read the current status of the camera. The data is “CAM_CON2”.

PC → Camera

0xC5 0xAA 0x81 0x00 CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x81 0x00 CAM_CON2 0xXX 0xXX 0xXX C.S.

Construction of CAM_CON2 data

Bit	Explanation
7	1: Indicating that the camera recheck the object distance for Zoom Tracking.
6	Reserved.
5	Reserved.
4	Reserved.

3	Reserved.
2	Reserved.
1	Reserved.
0	0: Auto BACKLIGHT Mode OFF state. 1: Auto BACKLIGHT Mode ON state.

Digital Effect status of the Camera Read Command

Read the current Digital Effect status of the camera. The data is “DEFT_CON”.

PC → Camera

0xC5 0xAA 0x82 0x00 CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x82 0x00 DEFT_CON 0xXX 0xXX 0xXX C.S.

Construction of DEFT_CON data

Bit	Explanation
7	Reserved.
6	0: Mosaic OFF state. 1: Mosaic ON state.
5	0: Color ON state. 1: Color OFF state.
4	Reserved.
3	0: 100% Negative OFF state. 1: 100% Negative ON state.
2	0: Screen Inversion OFF state. 1: Screen Inversion ON state.
1	Reserved.
0	Reserved.

Read the White Balance Mode

Read the current White Balance Mode of the camera. The data is “WB_MODE”.

PC → Camera

0xC5 0xAA 0x83 0x00 CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x83 0x00 WB_MODE 0xXX 0xXX 0xXX C.S.

Explanation of “WB_MODE” data

WB_MODE	Explanation
0x0	ATW White Balance mode.
0x1	INDOOR White Balance mode.
0x2	OUTDOOR White Balance mode.
0x3	MANUAL White Balance mode.
0x4	PUSH LOCK White Balance mode.
0x5	ANTI-CR White Balance mode.

Read the Exposure Mode

Read the current Exposure Mode of the camera. The data is “AE_MODE”.

PC → Camera

0xC5 0xAA 0x84 0x00 CAM_ID C.S.

Camera → PC
0xC5 0xAA 0x84 0x00 AE_MODE 0xXX 0xXX 0xXX C.S.
Explanation of “AE_MODE” data

AE_MODE	Explanation
0x0	AUTO Exposure mode.
0x2	IRIS MAN Exposure mode.
0x3	AGC MAN Exposure mode.
0x4	MANUAL Exposure mode.

Read the current MWB_CTL data at the Hue White Balance Mode

Read the current HUE point adjust data of the Camera at the Hue White Balance Mode. The return data is “MWB_CTL”.
PC → Camera
0xC5 0xAA 0x87 0x00 CAM_ID C.S.

Camera → PC
0xC5 0xAA 0x87 0x00 MWB_CTL 0xXX 0xXX 0xXX C.S.

Read the current SHARPNESS data

Read the current SHARPNESS data of the camera. The data is “Sharpness”.
PC → Camera
0xC5 0xAA 0x88 0x00 CAM_ID C.S.
Camera → PC
0xC5 0xAA 0x88 0x00 Sharpness 0xXX 0xXX 0xXX C.S.

Read the current BRIGHTNESS data

Read the current BRIGHTNESS data of the camera. The data is “Brightness”.
PC → Camera
0xC5 0xAA 0x89 0x00 CAM_ID C.S.

Camera → PC
0xC5 0xAA 0x89 0x00 Brightness 0xXX 0xXX 0xXX C.S.

Read the current Shutter Speed Control counter value

Read the current counter value to control Shutter Speed. The data is “SSC_CNT”.
PC → Camera
0xC5 0xAA 0x8A 0x00 CAM_ID C.S.

Camera → PC
0xC5 0xAA 0x8A 0x00 SSC_CNT 0xXX 0xXX 0xXX C.S.

Read the IRIS control data

Read the current IRIS control value to control IRIS OPEN level. The data is “IRIS_CTL”.

PC → Camera

0xC5 0xAA 0x8B 0x00 CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x8B 0x00 IRIS_CTL 0xXX 0xXX 0xXX C.S.

Read the AGC control data

Read the current AGC control value to control AGC level. The data is “AGC_CTL”.

