Active Silicon

Harrier 36x Autofocus-Zoom SDI Camera

(HD-SDI/EX-SDI/CVBS – Global Shutter)

AS-CAM-36SGHD-A

Technical Reference Manual

Edition: v1.05

Issued Date: 24 July 2024

Contents

Features

◆ **1/2.3" Sony Global shutter CMOS sensor**
2.37M Pixels (Total)
2.35M Pixels (Active)

◆ **36x Optical Zoom**
High reliability built-in 36x optical zoom lens with auto focus, auto iris and auto D&N functions.

◆ **Full HD Resolution**
1920x1080p 30/25fps (60/50fps EX-SDI only)
1280x720p 60/50/30/25fps

◆ **DAY & NIGHT (ICR)**
The ICR will automatically engage depending on the ambient light, allowing the camera to be effective in day and night environments.

◆ **DNR (Digital Noise Reduction, 2D+3D)**
The DNR technology eliminates noise thus generating a distinct and clear image. This camera DNR function utilizes both an adaptive 2D filter reducing noise in the brightness of the image and an adaptive 3D filter reducing noise caused by movement.

◆ **Privacy mask Function**
The privacy zone function makes it possible to hide specific areas of the scene from view.

◆ **On Screen Display**
This camera supports an OSD function and the camera can be controlled by selecting text displayed on the monitor screen.

◆ **Intelligent motion detection**
Can transmit an alert signal when it detects motion of an object on the screen. This feature is useful when you have to monitor several screens simultaneously.

◆ **Digital Image Stabilizer (DIS)**
The Image Stabilizer function reduces image blurring caused by, for example, vibration, which allows you to obtain images without much blurring.

◆ **Output**
Digital output: HD-SDI, EX-SDI
Analog output: CVBS, HD-TVI

◆ **Protocol**
This camera supports VISCA, PELCO-D and PELCO-P protocols. UART (TTL Level) and RS-485 are used for communication.

Cautions

◆ Power Supply

This camera must always be operated at 9V to 15V DC

◆ Handling of the unit

Be careful not to spill water or other liquids on the unit.
Be cautions not to get combustible or metallic material inside the body.
If used with foreign matter inside, the camera is liable to fail or to get cause of fire or electric shock.

◆ Operating and storage location

Avoid viewing a very bright object (such as light fittings) during an extended period. Avoid operating or storing the unit in the following locations.

- Extremely hot or cold places (operating temperature -10℃ ~ 50℃, however, we recommend that the unit be used within a temperature range of 0℃ ~ 45℃)
- Damp or dusty places
- Places exposed to rain
- Places subject to strong vibration
- Close to generators of powerful electromagnetic radiation such as radio or TV transmitters.

◆ Care of the unit

- Remove dust or dirt on the surface of the lens with a blower (commercially available).
- Avoid the use of volatile solvents such as thinners, alcohol, benzene and insecticides. They may damage the surface finish and/or impair the operation of the camera.

Specification

Model	AS-CAM-36SGHD-A			
Image Sensor	1/2.3" Sony IMX392LQR-C CMOS Sensor			
Total Pixels	1936(H) x 1226(V) = 2.37M pixels			
Effective pixels	1936(H) x 1216(V) = 2.35M pixels			
Active pixels	1936(H) x 1216(V) = 2.35M pixels			
Shutter type	Global shutter			
Sync. System	Internal			
Resolution	Digital: 1080p 30/25fps, 720p 60/5030/25fps (1080p 60/50fps EX-SDI only) Analog: CVBS			
Min. illumination (50%)	Color(1/30s, 48dB): 0.3 lux , BW(1/30s, 48dB): 0.01 lux Color DSS(1/2s, 48dB): 0.06 lux , BW DSS(1/2s, 48dB): 0.002 lux			
Video Output	Digital: HD-SDI, EX-SDI Analog: HD-TVI, CVBS			
Signal-to-Noise (S/N) Ratio	more than 50dB (AGC off)			
Lens				
Lens type	36x Day & Night Zoom Lens			
Zoom Ratio	Optical x36 Zoom, Digital x32 Zoom			
Focal Length	f = 6.0mm ~ 216.0mm			
Aperture Ratio	F1.5 (wide) ~ F4.8 (tele)			
Angle of View (D, H, V)	Wide	59.1°	52.6°	31.1°
	Tele	2.3°	2.0°	1.1°
Function				
Trigger Mode	Free run / Ext-trigger			
Trigger Polarity	Active Low / Active High			
Trigger Delay	0 ~ 255.9ms			
Strobe Polarity	Active Low / Active High			
Strobe Delay	Ext-Trigger: 0 ~ 255.9ms / Free run: 0 ~ (1V period – Width)ms			
Strobe Width	Ext-Trigger: 0 ~ 255.9ms / Free run: 0 ~ (1V period – Delay)ms			
Shutter Speed (Ext-trigger)	1/30(25) ~ 1/20,000 sec			
AGC (Ext-trigger)	0 ~ 10 steps [Automatic Gain Control]			
Iris (Ext-trigger)	Close ~ F1.5			
Day & Night (Ext-trigger)	Day / Night			
Zoom/Focus				
Focus Mode	Auto / One Push / Manual			
Distance (m)	Wide: 0.1m, Tele: 1.5m (may be set higher using near focus limit)			
Zoom Speed	0 (Slow) ~ 7 (Fast)			
Lens Refresh	One Push / 1day ~ 10days			
E.Zoom	Off / MAX 2x ~ 32x			
Zoom Preset	5 preset			

Model	AS-CAM-36SGHD-A
Exposure	
Mode	Auto / Iris. Priority / Shut. Priority / Manual
AGC (Gain Control)	0 ~ 10 steps
Shutter Speed	1/1 ~ 1/20,000 sec
Iris	Close ~ F1.5
DSS (Digital Slow Shutter)	Off / 2x / 4x / 8x / 16x / 32x (/64x: 60 or 50fps mode only)
Flickerless	Off / On / Auto
Brightness	0 ~ 14 steps
Back Light	Off / BLC / HLC [Back- / High Light Compensation]
Day&Night	Auto / Day / Night / Ext-in
Night Function Set	Off / On
White Balance	
Mode	Auto / One Push / Manual / Indoor / Outdoor
Red Gain	0 ~ 100 steps (Manual mode only)
Blue Gain	0 ~ 100 steps (Manual mode only)
Chroma	0 ~ 20 steps
Hue	0 ~ 20 steps
Image	
DNR	2D/3D, 2D+3D (Level : 0 ~ 15 steps)
Mirror	Off / H / V / H&V [horizontally/vertically]
Sharpness	0 ~ 10 steps
Contrast	0 ~ 20 steps
Image Bright	0 ~ 20 steps
DWDR	Off / Manual / Auto
Defog	Off / Manual / Auto
Freeze	Off / On
Gamma	0.35 ~ 0.70
Intelligence	
Privacy Mask	Off / On (8 points)
Motion Detection	Off / On (4 points)
DIS (Digital Image Stabilizer)	Off / On / Hold
Special Functions	
Defect DET	Off / On
System	NTSC / PAL
HD Format	720p30(25)fps / 720p60(50)fps / 1080p30(25)fps / 1080p60(50)fps EX-SDI only
EX-SDI Mode	EX270M(1.0) / EX135M(2.0)
OUT Select	HD-SDI/EX-SDI CVBS/TVI
UART/RS-485 Communication	ID: 1 ~ 255
	Baud Rate: 2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 bps
	Protocol: Pelco-P / Pelco-D / VISCA

Model	AS-CAM-36SGHD-A
Display	
Display Sel (Off / On)	ID / Title / Zoom Ratio / System Message
Set Title	Text Edit
Init Sel (Off / On)	ID / Baud Rate / Protocol / Version / Init. Message
Set Init Msg	Text Edit
Electrical	
Power Source	9V to 15V DC
Power Consumption	550mA (@ 12VDC)
General	
Power Input	Connector
Video Output	Connector
Operating Temperature	-10ºC ~ +50ºC (Humidity: 0%RH ~ 90%RH)
Storage Temperature	-20ºC ~ +60ºC (Humidity: 0%RH ~ 90%RH)
External Dimension (mm)	124(L) x 55.6(W) x 64(H) mm
Weight	416 g

Connectors

J203					
Pin No.	**Name**	**Level**	**Pin No.**	**Name**	**Level**
1	TVI - out		21	DC IN	9 ~ 15V DC
2	GND		22	GND	
3	CVBS_OUT	NTSC/PAL	23	GPIO2	
4	GND		24	GPIO1	
5	N.C.		25	ADKEY	(see text 2. below)
6	N.C.		26	D/N - input	+3.3V / GND
7	N.C.		27	IR–ON input	+3.3V / GND
8	N.C.		28	MD – output	
9	N.C.		29	RS-485 (-)	
10	N.C.		30	RS-485 (+)	
11	N.C.				
12	N.C.				
13	N.C.				
14	STROBE_OUT	Strobe Output (CMOS 3.3V)			
15	TRIG_IN	External Trigger Input (CMOS 3.3V)			
16	+5V output				
17	GND				
18	GND				
19	DC IN	9 ~ 15V DC			
20	DC IN	9 ~ 15V DC			
Ref.	USL00-30L-C (KEL Cop.)				

J202		
Pin No.	**Name**	**Level**
1	RxD	TTL
2	TxD	TTL
3	GND	
4	DC IN	9 ~ 15V DC
5	GND	
6	CVBS	PAL/NTSC
7	GND	
8	TVI out	
9	GND	
Ref.	10019HR-09 (YEONHO)	

J300		
Pin No.	**Name**	**Level**
-	HD-SDI/EX-SDI	
Ref.	MMCX - R/A	

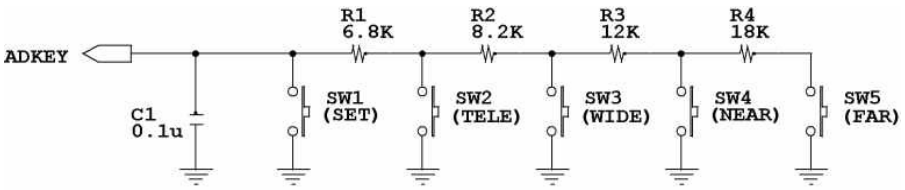
1. D&N IN (J203-26)

Port giving input of any external signal in Day&Night “Ext-In” Mode

- Day Mode: High (+3.3V)
- Night Mode: Low (Ground)

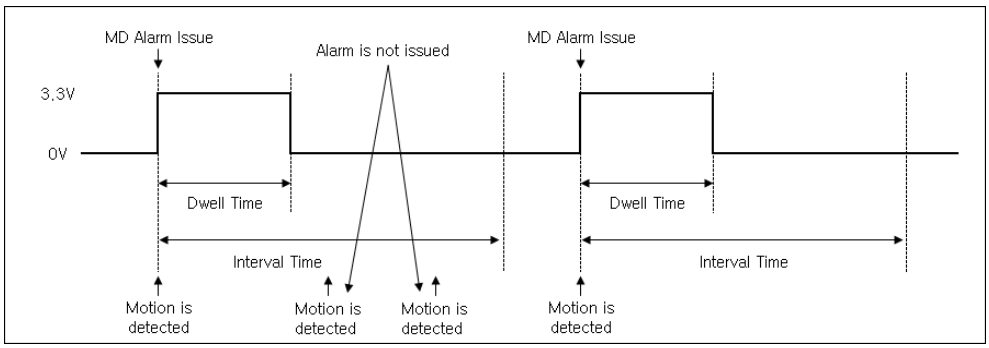
2. AD KEY (J203-25)

The externally wired remote controller connector.