PC → Camera

0xC5 0xAA 0x8C 0x00 CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x8C 0x00 AGC_CTL 0xXX 0xXX 0xXX C.S.

Read the MENU OSD ON/ OFF status

Read the current MENU OSD ON/OFF state of the camera. The data is “M_STATE”.

PC → Camera

0xC5 0xAA 0x8D 0x00 CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x8D 0x00 M_STATE 0xXX 0xXX 0xXX C.S.

1. In case of “M_STATE = 0x00”, the MENU OSD is currently not displayed.
2. In case of “M_STATE = 0x01”, the MENU OSD is currently displayed.

Read the Function OSD Display Mode

Read the current Function OSD Display mode of the camera. The data is “OSD_DISP”.

PC → Camera

0xC5 0xAA 0x8E 0x00 CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x8E 0x00 OSD_DISP 0xXX 0xXX 0xXX C.S.

Read the Digital Zoom Max Power Mode

Read the current Max Power Digital Zoom Mode of the camera. The data is “DZ_MAX”.

PC → Camera

0xC5 0xAA 0x8F 0x00 CAM_ID C.S.

Camera → PC
0xC5 0xAA 0x8F 0x00 DZ_MAX 0xXX 0xXX 0xXX C.S.

Caution: The data of this command is valid only when the Digital Zoom mode is ON.

Explanation of “DZ_MAX” data

DZ_MAX	Explanation
0x2	The current Max Power Digital Zoom of the Camera is “x2”.
0x3	The current Max Power Digital Zoom of the Camera is “x3”.
0x4	The current Max Power Digital Zoom of the Camera is “x4”.
0x5	The current Max Power Digital Zoom of the Camera is “x5”.
0x6	The current Max Power Digital Zoom of the Camera is “x6”.
0x7	The current Max Power Digital Zoom of the Camera is “x7”.
0x8	The current Max Power Digital Zoom of the Camera is “x8”.
0x9	The current Max Power Digital Zoom of the Camera is “x9”.
0xA	The current Max Power Digital Zoom of the Camera is “x10”.
0xB	The current Max Power Digital Zoom of the Camera is “x11”.
0xC	The current Max Power Digital Zoom of the Camera is “x12”.
0xD	The current Max Power Digital Zoom of the Camera is “x13”.
0xE	The current Max Power Digital Zoom of the Camera is “x14”.
0xF	The current Max Power Digital Zoom of the Camera is “x15”.
0x10	The current Max Power Digital Zoom of the Camera is “x16”.

Memorize Internal PRESET Position for Internal PRESET control

Memorize the current zoom, focus, and digital zoom position value into the internal nonvolatile memory of the CAMERA for controlling the Internal PRESET Move. The memory position to store is indicated by the “INDEX” value.

PC → Camera
0xC5 0x79 INDEX 0x00 CAM_ID C.S.

Camera → PC
0xC5 0x79 INDEX 0x00 INDEX 0xXX 0xXX 0xXX C.S.

INDEX: The value for indicating the memory position to store the zoom, focus, and digital zoom position value.
The range of this value is from 0x00 to 0x7F.

Internal Non Zoom Tracking PRESET Moving control

Performs the Internal PRESET Moving action. When the camera receives this command, the zoom, focus, and digital zoom position is moved to the position memorized in the internal nonvolatile memory of the camera according to “INDEX” value.

PC → Camera

0xC5 0x7A INDEX 0x00 CAM_ID C.S.

Camera → PC
0xC5 0x7A INDEX 0x00 INDEX 0xXX 0xXX 0xXX C.S.

INDEX: The value for indicating the memory position to store the zoom, focus, and digital zoom position value.
The range of this value is from 0x00 to 0x7F.

Slow Speed Internal Zoom Tracking PRESET Moving control

Perform the Zoom Tracking PRESET action to the target zoom position slowly. In this case, the target zoom position value is memorized in the internal nonvolatile memory. And, the memory position is indicated by the "INDEX" value
PC → Camera
0xC5 0x7D INDEX 0x00 CAM_ID C.S.