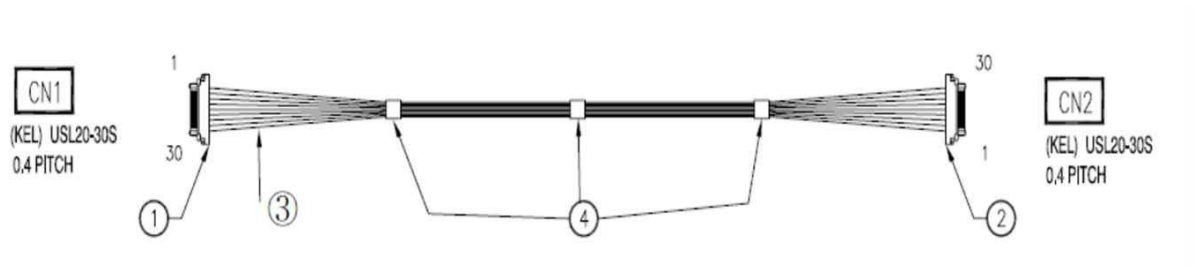


3. MD (J203-28)

Port giving signal output of Motion Detection Alarm

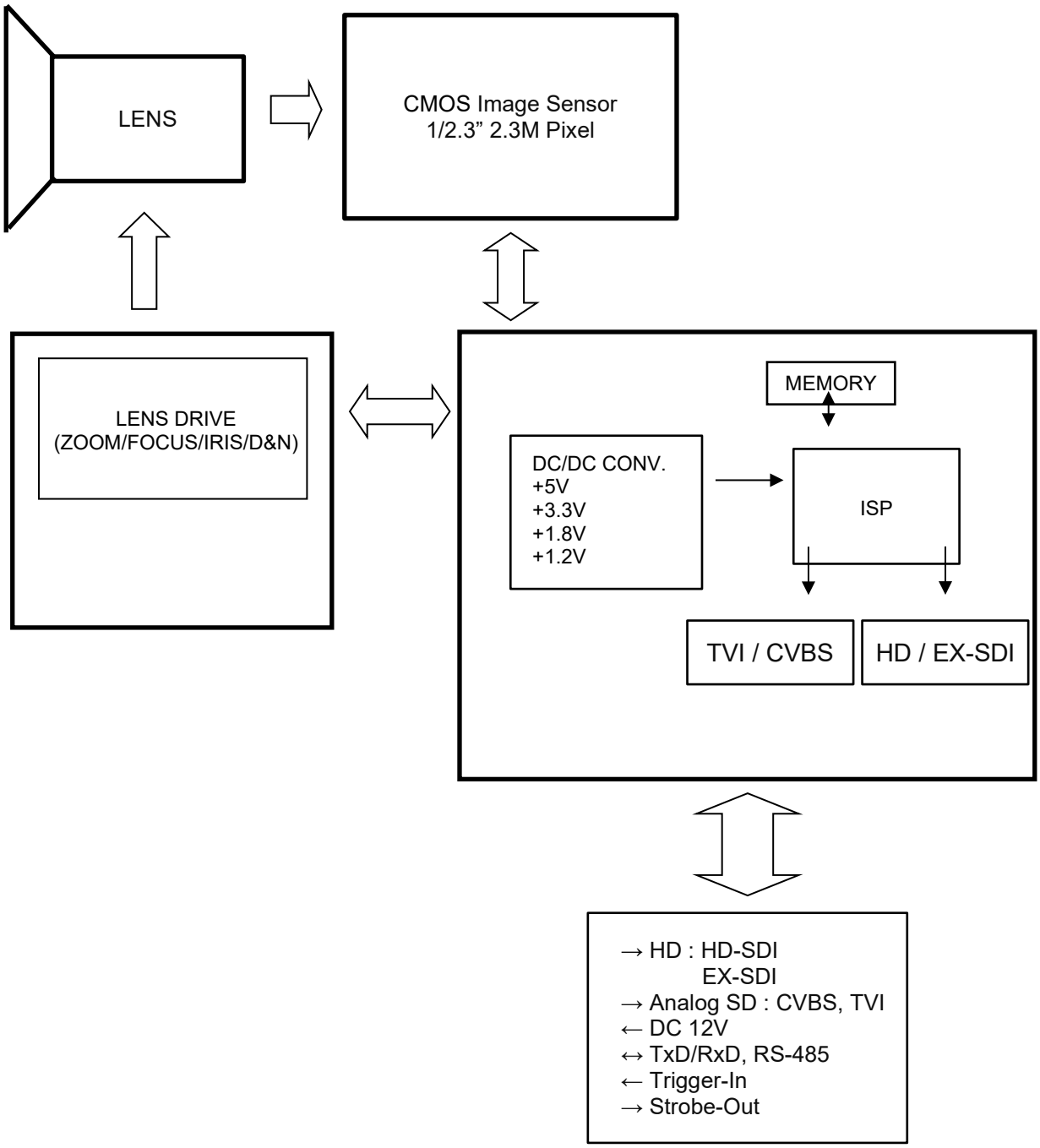


Cable specification



①, ②: Connecting to USL20-30S (KEL)
③: #42 thin coaxial cable
④: Binding tape

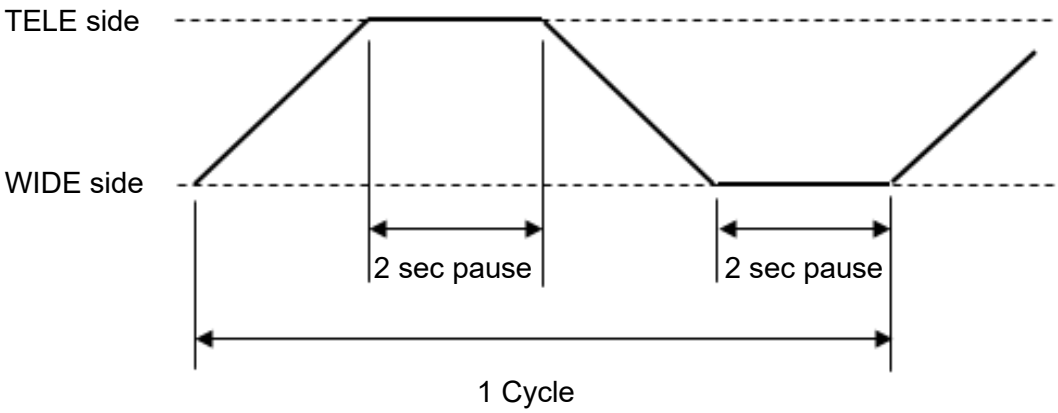
Block Diagram



Reliability

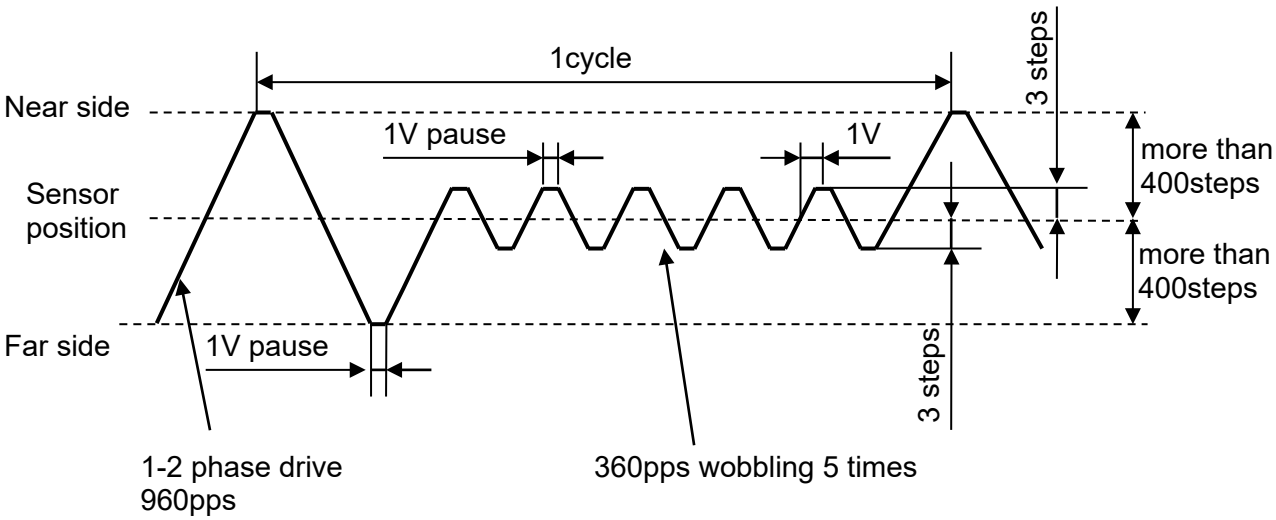
1. Zoom

(1) Zoom operation cycle: 500,000 cycles
(2) Operation condition: See below
(3) Test condition: Normal temperature



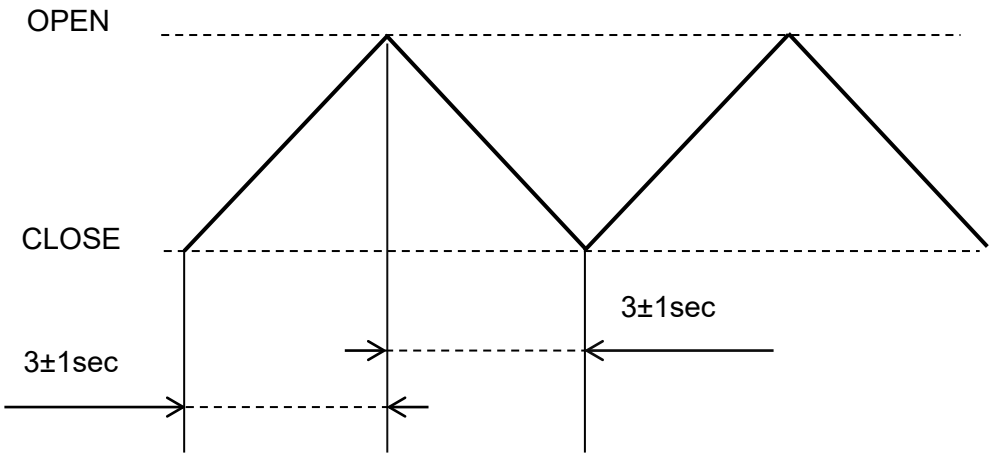
2. Focus

(1) Focus operation cycle: 500,000 cycles
(2) Operation condition: See below
(3) Test condition: Normal temperature



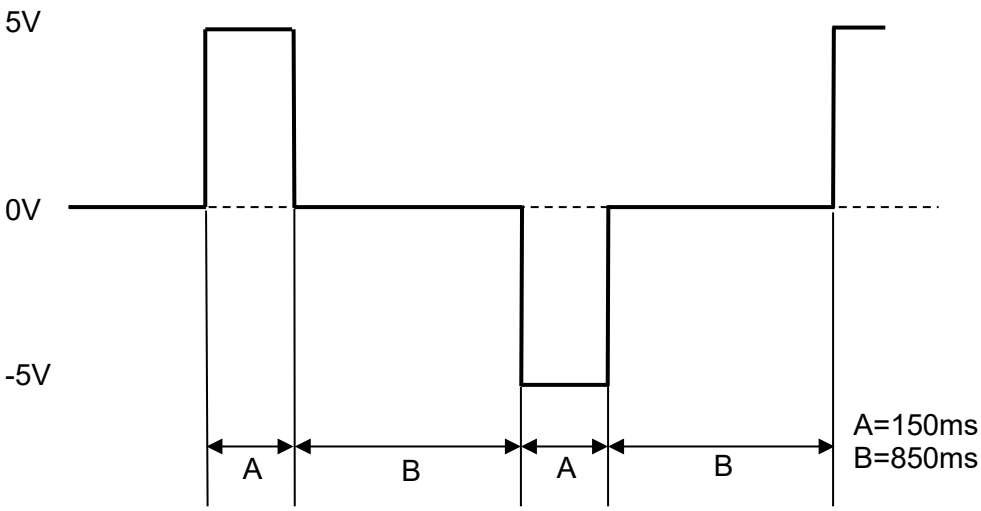
3. Auto-iris

(1) Auto-iris operation cycle: 300,000 cycles
(2) Operation condition: See below
(3) Test condition: Normal temperature



4. IR-Cut Filter

(1) IRCF operation cycle: 200,000 cycles
(2) Operation condition: See below
(3) Test condition: Normal temperature



Functions

1. Zoom

- Max. zoom ratio
  - Optical Zoom: Max x36
  - Digital Zoom: Max x32
  - Optical + Digital Zoom: Max x1152

  ※ Digital Zoom cannot be used with the DIS function.

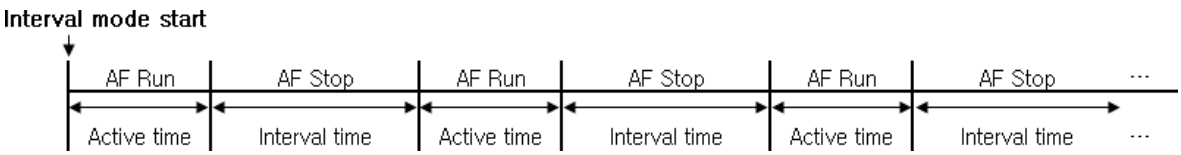
- Digital zoom mode
  - Combined mode:
    After the optical zoom has reached its maximum level, the camera switches to digital zoom mode when zooming in. And the camera switches to optical zoom mode again after the digital zoom has reached its minimum level when zooming out.

  - Separate mode:
    Optical zoom and digital zoom can be operated separately.

2. Focus

- Auto focus mode
  - Auto Mode:
    Auto Focus automatically adjusts the focus position to maximize the high frequency content of the picture in a center measurement area, taking into consideration the high luminance and strong contrast components. Auto Mode is the normal mode for AF operation.

  - Interval Mode:
    The mode used for Auto Focus movements carried out at particular intervals. The interval time and active time for AF movements and for the timing of the stops can be set.



  - Zoom trigger mode (One push mode):
    When the zoom is changed with the TELE or the WIDE buttons, the pre-set value becomes that for AF mode. Then it stops.

- Lens Initialize
  Initialize the zoom and focus of the lens. Even when power is already on, it initializes the Zoom and the Focus.
  Focus position can only be adjusted in manual mode using Far/Near button or Far/Near command.

- Manual focus mode
  Focus position can be adjusted by manual only using Far/Near button or Far/Near command.

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

  - Infinity mode:
    The lens is forcibly moved to a position suitable for an unlimited distance.

- Near Limit (Focus Distance)
  Can be set to limit minimum range of focus.

3. Trigger

- Trigger mode
  - Free run mode:
    Continuous image output mode.

  - Ext-trigger mode:
    External trigger synchronous image output mode.

※ When Ext-trigger mode is selected, focus mode and exposure mode are forced into manual mode.

4. Auto Exposure

- Exposure mode
  - Auto mode:
    Full Auto with Auto Iris and Shutter Speed. User can turn on/off AGC and Digital Slow Shutter feature.
  - Iris priority mode:
    User can set Iris Level, and shutter speed is set automatically according to the brightness of the subject. User can turn on/off AGC and Digital Slow Shutter.
  - Shutter priority mode:
    User can set variable shutter speed, and Iris is set automatically according to the brightness of the subject. User can turn on/off AGC.
  - Manual mode:
    User can set Iris, Shutter speed and Gain. User can also use Digital Slow Shutter by adjusting the shutter speed.
  - Bright mode (Manual):
    User can set Iris and Gain.

  ※ Refer to the Exposure Control in Command List for the value range of AGC Gain, Shutter Speed, Iris and Exposure compensation.

- Exposure compensation (Brightness)
  - Function to offset the internal reference brightness level used in the AE mode.

- Back light mode
  - BLC (Back Light Compensation) mode:
    The BLC function provides compensation by increasing the brightness of the overall screen so that subjects being shot with a loss of dark detail due to backlight will have just the right brightness level.
  - HLC (High Light Compensation) mode:
    When extremely bright light is projected to the camera masking is used on the portion to prevent partial saturation on the monitor

- Day & Night (ICR) mode
  An infrared (IR) cut filter can be disengaged from the image path for increased sensitivity in low light environment. The ICR will automatically engage depending on the ambient light, allowing the camera to be effective in day/night environments.
  - Auto Mode:
    Automatically switches the settings needed for attaching or removing the IR Cut Filter. With a set level of darkness, the IR Cut Filter is automatically disabled. With a level of brightness, the IR Cut Filter is automatically enabled.
  - Ext-In Mode:
    Switches to Day mode when the input from D&N-IN Port is High and switches to Night mode when it is low.

- Night function settings
  The following features can be set for Night state-only:
  - Focus Mode
  - Exposure Mode
  - AGC (Gain Limit and Manual Gain)
  - Shutter Speed
  - Iris
  - DSS
  - Flickerless
  - Brightness
  - Back Light mode
  - Sharpness

5. White balance

- AUTO mode
  This mode computes the white balance value output using color information from the entire screen. It outputs the proper value using the color temperature (2,300K ~ 8,000K).

- One push mode
  This is a fixed white balance mode that may be automatically readjusted only at the request of the user (One-push Trigger)

- Manual mode
  Manual control of R and B gain.

- Indoor mode
  3700K base mode

- Outdoor mode
  5100K base mode

- Auto-Ext mode:
  This mode operates on a wider range of color temperatures than Auto mode.
  (<2,000K(Sodium Light) ~ 10,000K)

6. DNR (Digital Noise Reduction)

By using both of 2D DNR (space-based) and 3D DNR (time-based), the amount of low illuminance noise has been significantly reduced and the signal-to-noise ratio(S/N) as well as horizontal resolution has been improved, resulting in a clear and sharp image display even in the dark environment.

※ If the 3D DNR Level is set too high, a ghost image may occur in dark environments.

7. Mirror

This function reverses the video output from the camera upside down or left/right reverse.

8. Sharpness (Aperture)

This function adjusts the enhancement of the edge of objects in the picture.

9. Defog

Eliminate amount of fog on display screen. When DEFOG is ON, ACE and WDR function cannot turn on.

10. Freeze

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

11. Privacy Mask

- Mask can be set on up to 8 places according to Pan/Tilt positions.
  ※ Only 4 masks are displayed on the CVBS and the SDI output.
- Individual on/off zone masking settings.
- For each privacy zone the color displayed when set OFF or ON can be individually set to one of 14 colors (or transparent).
- Interlocking control with zooming.
- Interlocking control with Pan/Tilt. (Interlock mode)
- Parameters in VISCA Command (Privacy related commands in Command List)

- Mask Number (mm):
  Mask A = 0 ~ Mask H = 7
  ※ Mask A has highest priority and Mask H has lowest priority

- Mask setting bit (pp pp pp pp)

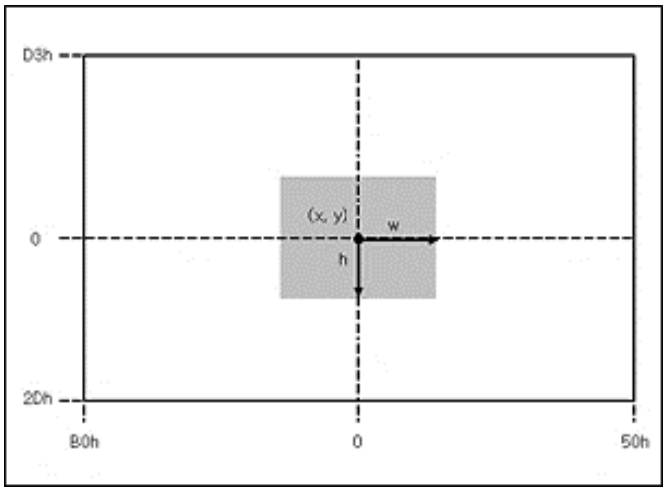
	pp								pp								pp								pp							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Mask#	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	H	G	-	-	F	E	D	C	B	A

- Mask Modify setting (nn):
  00h = modifying the mask size for the existing mask size
  01h = setting newly the mask size to default value

- Mask Center Position:
  x (pp) = B0h(-50h) ~ 50h
  y (qq) = D3h(-2Dh) ~ 2Dh
  ※ Can be set in Non-Interlock mode only.

  Fixed as (0,0) in Interlock mode.

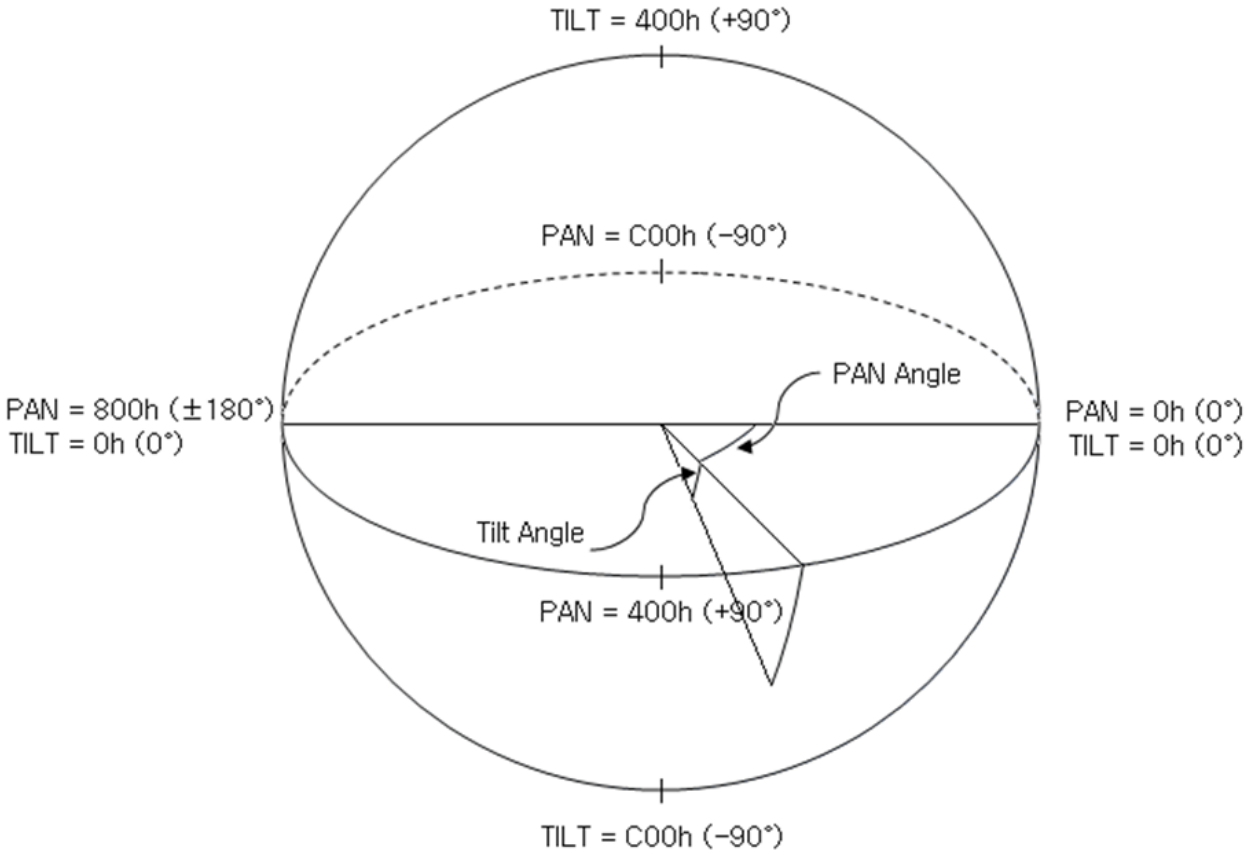
- Mask Size:
  w (rr) = B0h(-50h) ~ 50h
  h (ss) = D3h(-2Dh) ~ 2Dh



- Mask Color

Color		Code (qq,rr)	
		Non-transparency	Transparency
Black		00 h	10 h
Gray	Light ↑ ↓ Dark	01 h	11 h
		02 h	12 h
		03 h	13 h
		04 h	15 h
		05 h	15 h
		06 h	16 h
White		07 h	17 h
Red		08 h	18 h
Green		09 h	19 h
Blue		0A h	1A h
Cyan		0B h	1B h
Yellow		0C h	1C h
Magenta		0D h	1D h

- Pan/Tilt angle (ppp, qqq):
  Range of angle (PAN: -180˚ ~ 180˚, TILT: -90˚ ~ 90˚)
  Angle resolution (360˚ / 4096)



12. Motion detection

Instructs the camera to detect movement within the monitoring area and the send an alarm signal automatically.

- You can set up to 4 MD Window.
- When the motion is detected in the set frame, the Alarm activates through Alarm ACK and MD-Out port.
- The interval of alarm detection and dwell time can be set up to 255 seconds in units of one second.
  - Interval Time: The MD Alarm isn't activated again till the interval time passed by.
  - Dwell Time: It keeps the MD Alarm Signal (MD-Out) and MD Zoom Preset Position during the set dwell time, after the alarm activated.

13. DIS (Digital Image Stabilizer)

The DIS function internally detects shaking of the image due to camera shaking, and performs digital compensation processing to suppress this shaking and stabilize the image output.

※ When the DIS is turned on, the digital zoom is forced off.

14. Comp Scan

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

15. Custom Preset

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

16. Defect / Spot pixels

Spot pixels are caused by pixel sensors (on the image sensor) that have an output which does not accurately represent the incident light on the pixel area. This makes the affected pixel look different to the surrounding pixels. Regardless of the manufacturer, all CMOS image sensors have some spot pixels; they are caused by faults in the very small transistors in the pixel sensor. The smaller the transistor is, the more likely it is to have/develop an issue. Damage can be due to manufacturing issues, but often they are caused by particle radiation such as cosmic rays, etc. Usually, these spot pixels look like pixel size (therefore small) white points seen in a dark image - in a normal scene they can be very difficult to see. Sometimes the damage is minor and the pixel will 'misbehave' to different degrees depending on the temperature, shutter speed (integration time), gain and other factors. This can make the spot pixel flash, or only appear under certain conditions. Unfortunately, with current CMOS image sensor technology it is not possible to prevent these spot pixels, and, over time as the sensor ages and accumulates damage from ambient radiation, the number of spot pixels will increase. Due to this, manufacturers of standard image sensors do not warranty against spot pixel faults. Instead, they recommend that camera designers take measures to compensate for spot pixels. This involves identifying problem pixels and replacing the pixel output with a value that has been interpolated from the surrounding pixels. However, problem pixels can be difficult to identify accurately. For example, as the temperature of the sensor fluctuates, or the exposure changes, some pixels may fall in and out of line with their expected response. Also, sensors will develop new defects after the initial factory correction has taken place. Therefore, Harrier cameras are only warrantied against major sensor faults (many pixels across) on first delivery of the camera. To mitigate against this problem, Harrier cameras offer the ability to perform a re-calibration that will eliminate new spot pixels that appear in dark scenes. When using this function, the lens must be completely covered such that no light gets into the lens - this allows the identification of white spot pixels.

- Using the ADKEY feature, or the CAM_MENUKey VISCA commands, open the On Screen Menu and select Special Functions.
- Highlight the DEFECT option and 'Select' it.

The camera will analyze the dark image and identify spot pixels so that they can be compensated for when processing the final image.

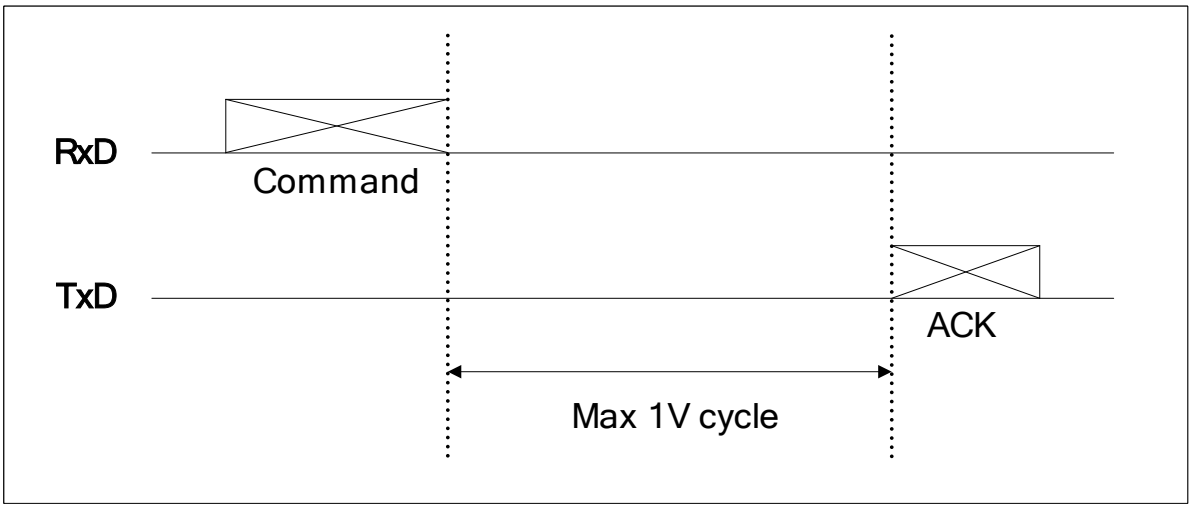
Protocols

1. Timing

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

※ 1V cycle

- 30fps mode: 33.3ms
- 60fps mode: 16.7ms
- 25fps mode: 40.0ms
- 50fps mode: 20.0ms



2. Communication parameters (UART/RS-485)

- Protocol: VISCA, Pelco-D, Pelco-P
- ID: 1~7 (VISCA), 1~255(Pelco-D), 0~254(Pelco-P)
- Baud rate: 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
- Data bit: 8
- Start bit: 1
- Stop bit: 1
- Non parity bit

3. Pelco-D Protocol Command List

Function	Message Format (Hex)						
	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Zoom Tele	FF	ID	00	20	00	00	CS
Zoom Wide	FF	ID	00	40	00	00	CS
Focus Near	FF	ID	01	00	00	00	CS
Focus Far	FF	ID	00	80	00	00	CS
Stop	FF	ID	00	00	Don’t care		CS
Menu (Set)	FF	ID	00	03 or 07	00	5F	CS
Esc	FF	ID	00	03 or 07	00	60	CS
Up	FF	ID	00	08	00	XX	CS
Down	FF	ID	00	10	00	XX	CS
Left	FF	ID	00	04	XX	00	CS
Right	FF	ID	00	02	XX	00	CS
Set Zoom Preset	FF	ID	00	03	00	Preset ID (01 ~ 05)	CS
Clear Zoom Preset	FF	ID	00	05	00	Preset ID (01 ~ 05)	CS
Go to Zoom Preset	FF	ID	00	07	00	Preset ID (01 ~ 05)	CS
Focus Mode	FF	ID	00	2B	00	00,01:Auto 02: Manual	CS

- ID: Camera ID (1 ~ 255)
- XX: Speed (10h < XX ≤ 40h)
- CS (Check Sum): An 8-bit sum of byte 2 ~ 6 in the message.

4. Pelco-D Protocol Command List

Function	Message format (Hex)							
	Byte1	**Byte2**	**Byte3**	**Byte4**	**Byte5**	**Byte6**	**Byte7**	**Byte8**
Zoom Tele	A0	ID	00	20	00	00	AF	CS
Zoom Wide	A0	ID	00	40	00	00	AF	CS
Focus Near	A0	ID	02	00	00	00	AF	CS
Focus Far	A0	ID	01	00	00	00	AF	CS
Stop	A0	ID	00	00	Don’t care		AF	CS
Menu (Set)	A0	ID	00	03 or 07	00	5F	AF	CS
Esc	A0	ID	00	03 or 07	00	60	AF	CS
Up	A0	ID	00	08	00	XX	AF	CS
Down	A0	ID	00	10	00	XX	AF	CS
Left	A0	ID	00	04	XX	00	AF	CS
Right	A0	ID	00	02	XX	00	AF	CS
Set Zoom Preset	A0	ID	00	03	00	Preset ID (01 ~ 05)	AF	CS
Clear Zoom Preset	A0	ID	00	05	00	Preset ID (01 ~ 05)	AF	CS
Go to Zoom Preset	A0	ID	00	07	00	Preset ID (01 ~ 05)	AF	CS

- ID: Camera ID (0 ~ 254, Zero indexed)
- XX: Speed (10h < XX ≤ 40h)
- CS (Check Sum): An XOR sum of byte 1 ~ 7 in the message.

5. VISCA Protocol

- Command packet (Variable packet length)

Byte 0	Byte 1	Byte 2		…		Byte n-2	Byte n-1
Header	Message						Terminator
8Xh	QQ			…			FFh

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
1	0	0	0	0	x	x	x
	Sender's address				Receiver's address		

- X: 1 ~ 7 (Camera address)
- QQ: 01 (Command), 09 (Inquiry)

- ACK message packet (Variable packet length)

Byte 0	Byte 1	Byte 2		…		Byte n-2	Byte n-1
Header	Message						Terminator
Y0h	QR			…			FFh

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
1	y	y	y	0	0	0	0
	Sender's address				Receiver's address		

- Y: 9 ~ F (Camera address + 8)
- Q: 4 (Receive ACK), 5 (Completion message), 6 (Error message)
- R: Socket Number (1 ~ 3)

※ When command messages are sent to the 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 camera has three buffers (memories) for commands, so that up to three commands including the commands currently being executed can be received. When the camera receives commands, it notifies the sender which command buffer was used using the socket number of the ACK message.

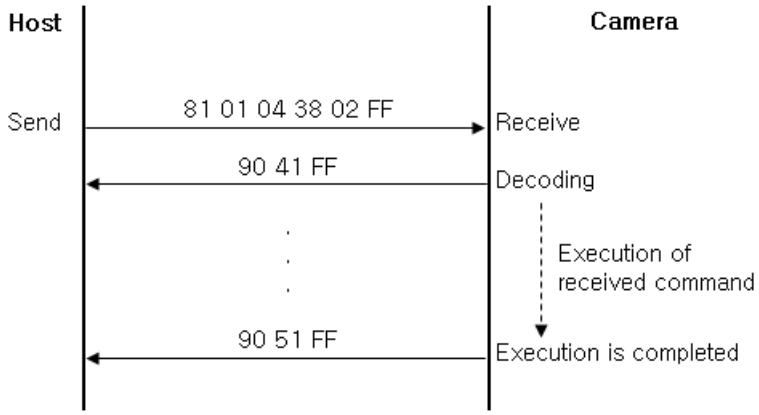
Ack type	Reply packet
Recevie Ack	Y0 4R FF
Compeletion (Commands)	Y0 5R FF
Compeletion (Inquiries)	Y0 50 … FF
Error	Y0 6R SS FF

SS	Description
01	Message length error
02	Syntax error
03	Command buffer full
04	Command cancelled
05	No socket (to be cancelled)
41	Command not executable

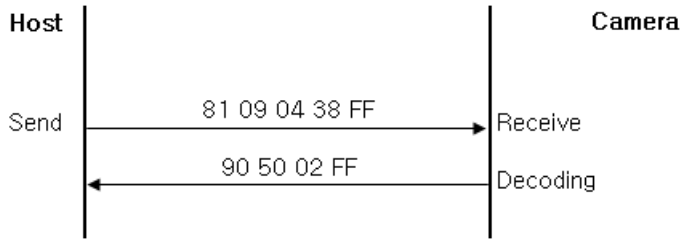
- Example of communication

  - Camera ID: 1
  - Socket number: 1

※ Command



※ Inquiry command



- Network change message

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

    Y0 38 FF

    Y = 9 ~ F (Camera address + 8)

VISCA Command List

Command Set	Command	Command Packet	Comments
AddressSet	Broadcast	88 30 01 FF	Address setting
IF_Clear	Broadcast	88 01 00 01 FF	I/F Clear
		8x 01 00 01 FF	
CommandCancel		8x 2p FF	p: Socket No.(1 ~ 3)
CAM_Power	Power Reset	8x 01 04 00 03 FF	Camera Rebooting
CAM_Zoom	Stop	8x 01 04 07 00 FF	
	Tele (Standard)	8x 01 04 07 02 FF	
	Wide (Standard)	8x 01 04 07 03 FF	
	Tele (Variable)	8x 01 04 07 2p FF	p: 0 (Slow) ~ 7 (Fast)
	Wide (Variable)	8x 01 04 07 3p FF	
	Direct	8x 01 04 47 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM_ZoomPreset	Set	8x 01 04 67 01 0p FF	p: Zoom Preset Number (0 ~ 4)
	Run	8x 01 04 67 02 0p FF	p: Zoom Preset Number (0 ~ 4)
	Clear	8x 01 04 67 03 0p FF	p: Zoom Preset Number (0 ~ 4, Fh: All)
CAM_DZoom	On	8x 01 04 06 02 FF	Digital Zoom ON/OFF
	Off	8x 01 04 06 03 FF	
	Combined Mode	8x 01 04 36 00 FF	Optical/Digital Zoom Combined
	Separate Mode	8x 01 04 36 01 FF	Optical/Digital Zoom Separated
	Stop	8x 01 04 06 00 FF	
	Tele (Variable)	8x 01 04 06 2p FF	p: 0(Slow) ~ 7(Fast) * Effective separate mode
	Wide (Variable)	8x 01 04 06 3p FF	
	x1/Max	8x 01 04 06 10 FF	x1/Max Magnification switchover * Effective separate mode
	Direct	8x 01 04 46 00 00 0p 0q FF	pq: D-Zoom Position * Effective separate mode
CAM_Focus	Stop	8x 01 04 08 00 FF	
	Far (Standard)	8x 01 04 08 02 FF	
	Near (Standard)	8x 01 04 08 03 FF	
	Far (Variable)	8x 01 04 08 2p FF	p: 0(Slow) ~ 7(Fast)
	Near (Variable)	8x 01 04 08 3p FF	
	Direct	8x 01 04 48 0p 0q 0r 0s FF	pqrs: Focus Position
	Auto Focus	8x 01 04 38 02 FF	AF ON/OFF
	Manual Focus	8x 01 04 38 03 FF	
	Auto/Manual	8x 01 04 38 10 FF	
	Focus mode (D&N)	8x 01 04 38 0p 0q FF	p: Focus mode in Day State q: Focus mode in Night State (2: Auto Focus, 3: Manual Focus)
	One Push Trigger	8x 01 04 18 01 FF	One Push AF Trigger
	Infinity	8x 01 04 18 02 FF	Forced Infinity
	Near Limit	8x 01 04 28 0p 0q 0r 0s FF	pqrs: Focus Near Limit Position
CAM_AF Mode	Normal AF	8x 01 04 57 00 FF	Normal AF Mode
	Interval AF	8x 01 04 57 01 FF	Interval AF Mode
	Zoom Trigger AF	8x 01 04 57 02 FF	Zoom Trigger Mode
	AF mode of (D&N)	8x 01 04 57 0p 0q FF	p: AF mode in Day State q: AF mode in Night State (0: Normal, 1: Interval, 2: Zoom Trigger)
	Active/Interval Time	8x 01 04 27 0p 0q 0r 0s FF	pq: Active Time (0: 1sec ~ 255: 256sec) rs: Interval Time (0: 1sec ~ 255: 256sec)
CAM_ZoomFocus	Direct	8x 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w FF	pqrs: Zoom Position tuvw: Focus Position
CAM_Initialize	Lens	8x 01 04 19 01 FF	Lens Soft Reset
	Comp Scan	8x 01 04 19 02 FF	Execute White spot compensation