Camera → PC
0xC5 0x7D INDEX 0x00 INDEX 0xXX 0xXX 0xXX C.S.

INDEX: This is a value for indicating the memory position to store the zoom, focus, and digital zoom position value.
The range of this value is from 0x00 to 0x7F.

High Speed Internal Zoom Tracking PRESET Moving control

Performs the Zoom Tracking PRESET action to the target zoom position quickly. In this case, the target zoom position value is memorized in the internal nonvolatile memory. And, the memory position is indicated by the "INDEX" value
PC → Camera
0xC5 0x7E INDEX 0x00 CAM_ID C.S.

Camera → PC
0xC5 0x7E INDEX 0x00 INDEX 0xXX 0xXX 0xXX C.S.

INDEX: The value for indicating the memory position to store the zoom, focus, and digital zoom position value.
The range of this value is from 0x00 to 0x7F.

Focusing Object Distance Setting

Set the object distance range.
PC → Camera
0xC5 0x58 Distance 0x00 CAM_ID C.S.
Camera → PC
0xC5 0x58 Distance 0x00 Distance 0xXX 0xXX 0xXX C.S.

Distance: The value for indicating the object distance range limit that the camera can be focused.

1. In case of “0x00”: Focusing range = From 1 cm To infinite
2. In case of “0x01”: Focusing range = From 10 cm To infinite
3. In case of “0x02”: Focusing range = From 50 cm To infinite
4. In case of “0x03”: Focusing range = From 1 m To infinite
5. In case of “0x04”: Focusing range = From 3 m To infinite
6. In case of “0x05”: Focusing range = From 5 m To infinite
7. In case of “0x06”: Focusing range = From 10 m To infinite
8. In case of every other value: The focusing range remains unchanged.

Focus Lens FAR Direction Step Move Command

This command moves the focus lens by a specific step number in the direction of FAR.

Caution: This command is performed, when the focus mode is MANUAL or PUSH_AUTO. And is not performed during Zooming.

PC → Camera

0xC5 0xAA 0x5D STEP CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x5D STEP 0x5D 0xXX 0xXX 0xXX C.S.

STEP: The value specifying the number step to move the focus lens in the direction of FAR.

Focus Lens NEAR Direction Step Move Command

This Command moves the focus lens by a specific step number in the direction of NEAR.

Caution: This command is performed, when the focus mode is MANUAL or PUSH_AUTO. And is not performed during Zooming.

PC → Camera

0xC5 0xAA 0x5E STEP CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x5E STEP 0x5E 0xXX 0xXX 0xXX C.S.

STEP: The value specifying the step number to move the focus lens in the direction of NEAR.

MENU OSD Display On/Off Command

This Command decides whether or not the MENU OSD is to be displayed on the screen according to “INDEX”.

PC → Camera

0xC5 0xAA 0x6F INDEX CAM_ID C.S.

Camera → PC
0xC5 0xAA 0x6F INDEX 0x6F 0xXX 0xXX 0xXX C.S.

INDEX: The value, which selects the MENU OSD page or erases the MENU OSD on the screen.

1. In case of INDEX = 0x00, the “Main Menu” OSD is displayed.
2. In case of INDEX = 0x01, the “Focus Sub Menu” OSD is displayed.
3. In case of INDEX = 0x02, the “White Balance Sub Menu” OSD is displayed.
4. In case of INDEX = 0x03, the “Exposure Sub Menu” OSD is displayed.
5. In case of INDEX = 0x04, the “Effect Function Sub Menu” OSD is displayed.
6. In case of INDEX = 0x05, the “Day/Night OSD Sub Menu” OSD is displayed.
7. In case of INDEX = 0x06, the “Display Function Sub Menu” OSD is displayed.
8. In case of INDEX = 0x07, the “Privacy Function Sub Menu” OSD is displayed.
9. In case of INDEX = 0x08, the “Motion Function Sub Menu” OSD is displayed.
10. In case of INDEX = 0x09, the “Communication Function Sub Menu” OSD is displayed.
11. In case of INDEX > 0x0ff, the Menu OSD is erased.

Camera ID Function OSD Display Mode On/ Off Setting Command

This Command decides whether or not the Camera ID Function OSD is displayed on the screen.