Command Set	Command	Command Packet	Comments
CAM_WB	Auto	8x 01 04 35 00 FF	Normal Auto
	Indoor	8x 01 04 35 01 FF	Indoor Mode
	Outdoor	8x 01 04 35 02 FF	Outdoor Mode
	One Push AWB	8x 01 04 35 03 FF	One Push AWB Mode
	Manual	8x 01 04 35 05 FF	Manual Control Mode
	Auto-Ext	8x 01 04 35 07 FF	Auto Extended Mode
	One Push Trigger	8x 01 04 10 05 FF	One Push AWB trigger
CAM_RGain	Reset	8x 01 04 03 00 FF	Red Gain Manual setting
	Up	8x 01 04 03 02 FF	
	Down	8x 01 04 03 03 FF	
	Direct	8x 01 04 43 00 00 0p 0q FF	pq: R Gain (0 ~ 64h)
CAM_BGain	Reset	8x 01 04 04 00 FF	Blue Gain Manual setting
	Up	8x 01 04 04 02 FF	
	Down	8x 01 04 04 03 FF	
	Direct	8x 01 04 44 00 00 0p 0q FF	pq: B Gain (0 ~ 64h)
CAM_Chroma	Direct	8x 01 04 13 00 00 0p 0q FF	pq: Chroma level (0~14h)
CAM_ColorHue	Direct	8x 01 04 4F 00 00 00 0p FF	p:Color Hue setting (0: -18º ~ 14h: +18º)
CAM_AE	Full Auto	8x 01 04 39 00 FF	Auto exposure mode
	Manual	8x 01 04 39 03 FF	Manual control mode
	Shutter Priority	8x 01 04 39 0A FF	Shutter priority auto exposure mode
	Iris Priority	8x 01 04 39 0B FF	Iris priority auto exposure mode
	Bright	8x 01 04 39 0D FF	Bright Mode (Manual control)
	AE mode (D&N)	8x 01 04 39 0p 0q FF	p: AE mode in Day State q: AE mode in Night State (0: Auto exposure, 3: Manual control, Ah: Shutter priority, Bh: Iris priority, Dh: Bright Mode)
CAM_SlowShutter	Auto (On)	8x 01 04 5A 02 FF	Auto Slow Shutter ON/OFF
	Manual (Off)	8x 01 04 5A 03 FF	
	SlowShutter (D&N)	8x 01 04 5A 0p 0q FF	p: Slow Shutter mode in Day State q: Slow Shutter mode in Night State (2: Auto, 3: Manual)
CAM_MaxDSSLev	Direct	8x 01 04 5A 1p FF	p: Max Slowshutter level (0:x2, 1:x4, 2:x8, 3:x16, 4:x32, 5:x64) ※ You can't select "x64" in 30 or 25fps mode
	Direct (D&N)	8x 01 04 5A 1p 0q FF	p: Max Slowshutter level in Day State q: Max Slowshutter level Night State (0:x2, 1:x4, 2:x8, 3:x16, 4:x32, 5:x64) ※ You can't select "x64" in 30 or 25fps mode
CAM_Shutter	Reset	8x 01 04 0A 00 FF	Shutter setting
	Up	8x 01 04 0A 02 FF	
	Down	8x 01 04 0A 03 FF	
	Direct	8x 01 04 4A 00 00 0p 0q FF	pq: Shutter Position
	Direct (D&N)	8x 01 04 4A 1p 0q 0r 0s FF	pq: Shutter Position of Night State rs: Shutter Position of Day State
CAM_Iris	Reset	8x 01 04 0B 00 FF	Iris setting
	Up	8x 01 04 0B 02 FF	
	Down	8x 01 04 0B 03 FF	
	Direct	8x 01 04 4B 00 00 0p 0q FF	pq: Iris Position
	Direct (D&N)	8x 01 04 4B 1p 0q 0r 0s FF	pq: Iris Position of Night State rs: Iris Position of Day State

Command Set	Command	Command Packet	Comments
CAM_Gain	Reset	8x 01 04 0C 00 FF	Gain setting
	Up	8x 01 04 0C 02 FF	
	Down	8x 01 04 0C 03 FF	
	Direct	8x 01 04 4C 00 00 0p 0q FF	pq: Gain Position
	Direct (D&N)	8x 01 04 4C 1p 0q 0r 0s FF	pq: Gain Position of Night State rs: Gain Position of Day State
	Gain Limit	8x 01 04 2C 0p FF	p: Gain Position
	Gain Limit (D&N)	8x 01 04 2C 0p 0q FF	p: Gain Limit Position of Day State q: Gain Limit Position of Night State
CAM_Bright	Reset	8x 01 04 0D 00 FF	Bright setting
	Up	8x 01 04 0D 02 FF	
	Down	8x 01 04 0D 03 FF	
	Direct	8x 01 04 4D 00 00 0p 0q FF	pq: Bright Position
	Direct (D&N)	8x 01 04 4D 1p 0q 0r 0s FF	pq: Bright Position of Night State rs: Bright Position of Day State
CAM_ExpComp	On	8x 01 04 3E 02 FF	Exposure Compensation ON/OFF
	Off	8x 01 04 3E 03 FF	
	ExpComp (D&N)	8x 01 04 3E 0p 0q FF	p: Exposure Compensation in Day State q: Exposure Compensation in Night State (2: On, 3: Off)
	Reset	8x 01 04 0E 00 FF	Exposure Compensation amount setting
	Up	8x 01 04 0E 02 FF	
	Down	8x 01 04 0E 03 FF	
	Direct	8x 01 04 4E 00 00 0p 0q FF	pq: ExpComp Position (0 ~ Eh)
	Direct (D&N)	8x 01 04 4E 1p 0q 0r 0s FF	pq: ExpComp Level of Night State rs: ExpComp Level of Day State (0 ~ Eh)
CAM_Flickerless	On	8x 01 04 7A 02 FF	Flickerless ON
	Off	8x 01 04 7A 03 FF	Flickerless OFF
	Auto	8x 01 04 7A 04 FF	Flickerless Auto Mode
	Flickerless (D&N)	8x 01 04 7A 0p 0q FF	p: Flickerless mode in Day State q: Flickerless mode in Night State (2: On, 3: Off, 4: Auto)
CAM_BLC	On	8x 01 04 33 02 FF	Back Light Compensation
	Off	8x 01 04 33 03 FF	
	BLC of (D&N)	8x 01 04 33 0p 0q FF	p: BLC mode in Day State q: BLC mode in Night State (2: On, 3: Off)
CAM_BLCFunc	Area OSD Display	8x 01 04 3C 0p FF	p: 0(Area OSD Off), 1(Area OSD On)
	Area Start X	8x 01 04 3C 10 00 0p 0q FF	pq: Start Horizontal Position (0 ~ 26h)
	Area Start Y	8x 01 04 3C 20 00 0p 0q FF	pq: Start Vertical Position (0 ~ 1Ah)
	Area End X	8x 01 04 3C 30 00 0p 0q FF	pq: End Horizontal Position (9 ~ 2Fh)
	Area End Y	8x 01 04 3C 40 00 0p 0q FF	pq: End Vertical Position (7 ~ 21H)
	BLC Level	8x 01 04 3C 50 00 0p 0q FF	pq: BLC Area Weight (0 ~ 6)
CAM_HLC	Mode	8x 01 04 32 0p FF	p: HLC Mode - 0(Off), 1(On), 2(Night Only)
	HLC (D&N)	8x 01 04 32 0p 0q FF	p: HLC mode in Day State (0: Off, 1: On, 2: Night Only) q: HLC mode in Night State (0: Off, 1: On)
	Level	8x 01 04 32 10 00 0p 0q FF	pq: HLC Level (0 ~ 14h)
	Clip Color	8x 01 04 32 3p FF	p: HLC Color (0: Black ~ Ah: White)
	Area Start X	8x 01 04 32 40 00 0p 0q FF	pq: Start Horizontal Position (0 ~ 26h)
	Area Start Y	8x 01 04 32 50 00 0p 0q FF	pq: Start Vertical Position (0 ~ 1Ah)
	Area End X	8x 01 04 32 60 00 0p 0q FF	pq: End Horizontal Position (9 ~ 3Eh)
	Area End Y	8x 01 04 32 70 00 0p 0q FF	pq: End Vertical Position (7 ~ 30H)

Command Set	Command	Command Packet	Comments
CAM_DWDR	On	8x 01 04 1A 02 FF	DWDR ON/OFF/AUTO
	Off	8x 01 04 1A 03 FF	
	Mode	8x 01 04 1A 20 0p FF	p : DWDR Mode - 0(Manual), 1(Auto)
	Auto Level	8x 01 04 1A 30 0p FF	p: Auto mode level (0:Low, 1:Middle, 2:High)
	Dark Level	8x 01 04 1A 40 0p 0q FF	pq: Dark area level of manual mode (0 ~ 10h)
	Bright Level	8x 01 04 1A 50 00 0p 0q FF	pq: Bright area level of manual mode (0 ~ 10h)
CAM_Defog	On	8x 01 04 65 02 FF	Defog ON/OFF/AUTO
	Off	8x 01 04 65 03 FF	
	Level	8x 01 04 65 10 0p FF	p: Manual mode level (0 ~ 8)
	Mode	8x 01 04 65 20 0p FF	p: Defog Mode - 0(Manual), 1(Auto)
	Auto level	8x 01 04 65 30 0p FF	p: Auto mode level (0:Low, 1:Middle, 2:High)
CAM_DNR	Mode	8x 01 04 53 0p FF	p: 0 (Off), 1 ~ 3 (Manual Level), 4 (Auto)
	2D/3D NR independent setting	8x 01 05 53 0p 0q FF	p: 2DNR level (0: Off, 1 to Fh - level 1 to 15) q: 3DNR level (0: Off, 1 to Fh - level 1 to 15)"
CAM_GAMMA	Direct	8x 01 04 5B 0p FF	p: Gamma setting (0:0.35 ~ 7:0.70)
CAM_Contrast	Direct	8x 01 05 5D 00 00 0p 0q FF	pq: (0 ~ 14h)
CAM_ImageBright	Direct	8x 01 05 5E 00 00 0p 0q FF	pq: (0 ~ 14h)
CAM_Aperture	Reset	8x 01 04 02 00 FF	Aperture Control
	Up	8x 01 04 02 02 FF	
	Down	8x 01 04 02 03 FF	
	Direct	8x 01 04 42 00 00 0p 0q FF	pq: Aperture Gain (0~Ah)
	Direct (D&N)	8x 01 04 42 1p 0q 0r 0s FF	pq: Aperture Gain of Night State rs: Aperture Gain of Day State (0 ~ Ah)
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	Freeze Picture ON/OFF
	Off	8x 01 04 62 03 FF	
CAM_PictureFlip	On	8x 01 04 66 02 FF	Picture Reverse On/Off (Rotate 180°)
	Off	8x 01 04 66 03 FF	
CAM_ICR	Night	8x 01 04 01 02 FF	ICR Mode ON/OFF
	Day	8x 01 04 01 03 FF	
	Auto	8x 01 04 51 02 FF	ICR is changed automaticaly by AGC Gain
	Ext-In	8x 01 04 51 05 FF	ICR is changed by external input
	Night Function Set	8x 01 04 51 10 0p FF	p: Night mode function setting On/Off (2: On, 3: Off)
	Threshold	8x 01 04 21 00 00 0p 0q FF	pq: Threshold level of Auto mode (0 ~ 1Ch)
	Gap	8x 01 04 21 10 00 00 0p FF	pq: On/Off Threshold Gap of Auto mode (0 ~ 4)
	Auto ICR Delay	8x 01 04 41 00 00 0p 0q FF	pq: Auto mode delay - 0(0sec) ~ FFh(255sec)
	Ext-In Delay	8x 01 04 71 00 00 0p 0q FF	pq: Ext-In mode delay - 0(0sec) ~ FFh(255sec)
	Burst On	8x 01 04 72 02 FF	Burst On/Off IR
	Burst Off	8x 01 04 72 03 FF	
	IR Detection On	8x 01 04 6E 02 FF	IR detection On/Off
	IR Detection Off	8x 01 04 6E 03 FF	
	IR Detection Level	8x 01 04 6E 10 0p FF	p : IR detection threshold level (0 ~ 4h)
CAM_AutoICR AlarmReply	On	8x 01 04 31 02 FF	Auto ICR switching Alarm On/Off
	Off	8x 01 04 31 03 FF	
	(Reply)	y0 07 04 31 02 FF	ICR Off → On
		y0 07 04 31 03 FF	ICR On → Off
CAM_Stabilizer	On	8x 01 04 34 02 FF	Stabilizer ON/OFF/Hold
	Off	8x 01 04 34 03 FF	
	Hold	8x 01 04 34 00 FF	

Command Set	Command	Command Packet	Comments
CAM_MEMORY	Reset	8x 01 04 3F 00 0p FF	p: Memory number (0 ~ 9h)
	Set	8x 01 04 3F 01 0p FF	
	Recall	8x 01 04 3F 02 0p FF	
CAM_CUSTOM	Reset	8x 01 04 3F 00 7F FF	Starts in this mode at Power On
	Set	8x 01 04 3F 01 7F FF	
	Recall	8x 01 04 3F 02 7F FF	
CAM_MemSave	Write	8x 01 04 23 0t 0p 0q 0r 0s FF	t: 00 ~ 07 (Address) Total 16Byte pqrs: 0000 ~ FFFFh (Data)
CAM_Display	On	8x 01 04 15 02 FF	Display ON/OFF
	Off	8x 01 04 15 03 FF	
	On/Off	8x 01 04 15 10 FF	
CAM_DispSel		8x 01 04 14 00 0p FF	Display Item On(1)/Off(0) p: bit[0] - ID, bit[1] - Title, bit[2] - Zoom Position bit[3] - System Message
CAM_MultiLineTitle	Title Set1	8x 01 04 73 1L 00 nn 0p qq rr 00 00 00 00 00 FF	L: Line Number (0 ~ Eh), nn: H-Position (0 ~ 27h), p: Color (0:White, 1: Yellow, 2:Black, 3:Red, 4:Gray, 5:Green) qq: Blink, rr: Opening Title
	Title Set2	8x 01 04 73 2L mm nn pp qq rr ss tt uu vv ww FF	L: Line Number (0 ~ Eh) mnpqrstuvw: Set of characters (1 ~ 10)
	Title Set3	8x 01 04 73 3L mm nn pp qq rr ss tt uu vv ww FF	L: Line Number (0 ~ Eh) mnpqrstuvw: Set of characters (11~ 20)
	Title Clear	8x 01 04 74 1p FF	Title Set clear (p: 0 ~ Eh, Fh= all line)
	On	8x 01 04 74 2p FF	Title display On/Off (0 ~ Eh, Fh= all line)
	Off	8x 01 04 74 3p FF	
CAM_MENUKey	Up	8x 01 04 16 01 FF	
	Down	8x 01 04 16 02 FF	
	Left	8x 01 04 16 04 FF	
	Right	8x 01 04 16 08 FF	
	Menu	8x 01 04 16 10 FF	
	ESC	8x 01 04 16 20 FF	
CAM_User OSD	Display String	8x 01 05 10 xx yy cc ss "nnnnnnnnnnnn" FF	xx: X position (0 ~ 27h) yy: Y Position (0 ~ 11h) cc: Color (0:White, 1: Yellow, 2:Black, 3:Red, 4:Gray, 5:Green) ss: NORMAL = 00 INVERSE = 01 BLINK = 02 "nnnnn….": Display String (Max 26 char)
	Blue Screen	8x 01 05 20 0p FF	p: Blue Screen Display - 0(Off), 1(On)
	Screen Clear	8x 01 05 30 01 FF	Screen All clear
CAM_Mute	On	8x 01 04 75 02 FF	Mute ON/OFF
	Off	8x 01 04 75 03 FF	
	On/Off	8x 01 04 75 10 FF	

Command Set	Command	Command Packet	Comments
CAM_PrivacyZone	SetMask	8x 01 04 76 mm nn 0r 0r 0s 0s FF	mm: MaskSettings nn: 00=Modify, 01=New rr: W, ss: H
	Display	8x 01 04 77 pp pp pp pp FF	Mask Display On/Off pppppppp: MaskSettings (0: OFF, 1: ON)
	SetMaskColor	8x 01 04 78 pp pp pp pp qq rr FF	pppppppp: Mask Color Settings qq: Color Setting when 0 is selected rr: Color Setting when 1 is selected
	SetPanTiltAngle	8x 01 04 79 0p 0p 0p 0q 0q 0q FF	Pan/Tilt Angle Settings ppp: Pan, qqq: Tilt
	SetPTZMask	8x 01 04 7B mm 0p 0p 0p 0q 0q 0q 0r 0r 0r 0r FF	Pan/Tilt/Zoom Settings for Mask mm: Mask Settings ppp: Pan, qqq: Tilt, rrrr: Zoom
	Non_InterlockMask	8x 01 04 6F mm 0p 0p 0q 0q 0r 0r 0s 0s FF	mm: Non-Interlock Mask Settings pp: X, qq: Y, rr: W, ss: H
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 ~ FFFFh)
CAM_TriggerMode		8x 01 04 55 0p FF	p: Trigger mode (0:Free run, 1:Ext-Trigger)
CAM_Trigger Function	Trigger Polarity	8x 01 04 55 10 0p FF	p: Polarity Setting (0:Active Low, 1:Active High)
	Trigger Delay	8x 01 04 55 11 0p 0q 0r FF	pq: 0 (0ms) ~ FFh (255ms) r: 0 (0.0ms) ~ 9 (0.9ms)
	Strobe Polarity	8x 01 04 55 20 0p FF	p: Polarity Setting (0:Active Low, 1:Active High)
	Strobe Delay (Free run mode)	8x 01 04 55 21 0p 0q 0r FF	pq: 0 (0ms) ~ 20h(32ms@30fps) / Fh(15ms@60fps) / 27h(39ms@25fps) / 13h(19ms@50fps) r: 0 (0.0ms) ~ 9 (0.9ms) ※ Delay: 0 ~ (1 VD Period - Width)
	Strobe Delay (Ext-Trigger mode)	8x 01 04 55 22 0p 0q 0r FF	pq: 0 (0ms) ~ FFh (255ms) r: 0 (0.0ms) ~ 9 (0.9ms)
	Strobe Width (Free run mode)	8x 01 04 55 23 0p 0q 0r FF	pq: 0 (1ms) ~ 20h(33ms@30fps) / Fh(16ms@60fps) / 27h(40ms@25fps) / 13h(20ms@50fps) r: 0 (0.0ms) ~ 9 (0.9ms) ※ Delay: 1 ~ (1 VD Period - Delay)
	Strobe Width (Ext-Trigger mode)	8x 01 04 55 24 0p 0q 0r FF	pq: 0 (1ms) ~ FEh (255ms) r: 0 (0.0ms) ~ 9 (0.9ms)
	Strobe Mode	8x 01 04 55 25 0p FF	p: Strobe Mode (0:Off, 1:On, 2:Night Only, 3:Day Only)
	ICR (Ext-Trigger mode)	8x 01 04 55 30 0p FF	p: ICR Mode (2: Night, 3: Day)
	Shutter Speed (Ext-Trigger mode)	8x 01 04 55 31 00 0p 0q FF	pq: Shutter Position ※ 30(25)fps - 5: 1/30(25) ~ Fh: 1/20000 ※ 60(50)fps - 6: 1/60(50) ~ Fh: 1/20000
	Iris (Ext-Trigger mode)	8x 01 04 55 32 00 0p 0q FF	pq: Iris Position
	Gain (Ext-Trigger mode)	8x 01 04 55 33 00 0p 0q FF	pq: Gain Position

Command Set	Command	Command Packet	Comments
CAM_MD	On	8x 01 04 1B 02 FF	Motion Detection On/Off
	Off	8x 01 04 1B 03 FF	
	Function Set	8x 01 04 1C 0m 0n 0p 0q 0r 0s FF	m: Display mode n: Detection Frame Set (bit[0]:1, bit[1]:2, bit[2]:3, bit[3]:4) pq: Threshold Level (00 ~ 14h) rs: Interval Time set (00 ~ FFh)
	Window Set	8x 01 04 1D 0m 0p 0q 0r 0s FF	m: Select Detection Frame Number (0, 1, 2, 4) p: Start Horizontal Position (0 ~ Dh) q: Start Vertical Position (0 ~ 7) r: End Horizontal Position (1 ~ Eh) s: End Vertical Position (1 ~ 8)
	MD Zoom Preset	8x 01 04 1E 02 FF	MD Zoom Preset On
		8x 01 04 1E 03 FF	MD Zoom Preset Off
	Set MD Zoom Pos	8x 01 04 1E 10 FF	Set MD Zoom preset to current zoom position
	Alarm (Reply)	y0 07 04 1B 0p FF	p: Detection Frame Set
CAM_Continuous ZoomPosReply	On	8x 01 04 69 02 FF	Zoom Positon data continues output On/Off
	Off	8x 01 04 69 03 FF	
	(Reply)	y0 07 04 69 0p 0p 0q 0q 0q 0q FF	pp: D-Zoom Position * 00: When D-Zoom Mode is Combine qqqq: Zoom Position
CAM_Reply IntervalTimeSet		8x 01 04 6A 00 00 0p 0q FF	pq: Interval Time [Vertical timing]
CAM_RegisterValue		8x 01 04 24 mm 0p 0q FF	mm: Register No. (0, 52h, 72h, 73h, 99, 9Ah) pq: Register Value
CAM_UTC	On	8x 01 05 1C 02 FF	UTC On/Off
	Off	8x 01 05 1C 03 FF	
CAM_UTCProtocol	Direct	8x 01 05 3C 0p FF	p : UTC Protocol (0 : Pelco-C, 1 : Hikvision-C)
CAM_UTCForward	On	8x 01 05 0C 02 FF	UTC to UART forwarding On/Off
	Off	8x 01 05 0C 03 FF	
	Port select	8x 01 05 0C 10 0p FF	p : Cummunication Port to Deliver UTC Command (0 : UART, 1 : RS-485)
	Reply	y0 07 05 0C 0p 0p 0q 0q 0r 0r 0s 0s 0t 0t 0u 0u 0v 0v 0w 0w FF	pp : Byte 1 qq : Byte 2 rr : Byte 3 ss : Byte 4 tt : Byte 5 uu : Byte 6 vv : Byte 7 ww : Byte 8

VISCA Inquiry Command List

Inquiry Command	Command Packet	Inquiry Packet	Comments
CAM_PowerInq	8x 09 04 00 FF	y0 50 02 FF	On
CAM_ZoomPosInq	8x 09 04 47 FF	y0 50 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM_ZoomPresetInq	8x 09 04 67 FF	y0 50 00 00 0p 0q FF	pq: bit[0]:0 ~ bit[4]:4, (1:Set, 0:Unset)
CAM_DZoomModeInq	8x 09 04 06 FF	y0 50 02 FF	D-Zoom On
		y0 50 03 FF	D-Zoom Off
CAM_DZoomC/SModeInq	8x 09 04 36 FF	y0 50 00 FF	Combine Mode
		y0 50 01 FF	Separate Mode
CAM_DZoomPosInq	8x 09 04 46 FF	y0 50 00 00 0p 0q FF	pq: D-Zoom Position
CAM_FocusModeInq	8x 09 04 38 FF	y0 50 0p 0q FF	p: Focus mode in Day State q: Focus mode in Night State (2: Auto Focus, 3: Manual Focus)
CAM_FocusPosInq	8x 09 04 48 FF	y0 50 0p 0q 0r 0s FF	pqrs: Focus Position
CAM_FocusNearLimitInq	8x 09 04 28 FF	y0 50 0p 0q 0r 0s FF	pqrs: Focus Near Limit
CAM_AFModeInq	8x 09 04 57 FF	y0 50 0p 0q FF	p: AF mode in Day State q: AF mode in Night State (0: Normal, 1: Interval, 2: Zoom Trigger)
CAM_AFStateInq	8x 09 04 26 FF	y0 50 0p FF	p: AF State - 0(Stop), 1(Run)
CAM_AFTimeSettingInq	8x 09 04 27 FF	y0 50 0p 0q 0r 0s FF	pq: Active Time, rs: Interval Time
CAM_WBModeInq	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 AWB
		y0 50 05 FF	Manual
		y0 50 07 FF	Auto-extended
CAM_RGainInq	8x 09 04 43 FF	y0 50 00 00 0p 0q FF	pq: R Gain (0 ~ 64h)
CAM_BGainInq	8x 09 04 44 FF	y0 50 00 00 0p 0q FF	pq: B Gain (0 ~ 64h)
CAM_ChromaInq	8x 09 04 13 FF	y0 50 00 00 0p 0q FF	pq: Chroma level (0 ~ 14h)
CAM_ColorHueInq	8x 09 04 4F FF	y0 50 00 00 00 0p FF	p:Color Hue setting (0: -18º ~ 14h: +18º)
CAM_AEModeInq	8x 09 04 39 FF	y0 50 0p 0q FF	p: AE mode in Day State q: AE mode in Night State (0: Auto exposure, 3: Manual control, Ah: Shutter priority, Bh: Iris priority, Dh: Bright Mode)
CAM_SlowShutterModeInq	8x 09 04 5A FF	y0 50 0p 0q FF	p: Slow Shutter mode in Day State q: Slow Shutter mode in Night State (2: Auto, 3: Manual)
CAM_MaxDSSLevInq	8x 09 04 5A 10 FF	y0 50 0p 0q FF	p: Max Slowshutter level in Day State q: Max Slowshutter level Night State (0:x2, 1:x4, 2:x8, 3:x16, 4:x32, 5:x64) ※ You can't select "x64" in 30 or 25fps mode
CAM_ShutterPosInq	8x 09 04 4A FF	y0 50 00 00 0p 0q FF	pq: Current Shutter Position
CAM_IrisPosInq	8x 09 04 4B FF	y0 50 00 00 0p 0q FF	pq: Current Iris Position

Inquiry Command	Command Packet	Inquiry Packet	Comments
CAM_GainPosInq	8x 09 04 4C FF	y0 50 00 00 0p 0q FF	pq: Current Gain Position
CAM_GainLimitInq	8x 09 04 2C FF	y0 50 0p 0q FF	p: Auto Gain Limit Position of Day State q: Auto Gain Limit Position of Night State
CAM_BrightPosInq	8x 09 04 4D FF	y0 50 0p 0q 0r 0s FF	pq: Bright Position of Night State rs: Bright Position of Day State
CAM_ExpCompModeInq	8x 09 04 3E FF	y0 50 0p 0q FF	p: Exposure Comp. mode in Day State q: Exposure Comp. mode in Night State (2: On, 3: Off)
CAM_ExpCompPosInq	8x 09 04 4E FF	y0 50 0p 0q 0r 0s FF	pq: ExpComp Level of Night State rs: ExpComp Level of Day State (0 ~ Eh)
CAM_FlickerlessInq	8x 09 04 7A FF	y0 50 0p 0q FF	p: Flickerless mode in Day State q: Flickerless mode in Night State (2: On, 3: Off, 4: Auto)
CAM_BLCModeInq	8x 09 04 33 FF	y0 50 0p 0q FF	p: BLC mode in Day State q: BLC mode in Night State (2: On, 3: Off)
CAM_BLCAreaInq	8x 09 04 3C 00 FF	y0 50 0p FF	p: 0(Area OSD Off), 1(Area OSD On)
CAM_BLC_StartXInq	8x 09 04 3C 10 FF	y0 50 00 00 0p 0q FF	pq: Start Horizontal Position (0 ~ 26h)
CAM_BLC_StartYInq	8x 09 04 3C 20 FF	y0 50 00 00 0p 0q FF	pq: Start Vertical Position (0 ~ 1Ah)
CAM_BLC_EndXInq	8x 09 04 3C 30 FF	y0 50 00 00 0p 0q FF	pq: End Horizontal Position (9 ~ 2Fh)
CAM_BLC_EndYInq	8x 09 04 3C 40 FF	y0 50 00 00 0p 0q FF	pq: End Vertical Position (7 ~ 21H)
CAM_BLC_LevelInq	8x 09 04 3C 50 FF	y0 50 00 00 0p 0q FF	pq: BLC Area Weight (0 ~ 6)
CAM_HLCModeInq	8x 09 04 32 00 FF	y0 50 0p 0q FF	p: HLC mode in Day State (0: Off, 1: On, 2: Night Only) q: HLC mode in Night State (0: Off, 1: On)
CAM_HLCLevelInq	8x 09 04 32 10 FF	y0 50 00 00 0p 0q FF	pq: HLC Level (0 ~ 14h)
CAM_HLCColorInq	8x 09 04 32 30 FF	y0 50 0p FF	p: HLC Color (0: Black ~ Ah: White)
CAM_HLC_StartXInq	8x 09 04 32 40 FF	y0 50 00 00 0p 0q FF	pq: Start Horizontal Position (0 ~ 26h)
CAM_HLC_StartYInq	8x 09 04 32 50 FF	y0 50 00 00 0p 0q FF	pq: Start Vertical Position (0 ~ 1Ah)
CAM_HLC_EndXInq	8x 09 04 32 60 FF	y0 50 00 00 0p 0q FF	pq: End Horizontal Position (9 ~ 3Eh)
CAM_HLC_EndYInq	8x 09 04 32 70 FF	y0 50 00 00 0p 0q FF	pq: End Vertical Position (7 ~ 30H)
CAM_DWDRInq	8x 09 04 1A FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_DWDRModeInq	8x 09 04 1A 20 FF	y0 50 0p FF	p : DWDR mode - 0(Manual), 1(Auto)
CAM_DWDRAutoLevelInq	8x 09 04 1A 30 FF	y0 50 0p FF	p: Auto mode level (0:Low, 1:Middle, 2:High)
CAM_DWDRDarkLevelInq	8x 09 04 1A 40 FF	y0 50 0p 0q FF	pq: Dark area level of manual mode (0 ~ 10h)
CAM_DWDRBrightLevelInq	8x 09 04 1A 50 FF	y0 50 0p 0q FF	pq: Bright area level of manual mode (0 ~ 10h)
CAM_DefogInq	8x 09 04 65 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_DefogLevelInq	8x 09 04 65 10 FF	y0 50 0p FF	p: Manual mode level (0 ~ 8)
CAM_DefogModeInq	8x 09 04 65 20 FF	y0 50 0p FF	p : Defog mode - 0(Manual), 1(Auto)

Inquiry Command	Command Packet	Inquiry Packet	Comments
CAM_DefogAutoLevelInq	8x 09 04 65 30 FF	y0 50 0p FF	p: Auto mode level (0:Low, 1:Middle, 2:High)
CAM_NRInq	8x 09 04 53 FF	y0 50 pq FF	pq: NR level (0 : Off, 1 ~ Fh : level 1 to 15, 7Fh : 2D/3D NR independent setting available)
CAM_NR2D3Dinq	8x 09 05 53 FF	y0 50 0p 0q FF	p: 2D NR level (0: Off, 01~Fh: level 1 to 15) q: 3D NR level (0: Off, 01~Fh: level 1 to 15)
CAM_GammaInq	8x 09 04 5B FF	y0 50 0p FF	p: Gamma setting (0:0.35 ~ 7:0.70)
CAM_ContrastInq	8x 09 05 5D FF	y0 50 00 00 0p 0q FF	pq:
CAM_ImageBrightInq	8x 09 05 5E FF	y0 50 00 00 0p 0q FF	
CAM_ApertureInq	8x 09 04 42 FF	y0 50 0p 0q 0r 0s FF	pq: Aperture Gain of Night State rs: Aperture Gain of Day State (0 ~ Ah)
CAM_LR_ReverseModeInq	8x 09 04 61 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_FreezeModeInq	8x 09 04 62 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_PictureFlipModeInq	8x 09 04 66 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_ICRStateInq	8x 09 04 01 FF	y0 50 02 FF	Night
		y0 50 03 FF	Day
CAM_ICRModeInq	8x 09 04 51 FF	y0 50 02 FF	Night
		y0 50 03 FF	Day
		y0 50 04 FF	ICR changed automatically by AGC Gain
		y0 50 06 FF	ICR changed by external input
CAM_ICRNightFuncSetInq	8x 09 04 51 10 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_ICRThresholdInq	8x 09 04 21 FF	y0 50 00 00 0p 0q FF	pq: Threshold level of Auto Mode (0 ~ 1Ch)
CAM_ICRGapInq	8x 09 04 21 10 FF	y0 50 0p FF	p: On/Off Threshold Gap of Auto mode (0 ~ 4)
CAM_AutoICRDelayInq	8x 09 04 41 FF	y0 50 00 00 0p 0q FF	pq: Auto mode delay - 0(0sec)~FFh(255sec)
CAM_Ext-InICRDelayInq	8x 09 04 71 FF	y0 50 00 00 0p 0q FF	pq: Ext-In mode delay - 0(0sec)~FFh(255sec)
CAM_AutoICRAlarmReplyInq	8x 09 04 31 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_BurstInq	8x 09 04 72 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_IRDetectionInq	8x 09 04 6E FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_IRDetectionLevelInq	8x 09 04 6E 10 FF	y0 50 0p FF	p : IR detection threshold level (0 ~ 4)
CAM_StabilizerModeInq	8x 09 04 34 FF	y0 05 02 FF	On
		y0 05 03 FF	Off
		Y0 05 00 FF	Hold
CAM_MemoryInq	8x 09 04 3F FF	y0 50 0p FF	p: Last Recall Memory No.
CAM_MemSaveInq	8x 09 04 23 0t FF	y0 50 0p 0q 0r 0s FF	t: 0 ~ 7 (Address) pqrs: 0000 ~ FFFFh (Data)