PC → Camera
0xC5 0xAA 0x96 OnOff CAM_ID C.S.

Camera → PC
0xC5 0xAA 0x96 OnOff 0x96 0xXX 0xXX 0xXX C.S.

1. In case of INDEX = 0x00, the Camera ID Function OSD is not displayed.
2. In case of INDEX = 0x01, the Camera ID Function OSD is displayed.
3. In case of INDEX = every other value, No action is performed.

Each Sub Menu Items Initialization Command.

This Command initializes all data of each sub menu.

PC → Camera
0xC5 0xAA 0x97 INDEX CAM_ID C.S.
Camera → PC
0xC5 0xAA 0x97 INDEX 0x97 0xXX 0xXX 0xXX C.S.

INDEX: This is a value, which selects the sub MENU.

1. In case of INDEX = 0x00, the data of all Sub Menu are initialized.
2. In case of INDEX = 0x01, the data of “Focus Sub Menu” are initialized.
3. In case of INDEX = 0x02, the data of “White Balance Sub Menu” is initialized.
4. In case of INDEX = 0x03, the data of “Exposure Sub Menu” is initialized.
5. In case of INDEX = 0x04, the data of “Effect Function Sub Menu” is initialized.
6. In case of INDEX = 0x05, the data of “Day/Night OSD Sub Menu” is initialized.
7. In case of INDEX = 0x06, the data of “Function OSD Sub Menu” is initialized.

Camera Control Status Register 3 Data Read Command

Read the status that the camera is controlled.
PC → Camera
0xC5 0xAA 0x9A 0x00 CAM_ID C.S.

Camera → PC
0xC5 0xAA 0x9A 0x00 CAM_CON3 0xXX 0xXX 0xXX C.S.

CAM_CON3: This is a status value that the camera is controlled currently.

Bit	Explanation
7	1: High Speed Zoom Tracking Mode
6	1: Normal Speed Zoom Tracking Mode
5	1: Auto Focus Zoom Tracking Mode at MANUAL or PUSH_AUTO Focus mode
4	Reserved.
3	0: Wide Burst Function OFF mode. 1: Wide Burst Function ON mode.
2	Reserved.
1	Reserved.
0	Reserved.

Zoom Tracking Mode Change Command

This command changes the zoom tracking mode according to MODE.
PC → Camera
0xC5 0xAA 0x9B MODE CAM_ID C.S.
Camera → PC
0xC5 0xAA 0x9B MODE 0x9B 0xXX 0xXX 0xXX C.S.

1. In case of MODE = 0x00, the zoom tracking mode becomes MANUAL mode.
2. In case of MODE = 0x01, the zoom tracking mode becomes AUTO FOCUS mode.
3. In case of MODE = every other value, the zoom tracking mode is not changed.

Caution: This command is valid when the focus mode is “MANUAL” or “PUSH AUTO” mode.

Back Light Control Mode Setting Command

This command sets the back light mode of the camera according to MODE.

PC → Camera

0xC5 0xAA 0x9C MODE CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x9C MODE 0x9C 0xXX 0xXX 0xXX C.S.

1. In case of MODE = 0x00, the back light mode becomes OFF mode.
2. In case of MODE = 0x01, the back light mode becomes BLC USER mode.
3. In case of MODE = 0x02, the back light mode becomes BLC SMART mode.
4. In case of MODE = 0x03, the back light mode becomes HLC mode.
5. In case of MODE = every other value, the back light mode remains unchanged.

Back Light Control Mode Read Command

This command reads the current back light mode of the camera.

PC → Camera

0xC5 0xAA 0x9D 0x00 CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x9D 0x00 MODE 0xXX 0xXX 0xXX C.S.

1. In case of MODE = 0x00, the current back light mode is OFF mode.
2. In case of MODE = 0x01, the current back light mode is BLC USER mode.
3. In case of MODE = 0x02, the current back light mode is BLC SMART mode.
4. In case of MODE = 0x03, the current back light mode is HLC mode.

Wide Burst Function On/ Off Control Command

This command controls the wide burst function of the camera according to ONOFF.

PC → Camera

0xC5 0xAA 0x9E ONOFF CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x9E ONOFF 0x9E 0xXX 0xXX 0xXX C.S.

1. In case of ONOFF = 0x00, the wide burst function becomes OFF mode.
2. In case of ONOFF = 0x01, the wide burst function becomes ON mode.
3. In case of ONOFF = every other value, the wide burst function mode remains unchanged.

Red Control Gain Adjust Command

This command adjusts the red control gain of the camera.
PC → Camera
0xC5 0xAA 0xA4 R_Cont CAM_ID C.S.

Camera → PC
0xC5 0xAA 0xA4 R_Cont 0xA4 0xXX 0xXX 0xXX C.S.

R_Cont: The value, which adjusts the red control gain of the camera.

Red Control Gain Read Command

This command reads the current red gain of the camera.
PC → Camera
0xC5 0xAA 0xA5 0x00 CAM_ID C.S.

Camera → PC
0xC5 0xAA 0xA5 0x00 R_Cont 0xXX 0xXX 0xXX C.S.

R_Cont: The value, which is currently assigned to the red control gain of the camera. There is some tolerance between read value and adjust value.

Blue Control Gain Adjust Command

This command adjusts the blue control gain of the camera.
PC → Camera
0xC5 0xAA 0xA6 B_Cont CAM_ID C.S.

Camera → PC
0xC5 0xAA 0xA6 B_Cont 0xA6 0xXX 0xXX 0xXX C.S.

B_Cont: The value, which adjusts the blue control gain of the camera.

Blue Control Gain Read Command

This command reads the current blue gain of the camera.
PC → Camera
0xC5 0xAA 0xA7 0x00 CAM_ID C.S.

Camera → PC
0xC5 0xAA 0xA7 0x00 B_Cont 0xXX 0xXX 0xXX C.S.

B_Cont: The value, which is currently assigned to the blue control gain of the camera. There is some tolerance between read value and adjust value.

The Object Distance Range Data Read Command

This command reads the object distance range data assigned the camera.
PC → Camera
0xC5 0x59 0x00 0x00 CAM_ID C.S.

Camera → PC
0xC5 0x59 0x00 0x00 Distance 0xXX 0xXX 0xXX C.S.

Distance: The index value, which indicates the current object distance range that the camera can be focused.

1. In case of Distance = “0x00”, the Focusing range = From 1 cm To infinite
2. In case of Distance = “0x01”, the Focusing range = From 10 cm To infinite
3. In case of Distance = “0x02”, the Focusing range = From 50 cm To infinite
4. In case of Distance = “0x03”, the Focusing range = From 1 m To infinite
5. In case of Distance = “0x04”, the Focusing range = From 3 m To infinite
6. In case of Distance = “0x05”, the Focusing range = From 5 m To infinite
7. In case of Distance = “0x06”, the Focusing range = From 10 m To infinite

User Title Display ON Command

This command displays the user title on the screen.

PC → Camera

0xC5 0x67 0x00 0x00 CAM_ID C.S.

Camera → PC

0xC5 0x67 0x00 0x00 0x00 0xXX 0xXX 0xXX C.S.

User Title Display OFF Command

This command does not display the user title on the screen.

PC → Camera

0xC5 0x68 0x00 0x00 CAM_ID C.S.

Camera → PC

0xC5 0x68 0x00 0x00 0x00 0xXX 0xXX 0xXX C.S.

User Title String Editing Command

This command edits the user title string.

PC → Camera

0xC5 0x66 INDEX CHAR CAM_ID C.S.

Camera → PC

0xC5 0x66 INDEX CHAR INDEX 0xXX 0xXX 0xXX C.S.

1. INDEX: The index value, which indicates the character position of the user title string in order to edit. The range of this value is from 0x00 to 0x09.
2. CHAR: The code value in order to edit the character pointed by “INDEX”.