Inquiry Command	Command Packet	Inquiry Packet	Comments
CAM_DisplayInq	8x 09 04 15 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_DispSelInq	8x 09 04 14 00 FF	y0 50 0p FF	Display Item On(1)/Off(0) p: bit[0] - ID, bit[1] - Title, bit[2] - Zoom Position bit[3] - System Message
CAM_TitleDisplayModeInq	8x 09 04 74 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_MenuModeInq	8x 09 04 16 FF	y0 50 02 FF	OSD menu On
		y0 50 03 FF	OSD menu Off
CAM_BlueScreenModeInq	8x 09 05 20 FF	y0 50 0p FF	p: Blue Screen Display - 0(Off), 1(On)
CAM_MuteModeInq	8x 09 04 75 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_PrivacyPosInq	8x 09 04 76 mm FF	y0 50 0n 0p 0p 0q 0q 0r 0r 0s 0s FF	mm: Mask Number n: 0(Non-interlock Mode), 1(Interlock Mode) pp: X, qq: Y, rr: W, ss: H
CAM_PrivacyDisplayInq	8x 09 04 77 FF	y0 50 pp pp pp pp FF	pppppppp: Mask Display (0: OFF, 1: ON)
CAM_PrivacyColorInq	8x 09 04 78 FF	y0 50 pp pp pp pp qq rr FF	pppppppp: Mask Color Setting qq: Color Setting when 0 is selected rr: Color Setting when 1 is selected
CAM_PrivacyPanTiltInq	8x 09 04 79 FF	y0 50 0p 0p 0p 0q 0q 0q FF	ppp: Pan, qqq: Tilt
CAM_PrivacyPTZInq	8x 09 04 7B mm FF	y0 50 0p 0p 0p 0q 0q 0q 0r 0r 0r 0r FF	mm: Mask Settings ppp: Pan, qqq: Tilt, rrrr: Zoom
CAM_PrivacyMonitorInq	8x 09 04 6F FF	y0 50 pp pp pp pp FF	pppppppp: Mask is displayed now
CAM_KeyLockInq	8x 09 04 17 FF	y0 50 02 FF	On
		y0 50 00 FF	Off
CAM_IDInq	8x 09 04 22 FF	y0 50 0p 0q 0r 0s FF	pqrs: Camera ID
CAM_TriggerModeInq	8x 09 04 55 FF	y0 50 0p FF	p:Trigger mode (0:Free run, 1:Ext-Trigger)
CAM_TriggerPolarityInq	8x 09 04 55 10 FF	y0 50 0p FF	p : Polarity Setting (0:Active Low, 1:Active High)
CAM_TriggerDelayInq	8x 09 04 55 11 FF	y0 50 00 0p 0q 0r FF	pq : 0 (0ms) ~ FFh (255ms) r : 0 (0.0ms) ~ 9 (0.9ms)
CAM_StrobePolarityInq	8x 09 04 55 20 FF	y0 50 0p FF	p : Polarity Setting (0:Active Low, 1:Active High)
CAM_StrobeDelayInq (Free run mode)	8x 09 04 55 21 FF	y0 50 00 0p 0q 0r FF	pq : 0 (0ms) ~ 20h(32ms@30fps) / Fh(15ms@60fps) / 27h(39ms@25fps) / 13h(19ms@50fps) r : 0 (0.0ms) ~ 9 (0.9ms) ※ Delay : 0 ~ (1 VD Period - Width)
CAM_StrobeDelayInq (Ext-Trigger mode)	8x 09 04 55 22 FF	y0 50 00 0 0 0 FF	pq : 0 (0ms) ~ FFh (255ms) r : 0 (0.0ms) ~ 9 (0.9)ms
CAM_StrobeWidthInq (Free run mode)	8x 09 04 55 23 FF	y0 50 00 0p 0q 0r FF	pq : 0 (1ms) ~ 20h(33ms@30fps) / Fh(16ms@60fps) / 27h(40ms@25fps) / 13h(20ms@50fps) r : 0 (0.0ms) ~ 9 (0.9ms) ※ Delay : 1 ~ (1 VD Period - Delay)

Inquiry Command	Command Packet	Inquiry Packet	Comments
CAM_StrobeWidthInq (Ext-Trigger mode)	8x 09 04 55 24 FF	y0 50 00 0p 0q 0r FF	pq : 0 (1ms) ~ FEh (255ms) Ext r : 0 (0.0ms) ~ 9 (0.9ms)
CAM_StrobeModeInq	8x 09 04 55 25 FF	y0 50 0p FF	p : Strobe Mode (0:Off, 1:On, 2:Night Only, 3:Day Only)
CAM_TriggerFncICRInq	8x 09 04 55 30 FF	y0 50 0p FF	p: ICR Mode (2: Night, 3: Day)
CAM_TriggerFncShutterInq	8x 09 04 55 31 FF	y0 50 00 00 0p 0q FF	pq: Shutter Position
CAM_TriggerFncIrisInq	8x 09 04 55 32 FF	y0 50 00 00 0p 0q FF	pq: Iris Position
CAM_TriggerFncGain	8x 09 04 55 33 FF	y0 50 00 00 0p 0q FF	pq: Gain Position
CAM_VersionInq	8x 09 00 02 FF	y0 50 00 20 mn pq rs tu vw FF	mnpq: Model Code (0466h) rstu: ROM version (0100h) vw: Socket Number (3)
CAM_ModelInq	8x 09 00 37 FF	y0 50 pp pp pp qq rr FF	pppppp: Model Code: YY0D32h (YY: Custom. Code, standard model=00) qqrr: Version (Ver.qq.rr)
CAM_MDModeInq	8x 09 04 1B FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_MDFunctionInq	8x 09 04 1C FF	y0 50 0m 0n 0p 0q 0r 0s FF	m: Display mode n: Detection Frame Set (bit[0]:1, bit[1]:2, bit[2]:3, bit[3]:4) pq: Threshold Level (00 ~ 14h) rs: Interval Time set (00 ~ FFh)
CAM_MDWindowInq	8x 09 04 1D 0m FF	y0 50 0p 0q 0r 0s FF	m: Select Detection Frame Number (0, 1, 2, 3) p: Start Horizontal Position (0 ~ Dh) q: Start Vertical Position (0 ~ 7) r: End Horizontal Position (1 ~ Eh) s: End Vertical Position (1 ~ 8)
CAM_MDZoomPresetInq	8x 09 04 1E FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_ContinuousZoomPos ReplyModeInq	8x 09 04 69 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_ReplyIntervalTimeInq	8x 09 04 6A FF	y0 50 00 00 0p 0p FF	pp: Interval Time
CAM_RegisterValueInq	8x 09 04 24 mm FF	y0 50 0p 0p FF	mm: Register No. (0, 52h, 72h, 73h, 9Ah) pp: Register Value
CAM_UTCInq	8x 09 05 1C FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_UTCProtocolInq	8x 09 05 3C FF	y0 50 0p FF	p : UTC Protocol (0 : Pelco-C, 1 : Hikvision-C)
CAM_UTCForwardInq	8x 09 05 0C FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_UTCFwdPortInq	8x 09 05 0C 10 FF	y0 50 0p FF	p : Communication Port to Deliver UTC Command (0 : UART, 1 : RS-485)

Exposure Control Values

Shutter Speed

Step (Hex)	NTSC	PAL
0F	1/20000	1/20000
0E	1/10000	1/10000
0D	1/5000	1/5000
0C	1/2000	1/2000
0B	1/1000	1/1000
0A	1/500	1/500
09	1/250	1/250
08	1/120	1/120
07	1/100	1/100
06	1/60	1/50
05	1/30	1/25
04	1/15	1/12
03	1/8	1/6
02	1/4	1/3
01	1/2	1/2
00	1/1	1/1

Iris

Step (Hex)	IRIS
12	F1.5
11	F1.8
10	F2.0
0F	F2.4
0E	F2.8
0D	F3.4
0C	F4.0
0B	F4.8
0A	F5.6
09	F6.8
08	F8.0
07	F9.6
06	F11
05	F14
04	F16
00	Close

Brightness

Step (Hex)	IRIS	GAIN
1C	F1.5	48.0dB
1B	F1.5	43.2dB
1A	F1.5	38.4dB
19	F1.5	33.6dB
18	F1.5	28.8dB
17	F1.5	24.0dB
16	F1.5	19.2dB
15	F1.5	14.4dB
14	F1.5	9.6dB
13	F1.5	4.8dB
12	F1.5	0dB
11	F1.8	0dB
10	F2.0	0dB
0F	F2.4	0dB
0E	F2.8	0dB
0D	F3.4	0dB
0C	F4.0	0dB
0B	F4.8	0dB
0A	F5.6	0dB
09	F6.8	0dB
08	F8.0	0dB
07	F9.6	0dB
06	F11	0dB
05	F14	0dB
04	F16	0dB
00	Close	0dB

Exposure comp.

Step (Hex)	Value (dB)
0E	+10.5
0D	+9
0C	+7.5
0B	+6
0A	+4.5
09	+3
08	+1.5
07	0
06	-1.5
05	-3
04	-4.5
03	-6
02	-7.5
01	-9
00	-10.5

Gain

Step (Hex)	GAIN
0A	48.0dB
09	43.2dB
08	38.4dB
07	33.6dB
06	28.8dB
05	24.0dB
04	19.2dB
03	14.4dB
02	9.6dB
01	4.8dB
00	0dB

Zoom & Focus control values

Optical Zoom

Magnification	Zoom Position
x1	0000
x2	1338
x3	1D6A
x4	2393
x5	27D2
x6	2B0B
x7	2D97
x8	2FC0
x9	3197
x10	3338
x11	34BE
x12	3616
x13	375C
x14	387E
x15	3985
x16	3A7A
x17	3B4A
x18	3BFF
x19	3CA3
x20	3D2B
x21	3DA0
x22	3E04
x23	3E56
x24	3E9E
x25	3EDE
x26	3F14
x27	3F41
x28	3F65
x29	3F8A
x30	3FA5
x31	3FB7
x32	3FC9
x33	3FDB
x34	3FED
x35	3FF6
x36	4000

D-Zoom : Combine Mode

Magnification	Zoom Position
x1	4000
x2	6000
x3	6A80
x4	7000
x5	7300
x6	7540
x7	76C0
x8	7800
x9	78C0
x10	7980
x11	7A00
x12	7AC0
x13	7B40
x14	7B80
x15	7BC0
x16	7C00
x17	7C40
x18	7C80
x19	7CC0
x21	7D00
x23	7D40
x25	7D80
x28	7DC0
x32	7E00

D-Zoom : Separate Mode

Magnification	Zoom Position
x1	00
x2	80
x3	AA
x4	C0
x5	CC
x6	D5
x7	DB
x8	E0
x9	E3
x10	E6
x11	E8
x12	EB
x13	ED
x14	EE
x15	EF
x16	F0
x17	F1
x18	F2
x19	F3
x21	F4
x23	F5
x25	F6
x28	F7
X32	F8

Focus Near Limit

Set Value	Distance	Set Value	Distance
1000	10m	9000	1.5m
2000		A000	
3000		B000	
4000	5m	C000	
5000		D000	10cm
6000	3m	E000	
7000		F000	
8000			

OSD Position and Character Values

V Position	00 ~ 0Eh	15 Rows (CAM_MultiLineTitle)
	00 ~ 11h	17 Rows (CAM_User OSD)
H Position	00 ~ 27h	40 Columns

Character Code

Code	Character	Code	Character	Code	Character	Code	Character
0	Space	21	A	42	b	63	Ç
1	!	22	B	43	c	64	È
2	"	23	C	44	d	65	É
3	#	24	D	45	e	66	Ê
4	$	25	E	46	f	67	Ë
5	%	26	F	47	g	68	Î
6	&	27	G	48	h	69	Ï
7		28	H	49	i	6A	Ñ
8	(	29	I	4A	j	6B	Ô
9	)	2A	J	4B	k	6C	Ö
0A	*	2B	K	4C	l	6D	Ù
0B	+	2C	L	4D	m	6E	Û
0C	,	2D	M	4E	n	6F	Ü
0D	-	2E	N	4F	o	70	ß
0E	.	2F	O	50	p	71	à
0F	/	30	P	51	q	72	â
10	0	31	Q	52	r	73	ä
11	1	32	R	53	s	74	ç
12	2	33	S	54	t	75	è
13	3	34	T	55	u	76	é
14	4	35	U	56	v	77	ê
15	5	36	V	57	w	78	ë
16	6	37	W	58	x	79	î
17	7	38	X	59	y	7A	ï
18	8	39	Y	5A	z	7B	ñ
19	9	3A	Z	5B	{	7C	ô
1A	:	3B	[	5C	|	7D	ö
1B	;	3C	\	5D	}	7E	ù
1C	<	3D	]	5E	~	7F	û
1D	=	3E	^	5F		80	ü
1E	>	3F	_	60	À	81	Œ
1F	?	40	`	61	Â	82	œ
20	@	41	a	62	Ä		

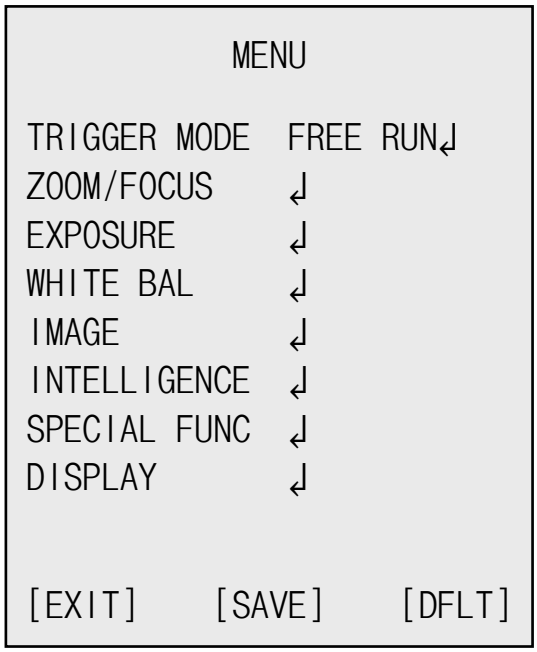
Register Setting

Function	Register No.	Register Value	Setting
BaudRate	00	10	2400 bps
		11	4800 bps
		00	9600 bps
		01	19200 bps
		02	38400 bps
		03	57600 bps
		04	115200 bps
D.ZOOM Max	52	00 ~ F8	Max DZoom Ratio = 256 / (256 - Value)
Monitoring Mode	72	06	1080p/30fps
		08	1080p/25fps
		09	720p/60fps
		0C	720p/50fps
		0E	720p/30fps
		11	720p/25fps
		13	1080p/60fps (EX-SDI only)
		14	1080p/50fps (EX-SDI only)
CVBS/TVI Output Select	73	1	CVBS
		2	TVI
		F	Switch input controlled
HD/EX-SDI Output Select	99	1	HD-SDI
		2	EX-SDI
		F	Switch input controlled
SDI mode	9A	2	EX-SDI 135M (v2.0)
		4	EX-SDI 270M (v1.0)

※ 1080p/60(50)fps format is only available in EX-SDI mode if TVI output is off.

OSD Menu

◆ Main Menu



Functions can be setup using “Menu Key Command” of VISCA protocol.

The menu consists of the “Main Menu” and “Sub Menu”.

The main menu is displayed where 8 camera functions can be selected.

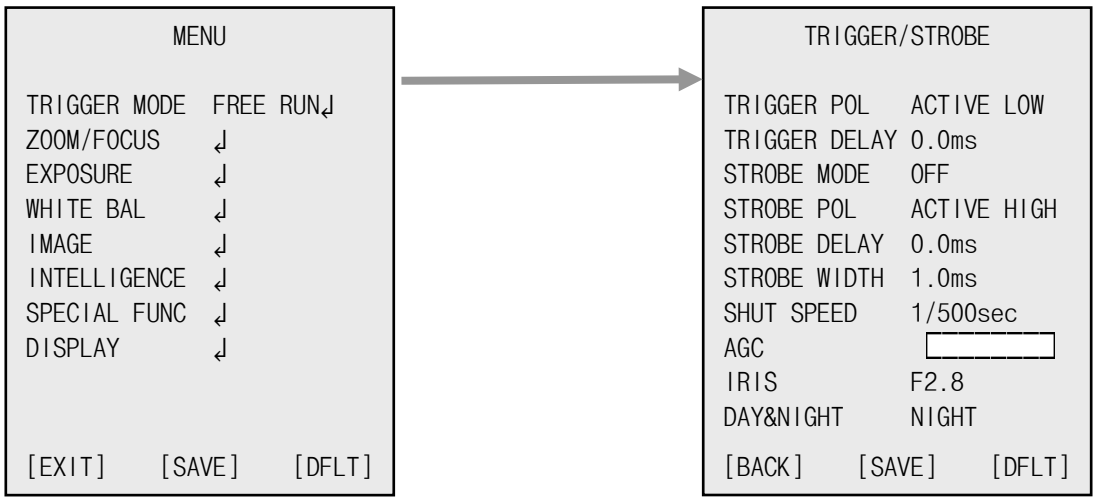
To the push of each main menu selection, the sub-menu is displayed

If you want to save the menu, select [SAVE].

If you do not want to save the menu, select [EXIT] (After select, Power off -> on)

If you want to set the menu to default, select [DFLT]

◆ TRIGGER MODE



- TRIGGER MODE:
  Select trigger mode
  - ▶ FREE RUN : Continuous image output mode.
  - ▶ EXT-TRIGGER : External trigger synchronous image output mode.

  ※ When Ext-trigger mode is selected, focus mode and exposure mode are forced into manual mode.

- TRIGGER POL:
  Select the polarity of the external trigger signal.
  - ▶ ACTIVE LOW / ACTIVE HIGH

- TRIGGER DELAY:
  Sets the delay time from the external trigger input to the image capture start.
  - ▶ 0 ~ 255.9ms

- STROBE MODE:
  Select the output mode of the strobe output signal.
  - ▶ OFF / ON / NIGHT / DAY

- STROBE POL:
  Select the polarity of the strobe output signal.
  - ▶ ACTIVE LOW / ACTIVE HIGH

- STROBE DELAY:
  Sets the delay time from the trigger signal to the strobe on signal output.
  - 0 ~ 255.9ms (※ Ext-trigger mode)
  - 0 ~ (33.3 – width)ms @30fps, 0 ~ (16.6 – width)ms @60fps,
    0 ~ (40 – width)ms @25fps, 0 ~ (20 – width)ms @50fps (※ Free run mode)

- STROBE WIDTH:
  Sets the length of the strobe on signal.
  - 1 ~ 255.9ms (※ Ext-trigger mode)
  - 1 ~ (33.3 – delay)ms @30fps, 1 ~ (16.6 – delay)ms @60fps,
    1 ~ (40 – delay)ms @25fps, 1 ~ (20 – delay)ms @50fps (※ Free run mode)

- SHUTTER SPEED
  Set the shutter speed used only in Ext-Trigger mode.
  - 1/30(25), 1/60(50), 1/100, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/5000, 1/10000, 1/20000sec (※ 30 or 25fps mode)
  - 1/60(50), 1/100, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/5000, 1/10000, 1/20000sec (※ 60 or 50fps mode)

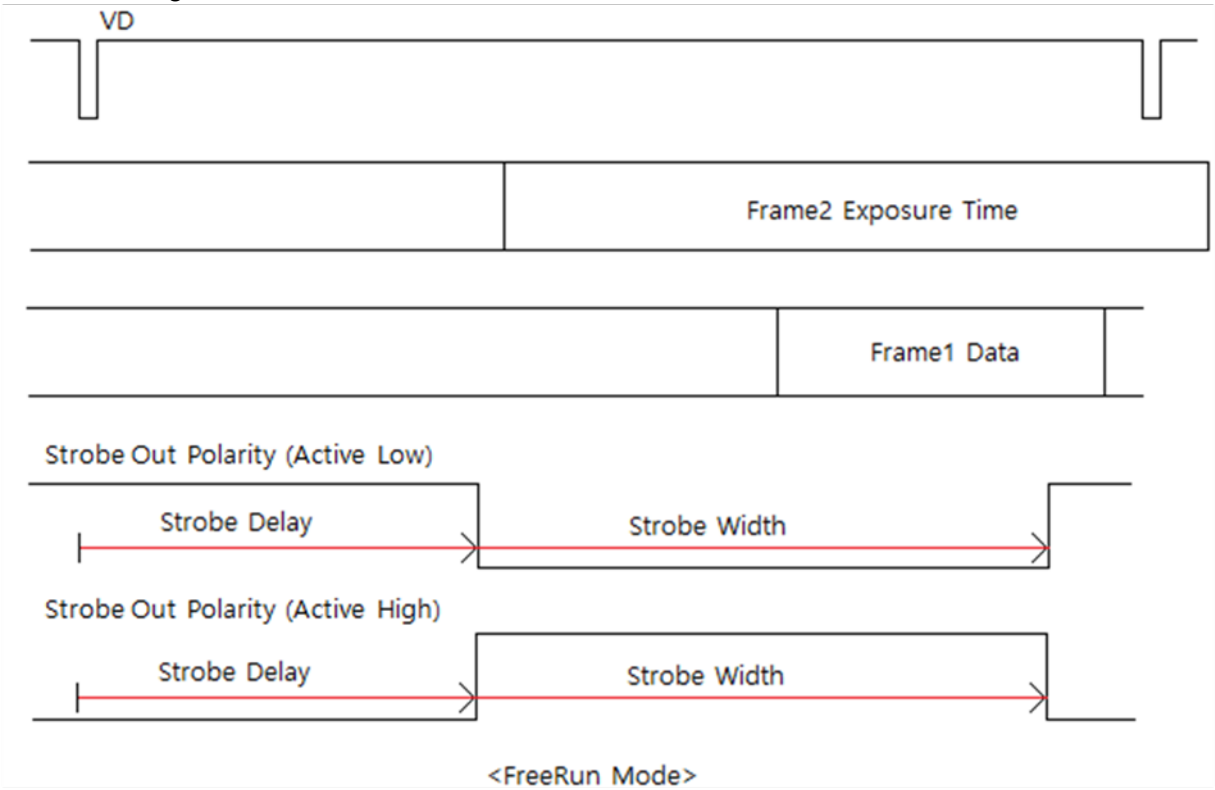
- AGC
  Set the Manual Gain used only in Ext-Trigger mode.
  - 0 ~ 10 steps

- IRIS:
  Set the Manual Iris used only in Ext-Trigger mode.
  - CLOSE / F1.5 / F1.8 / F2.0 / F2.4 / F2.8 / F3.4 / F4.0 / F4.8 / F5.6 / F6.8 / F8.0 / F9.6 / F11 / F14 / F16

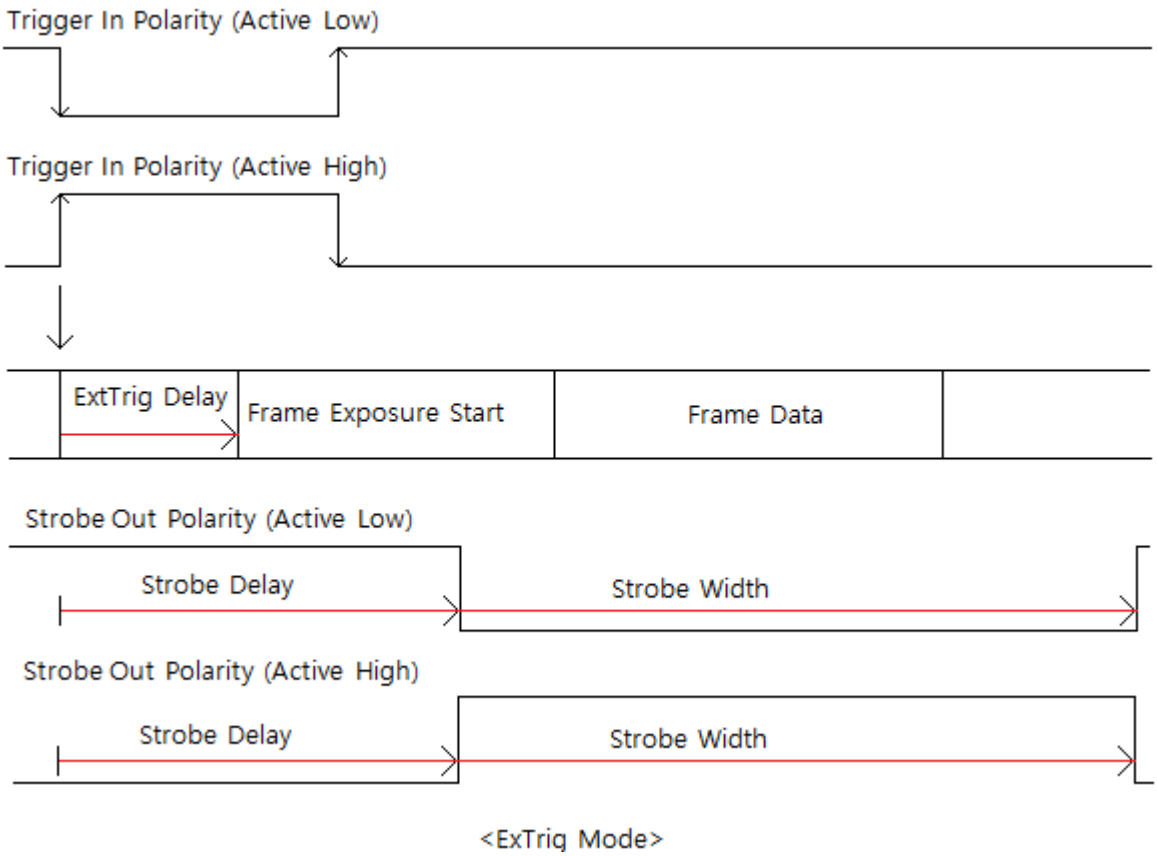
- DAY&NIGHT:
  Select whether to use Day or Night when in Ext-Trigger mode.
  - DAY / NIGHT

  ※ If you don't change exposure settings in the TRIGGER menu, exposure state is automatically set just before switching to the Ext-trigger mode.

※ Strobe Timing chart



<FreeRun Mode>

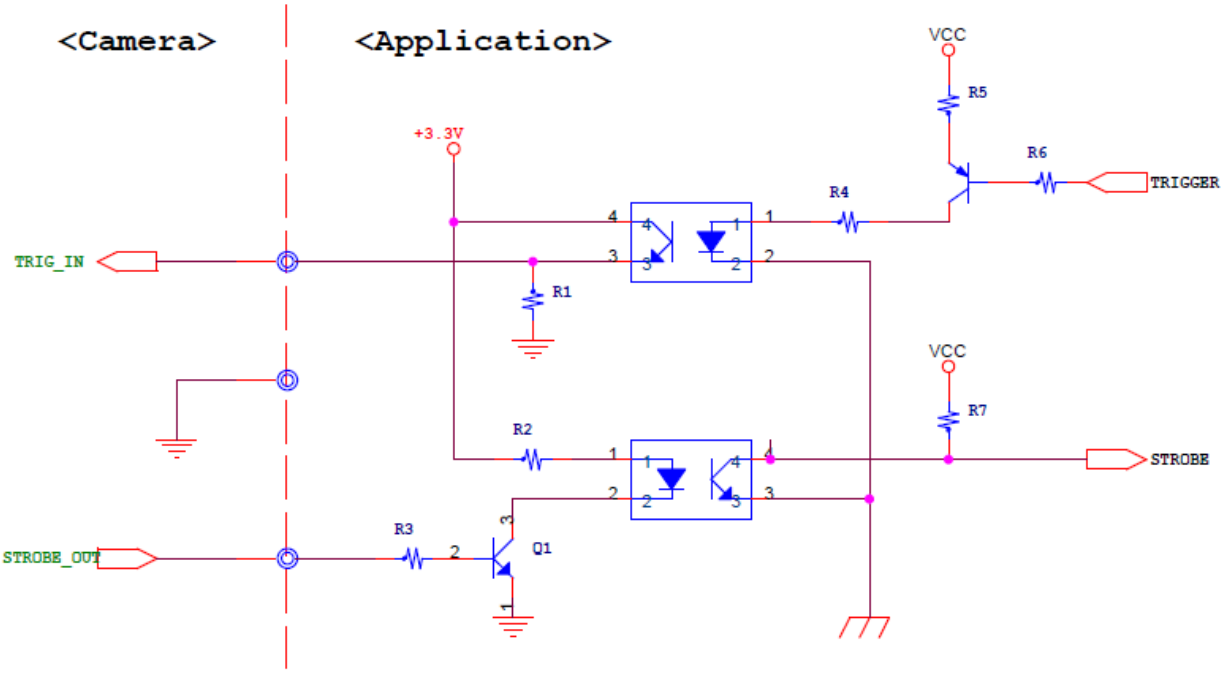


<ExTrig Mode>

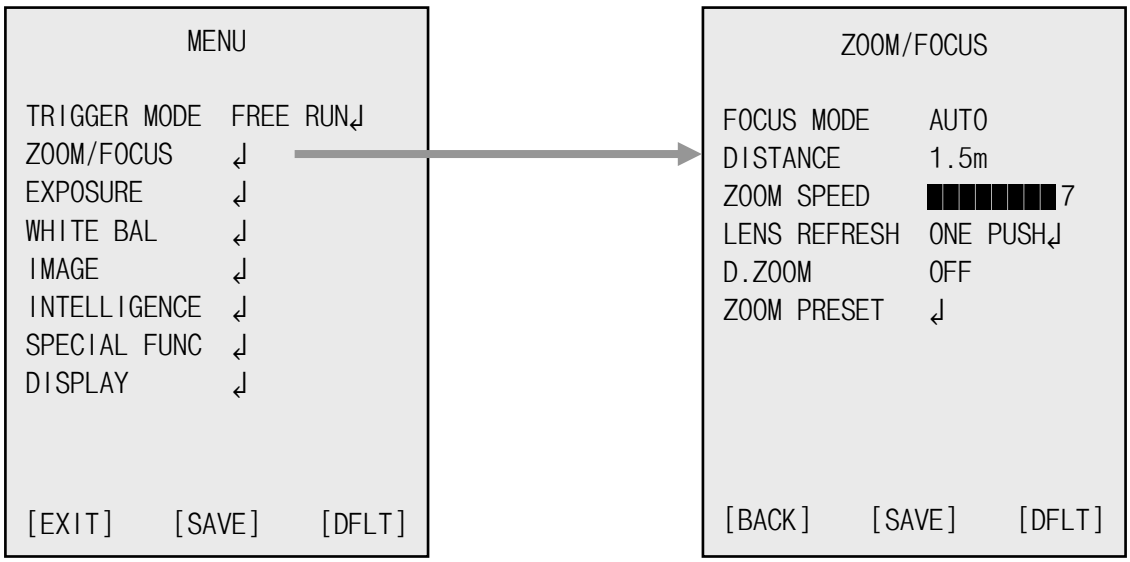
※ Electrical interface: Trigger and Strobe

- An input for external triggering of the camera is available at the I/O connector.
  Also a strobe output signal from the camera to control an external flash light is available at the I/O connector.
  The input and output require galvanic isolated from the outside electronics by means of an optocoupler.

- The recommended termination circuitry is drawn below.



◆ ZOOM / FOCUS



- FOCUS MODE:
  Select auto focus mode.
  ▶ AUTO / ONE PUSH / MANUAL
  ※ In Ext-Trigger Mode, it is fixed to Manual mode.

- DISTANCE:
  Select minimum distance in focus between camera and object.
  ▶ 0.1m / 1.5m / 3.0m / 5.0m / 10.0 m

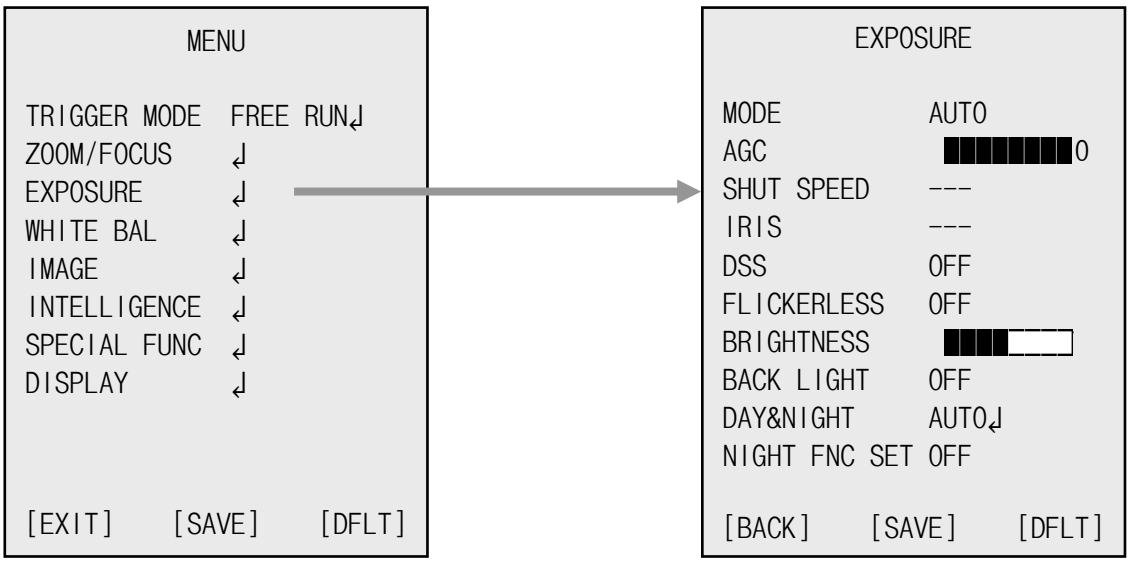
- ZOOM SPEED:
  Select Zoom Speed.
  ▶ 0(Slow) ~ 7(Fast) steps

- LENS REFRESH:
  Lens origin calibrated automatically.
  ▶ ONE PUSH↲ / ON (1 day ~ 10 days)

- D.ZOOM:
  Select maximum digital zoom magnification.
  ▶ OFF / MAX x2 ~ x19, x21, x23, x25, x28, x32
  ※ The Digital Zoom can not be used with the DIS function.

- ZOOM PRESET:
  Select zoom preset.
  ▶ PRESET# : Select Zoom preset number. (1 ~ 5)
  ▶ MODE : OFF / ON↲ (Adjust the Zoom Position)

◆ EXPOSURE



- MODE:
  Select Exposure Mode.
  ▶ AUTO / IRIS.P / SHUT.P / MANUAL
  ※ In Ext-Trigger Mode, it is fixed to Manual mode.