CHAR	Character
0x00	‘A’
0x01	‘B’
0x02	‘C’
0x03	‘D’
0x04	‘E’
0x05	‘F’
0x06	‘G’
0x07	‘H’
0x08	‘I’
0x09	‘J’
0x0A	‘K’
0x0B	‘L’
0x0C	‘M’
0x0D	‘N’
0x0E	‘O’
0x0F	‘P’
0x10	‘Q’
0x11	‘R’
0x12	‘S’
0x13	‘T’
0x14	‘U’
0x15	’V’
0x16	‘W’
0x17	’X’
0x18	‘Y’
0x19	‘Z’

Function OSD Display On/ Off Setting Command

This command indicates whether each function OSD of the camera is displayed on the screen.

PC → Camera

0xC5 0x6B INDEX ONOFF CAM_ID C.S.

Camera → PC

0xC5 0x6B INDEX ONOFF INDEX 0xXX 0xXX 0xXX C.S.

INDEX: The index value to select whether or not to display the function OSD.

ONOFF: The value, which indicates whether the selected function OSD is or not displayed.

1. In case of ONOFF = 0x00, the selected function OSD is not displayed on the screen.
2. In case of ONOFF = 0x01, the selected function OSD is displayed on the screen.
3. In case of every other value, the display status of the selected function OSD remains unchanged.

Index	Explanation
0x00	Select the function OSD that is related to the 3A DISP.
0x01	Select the function OSD that is related to the Alarm DISP.
0x02	Select the function OSD that is related to the Camera ID.

0x03	Select the function OSD that is related to the ZOOM DISP
0x04	Select the function OSD that is related to the User Title.

Dark Fade ON (Video Mute) Command

This command mutes the video signal out.

PC → Camera

0xC5 0xAA 0x54 0x00 CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x54 0x00 0x54 0xXX 0xXX 0xXX C.S.

Dark Fade OFF (Video Mute Release) Command

This command releases the video signal, which is muted.

PC → Camera

0xC5 0xAA 0x55 0x00 CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x55 0x00 0x55 0xXX 0xXX 0xXX C.S.

Set Day & Night Control Mode

This command is to set the camera's Day & Night control mode.

PC → Camera

0xC5 0x77 Day_&_Night_Mode 0x00 CAM_ID C.S.

Camera → PC

0xC5 0x77 Day_&_Night_Mode 0x00 Day_&_Night_Mode 0xXX 0xXX 0xXX C.S.

Day & Night Mode	Explanation
0x00	Camera's Day & Night Control Mode becomes "Night Mode".
0x01	Camera's Day & Night Control Mode becomes "Day Mode".
0x02	Camera's Day & Night Control Mode becomes "AE Mode". Camera toggle Day or Night Mode according to exposure of object.
0x03	Camera's Day & Night Control Mode becomes "External Mode".
Other Values	No Operation

Read Day & Night Control Mode

This command is to see the camera's Day & Night control mode.

PC → Camera

0xC5 0xAA 0x81 0x00 CAM_ID C.S.

Camera → PC

0xC5 0xAA 0x81 0x00 Status 0xXX 0xXX 0xXX C.S.

The status of Camera operation: Bit5 & Bit4 are the flags of Day & Night Control Mode

Status		Explanation
Bit5	Bit4	
0	0	Camera's Day & Night Control Mode is "Day & Night DAY Mode".
0	1	Camera's Day & Night Control Mode is "Day & Night NIGHT Mode"
1	0	Camera's Day & Night Control Mode is "Day & Night AUTO Mode" and the status of Camera's Day & Night Control is "Day Mode".
1	1	Camera's Day & Night Control Mode is "Day & Night AUTO Mode" and the status of Camera's Day & Night Control is "Night Mode".

Set Day & Night Data

This command is to set the camera's Day & Night data.

PC → Camera

0xC5 0x0F Day_&_Night_Index Data CAM_ID C.S.

Camera → PC

0xC5 0x0F Day_&_Night_Index Data Day_&_Night_Index 0xXX 0xXX 0xXX C.S.

Day & Night Index	Data	Explanation
0x00	SENSOR LEVEL	The SENSOR level is setting up threshold for turning the filter according to sensitivity of SENSOR.
0x01	FILTER DELAY	Delay time for turning the filter
Other Values	No Operation	

Read Day & Night Data

This command is to see the camera's Day & Night data.

PC → Camera

0xC5 0xF0 Day_&_Night_Index 0x00 CAM_ID C.S.

Camera → PC

0xC5 0xF0 Day_&_Night_Index 0x00 Data 0xXX 0xXX 0xXX C.S.

Day & Night Index	Data	Explanation
0x00	SENSOR LEVEL	The SENSOR level is setting up threshold for turning the filter according to sensitivity of SENSOR.
0x01	FILTER DELAY	Delay time for turning the filter
Other Values	No Operation	

9.3 Key Code Table

Key Variable	Key Code	Description
KN_NOT	0x00	No key function will operate.
KN_TELE	0x01	Perform Zoom Tracking to TELE side by slow speed. In case of displaying the MENU, it operates as the "MENU selection scroll up".
KN_HTELE	0x02	Perform Zoom Tracking to TELE side by high speed. In case of

		displaying the MENU, it operates as the “MENU selection scroll up“.
KN_WIDE	0x03	Perform Zoom Tracking to WIDE side by slow speed. In case of displaying the MENU, it operates as the “MENU selection scroll down“.
KN_HWIDE	0x04	Perform Zoom Tracking to WIDE side by high speed. In case of displaying the MENU, it operates as the “MENU selection scroll down“.
KN_FAR	0x08	In the manual focus mode, move the Focus lens to “FAR“ side quickly. In case of displaying the MENU, it operates as the “Decrease the data of a selected item on the MENU“.
KN_NEAR	0x09	In the manual focus mode, move the Focus lens to “NEAR“ side quickly. In case of displaying the MENU, it operates as the “Increase the data of a selected item on the MENU“.
KN_SFAR	0x0A	In the manual focus mode, move the Focus lens to “FAR“ side by 1 step. In case of displaying the MENU, it operates as the “Decrease the data of a selected item on the MENU“.
KN_SNEAR	0x0B	In the manual focus mode, move the Focus lens to “NEAR“ side by 1 step. In case of displaying the MENU, it operates as the “Increase the data of a selected item on the MENU“.
KN_STOP	0x0C	Stop all key actions that are being performed currently. After using the key action, the camera has to be notified by the stop of key action.
KN_BL	0x1A	Switch the BACKLIGHT mode (ON / OFF).
KN_FLICKER	0x1B	Switch the FLICKERLESS mode (ON / OFF).
KN_NEGA	0x1E	Switch the NEGATIVE mode (Negative / Positive).
KN_DZOOM	0x22	Switch the Digital Zoom mode (ON / OFF).
KN_OSD	0x24	Switch the Key function OSD (ON / OFF).
KN_MENU	0x25	Switch the main MENU (ON / OFF).
KN_M_UP	0x27	Increase the data of a selected item on the main MENU.
KN_M_DN	0x28	Decrease the data of a selected item on the main MENU.
KN_POWER	0x32	Switch the power of the Camera (ON / OFF).
KN_R_FAR	0x38	In the manual focus mode, move the Focus lens to “FAR“ side slowly. In case of displaying the MENU, it operates as the “Decrease the data of selected item in MENU“.
KN_R_NEAR	0x39	In the manual focus mode, move the Focus lens to “NEAR“ side slowly. In case of displaying the MENU, it operates as the “Increase the data of selected item in MENU“.
KN_AM_P	0x3F	According to Key selection mode, operate the key such as “AUTO / MANUAL Toggle“ or “Push AUTO“.

KN_RS_SSCup	0x40	Use for RS-232C Serial Communication: Scroll up the “Shutter Speed“.
KN_RS_SSCdn	0x41	Use for RS-232C Serial Communication: Scroll down the “Shutter Speed“.
KN_RS_IRISup	0x42	Use for RS-232C Serial Communication: Scroll up the Iris level of lens. The AE mode must be “IRIS MAN“, or “MANUAL“.
KN_RS_IRISdn	0x43	Use for RS-232C Serial Communication: Scroll down the Iris level of lens. The AE mode must be “IRIS MAN“, or “MANUAL“.
KN_RS_AGCup	0x44	Use for RS-232C Serial Communication: Scroll up the AGC level. The AE mode must be “AGC MAN“, or “MANUAL“.

KN_RS_AGCdn	0x45	Use for RS-232C Serial Communication: Scroll down the AGC level. The AE mode must be “AGC MAN“, or “MANUAL“.
KN_RS_BRTup	0x46	Use for RS-232C Serial Communication: Scroll up the Brightness level. The AE mode must be “AUTO”, “IRIS MAN“, or “AGC MAN“.
KN_RS_BRTdn	0x47	Use for RS-232C Serial Communication: Scroll down the Brightness level. The AE mode must be “AUTO“, “IRIS MAN”, or “AGC MAN“.
KN_RS_HUEup	0x4C	Use for RS-232C Serial Communication: Scroll up the HUE level in Hue White Balance mode.
KN_RS_HUEdn	0x4D	Use for RS-232C Serial Communication: Scroll down the HUE level in Hue White Balance mode.
KN_RS_WB_PUSH	0x4E	Use for RS-232C Serial Communication: Switch the Push White Balance ON or OFF in Push White Balance mode.
KN_RS_MITEM_UP	0x4F	Use for RS-232C Serial Communication: In case of displaying the MENU. Scroll up the MENU item.
KN_RS_MITEM_DN	0x50	Use for RS-232C Serial Communication: In case of displaying the MENU. Scroll down the MENU item.
KN_RS_AMkey_SET	0x51	Use for RS-232C Serial Communication: Switch the Focus mode “AUTO/MANUAL”, or “Push AUTO“.
KN_RS_INIT_SET	0x52	Use for RS-232C Serial Communication: Reset the Camera mode to default value.
KN_RS_SRPup	0x53	Use for RS-232C Serial Communication: Scroll up the Sharpness level.
KN_RS_SRPdn	0x54	Use for RS-232C Serial Communication: Scroll up the Sharpness level.
KN_Day_Mode_Control	0x93	Set the "Day & Night DAY Mode"
KN_Night_Mode_Control	0x94	Set the "Day & Night NIGHT Mode"
KN_DayNight_Mode_Control	0x95	Toggle "Day & Night Control Mode" of camera "AE Mode" → "SENSOR Mode" → "Day Mode" →"Night Mode" → "External Mode"

10. SPECIFICATION

Image Device	1/3" Color Sony Vertical double-Density WD CCD
Image Device	NTSC: 976 x 494 (H x V) / PAL: 976 x 582 (H x V)
Picture Elements	Day: 650 TVL, Night: 700 TVL
Resolution	(0.01)Lux(Day mode), (0.00011) Lux (Night mode) / F1.2
Min. Illumination	More than 48dB
S/N Ratio	NTSC:1/60~1/100,000, PAL:1/50~1/100,000 include Flickerless (NTSC:1/100, PAL:1/120)
Electronic Shutter	On / Off (NTSC:1/100, PAL:1/120)
Iris Control	DC Drive
Lens Mount	C / CS
Digital Noise Reduction	LOW/MID.LOW/MID/MID.HIGH/HIGH
Motion detection	24*16 detection blocks
Gamma	0.45
White Balance	Auto / Indoor / Outdoor / Manual / Push Lock/ Anti-CR
Gain Control	Manual (LOW/ MID/ HIGH)
Back Light Comp/HLC.	On / Off (Level & Area: user define and 7default area for adjustable)
Wide Dynamic Range (WDR)/ATR	On / Off (Level adjustable: LOW/MID.LOW/MID/MID.HIGH/HIGH)
Day & Night (ICR)	AE / Day / Night / EXT
Digital Zoom	16x
Camera ID	000~255
Camera Title	Up to 16 characters
Mirror	Off / Horizontal / Vertical / Rotate
Privacy Masking	15 free areas (Area size adjustable)
Freeze	On / Off
Positive / Negative	On / Off
Digital Slow Shutter (DSS)	Off, 2~20, 40, 80, 160, 256 FLD
Remote Control	RS-485 / RS-422
Protocol	PELCO D&P
Sync. System	Internal/ External Line Lock
Video Output	1 Vp-p / 75 Ohms
Power Supply	DC12V/AC24V Dual or AC90~240V (Optional)
Power Consumption	Dual: 8.5W max. AC:
Operating Temp.	-10 ~ 50

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