- AGC:
  Select auto gain limit (Auto, Iris.P and Shut.P mode) or manual gain (manual mode).
  ▶ 0 ~ 10 steps

- SHUTTER SPEED:
  Can be set in SHUT.P or MANUAL mode.
  ▶ 1/1, 1/2, 1/4(3), 1/8(6), 1/15(12), 1/30(25), 1/60(50), 1/100, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/5000, 1/10000, 1/20000 sec

- IRIS:
  Iris level can be set in IRIS.P or MANUAL mode.
  ▶ CLOSE / F1.5 / F1.8 / F2.0 / F2.4 / F2.8 / F3.4 / F4.0 / F4.8 / F5.6 / F6.8 / F8.0 / F9.6 / F11 / F14 / F16

- DSS:
  Select maximum DSS (Digital Slow Shutter).
  ▶ OFF / 2x / 4x / 8x / 16x / 32x / x64 (※ 60 or 50fps mode)
  ▶ OFF / 2x / 4x / 8x / 16x / 32x (※ 30 or 25fps mode)

- FLICKERLESS:
  Select Flickerless mode.
  - OFF / ON / AUTO (remove screen flicker)

- BRIGHTNESS:
  Adjust brightness level.
  - 0(dark) ~ 14(bright) steps

- BACK LIGHT:
  Select HLC(High Light compensation) or BLC(Back Light compensation).
  - OFF
  - BLC
  - LEVEL : 0 ~ 6 steps
  - POSITION : Adjust the window position.
  - SIZE : Adjust the window size.

  ※ BLC doesn't work in Manual Exposure Mode.
  - HLC
    When extremely bright light is projected to the camera masking is used on the portion to prevent partial saturation on the monitor.
  - MODE : ON / NIGHT
  - LEVEL : 0 ~ 20 steps
  - GRAY LEVEL : 0 ~ 10 steps
  - POSITION : Adjust the window position.
  - SIZE : Adjust the window size.

- DAY&NIGHT:
  Select Day&Night.
  - AUTO↲
  - DELAY : 0 ~ 255 sec
  - THRS : 0 ~ 28 steps
    Day→Night switching level in Auto Mode.
    Switching in higher lux with higher threshold level.
  - GAP : LOW / MID-LOW / MIDDLE / MID-HIGH / HIGH
    Margin between Day → Night switching level and Night Day switching level.
  - IR DETECTION : Setting IR-Detection mode. (ON / OFF)
  - IR DET LEVEL : Setting IR-Detection level.
    (LOW, MID-LOW, MIDDLE, MID-HIGH, HIGH)
  - BURST : OFF / ON

- EXT-IN↲ / DAY / NIGHT↲
- DELAY : 0 ~ 255 sec
- BURST : OFF / ON
- POLARITY : External Input polarity (ACTIVE LOW / ACTIVE HIGH).
- DAY
- NIGHT↲
- BURST : OFF / ON

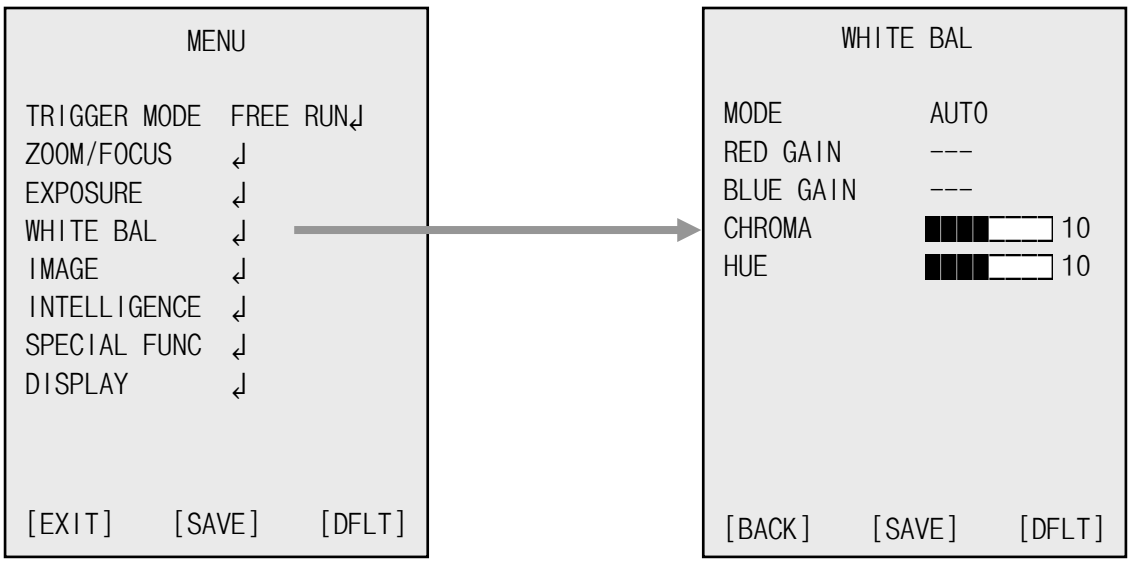
- NIGHT FNC SET:

  Select whether or not to use the Night State-Only setting.

  - OFF : Use the same settings as the Day status.
  - ON↲ : Use the Night State-Only setting for the following features.
  - FOCUS MODE : AUTO / ONE PUSH / MANUAL
  - EXPOSURE MODE : AUTO / IRIS.P / SHUT.P / MANUAL
  - AGC : 0 ~ 10
  - SHUT SPEED : 1/1, 1/2, 1/4(3), 1/8(6), 1/15(12), 1/30(25), 1/60(50), 1/100, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/5000, 1/10000, 1/20000 sec
  - IRIS : CLOSE / F1.5 / F1.8 / F2.0 / F2.4 / F2.8 / F3.4 / F4.0 / F4.8 / F5.6 / F6.8 / F8.0 / F9.6 / F11 / F14 / F16
  - DSS : OFF / 2x / 4x / 8x / 16x / 32x / x64 (※ 60 or 50fps mode)
    OFF / 2x / 4x / 8x / 16x / 32x (※ 30 or 25fps mode)
  - FLICKERLESS : OFF / ON / AUTO
  - BRIGHTNESS : 0(dark) ~ 14(bright)
  - BACK LIGHT : OFF / BLC / HLC
  - SHARPNESS : 0 ~ 10 steps

  ※ If you don't change the setting of NIGHT FNC SET menu, exposure state is automatically set just before switching to the night state.

◆ WHITE BALANCE



- MODE:
  Select WHITE BALANCE mode.
  - ▶ AUTO : Automatically adjusts color according to the available lighting (2,300K ~ 8,000K).
  - ▶ ONE PUSH↲ : It is a fixed white balance mode that may be automatically readjusted only by pressing ONE PUSH.
  - ▶ MANUAL : Adjust WB manually by setting Red / Blue Gain.
  - ▶ INDOOR : Set color temperature to be Indoor light. (3700°K)
  - ▶ OUTDOOR : Set color temperature to be Outdoor light. (5100°K)
  - ▶ AUTO-EXT : Auto mode operating on a wider range of color temperatures. (<2,000K (Sodium Light) ~ 10,000K)

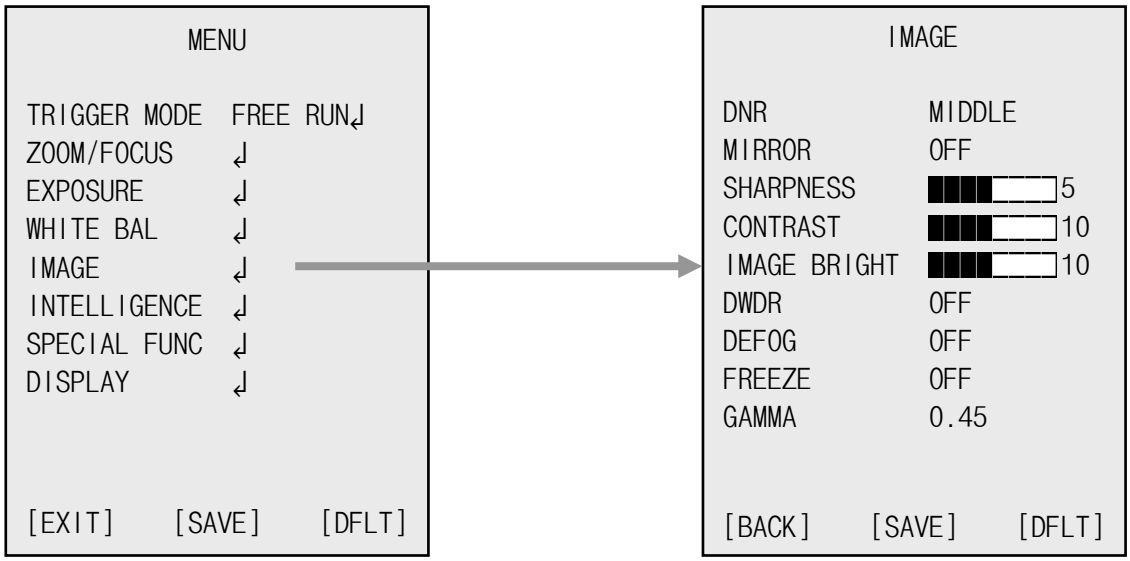
- RED GAIN:
  Adjust R gain value.
  - ▶ 0 ~ 100 steps

- BLUE GAIN:
  Adjust B gain value.
  - ▶ 0 ~ 100 steps

- CHROMA:
  Adjust Chroma gain value.
  - ▶ 0 ~ 20 steps

- HUE:
  Adjust Hue value.
  - ▶ 0 ~ 20 steps

◆ IMAGE



- DNR:
  Select Digital Noise Reduction.
  - ▶ 2D/3D
    - 2D-NR: 0~15 steps
    - 3D-NR: 0~15 steps
  - ▶ 2D + 3D
    - LEVEL: 0~15 steps

- MIRROR:
  Select a flip mode.
  - ▶ OFF
  - ▶ H : You can flip the picture horizontally on the screen.
  - ▶ V : You can flip the picture vertically on the screen.
  - ▶ H&V : You can flip the picture horizontally & vertically on the screen.

- SHARPNESS
  Adjust sharpness level.
  - ▶ 0 ~ 10 steps

- CONTRAST:
  Adjust contrast level.
  - ▶ 0 ~ 20 steps

- IMAGE BRIGHT:
  Adjust image brightness level.
  - ▶ 0 ~ 20 steps

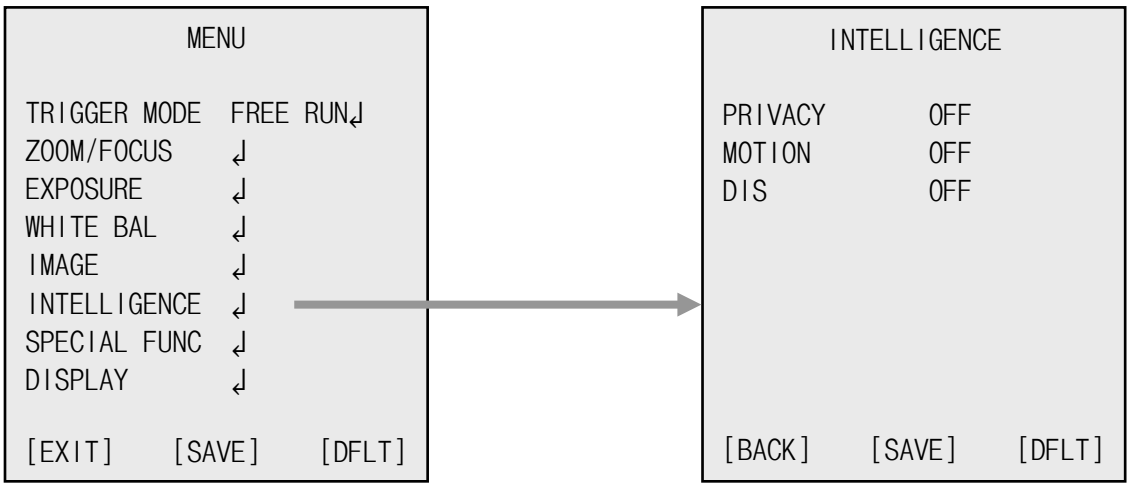
- DWDR:
  Select WDR (Wide Dynamic Range).
  - OFF
  - AUTO ↲ : Select auto level (HIGH, MIDDLE, LOW)
  - MANUAL ↲ : Select dark or bright level
    - DARK LEVEL : 0 ~ 16
    - BRIGHT LEVEL : 0 ~ 16

- DEFOG:
  Carry out defog function.
  - OFF
  - AUTO↲
    - AUTO LEVEL : HIGH, MIDDLE, LOW
  - MANUAL
    - LEVEL : 0 ~ 8

- FREEZE:
  Select real or still mode.
  - OFF / ON

- GAMMA:
  Select GAMMA.
  - 0.35 / 0.40 / 0.45 /0.50 / 0.55 / 0.60 / 0.65 / 0.70

◆ INTELLIGENCE



- PRIVACY:

  Hide an area you want to hide on the screen.

  - ▶ OFF
  - ▶ ON↲
    - ○ MASK# : Select mask area number. (1 ~ 8)

  ※ Only 4 masks are displayed on the CVBS and the SDI output.

  - ▶ MODE : Mask enable or disable. (OFF / ON)
  - ▶ POSITION : Adjust the mask position.
  - ▶ SIZE : Adjust the mask size.
  - ▶ COLOR : Select mask color. (0 ~ 13)

- MOTION:

  When there is movement of the subject in the screen, there will be motion detection.

  - ▶ OFF
  - ▶ ON↲
    - ○ AREA# : Setting 4areas of motion detection. (1 ~ 4)
    - ○ MODE : Limit and define areas of motion detection. (OFF / ON)
    - ○ SENSITIVITY : Adjust sensitivity of MD. (0 ~ 20 steps)
      More sensitive to setting to low step with sensitivity.
    - ○ POSITION : Adjust the Area position.
    - ○ SIZE : Adjust the Area size.
    - ○ INTERVAL :Select the alarm interval time. (0 ~ 255sec)
    - ○ DWELL TIME : Select the duration time for changing MD mode. (0~255 sec)
    - ○ ZOOM PRESET : Select Motion Zoom Preset Mode and Position. (OFF / ON↲)

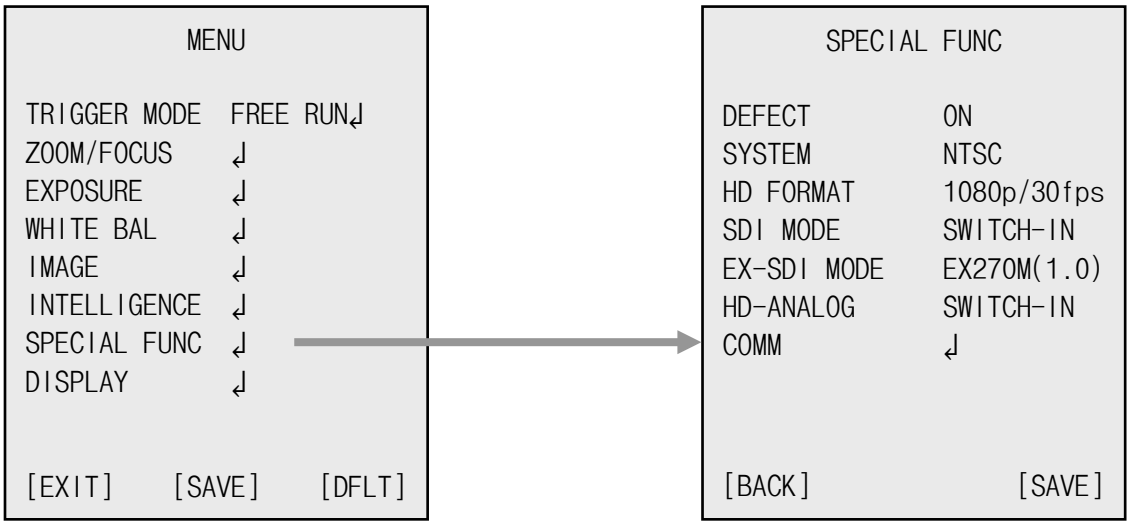
- DIS:

  Select Digital Image Stabilizer mode.

  - ▶ OFF / ON

  ※ When the DIS is turned on, the Digital Zoom is forced turned off.

◆ SPECIAL FUNC



- DEFECT:
  Compensates for bad pixels that may occur.
  ▶ ON / OFF↲

- SYSTEM:
  Select system frequency.
  ▶ NTSC(30/60fps) / PAL(25/50fps)

- HD FORMAT:
  Select Digital output format.
  ▶ 720p/30(25)fps, 1080p/30(25)fps, 1080p/60(50)fps (EX-SDI only)
  ※ 1080p/60(50)fps format is available in EX-SDI when TVI is off.

- SDI MODE:
  Select SDI output mode.
  ▶ HD-SDI / EX-SDI / SWITCH-IN
  ※ 1080p/60(50)fps format not supported in HD-SDI mode.
  ※ "SWITCH-IN" is for internal use only.

- EX-SDI MODE:
  Select EX-SDI output mode.
  ▶ EX270M (1.0) / EX135M (2.0)
  ※ In 1080p/60(50)fps format, it is fixed to EX270M mode.
  ※ "SWITCH-IN" is for internal use only.

- HD-ANALOG:
  Select CVBS output mode.
  ▶ CVBS / TVI / SWITCH-IN
  ※ "SWITCH-IN" is for internal use only.

- COMM:

  Set up the camera ID, baud rate, protocol.

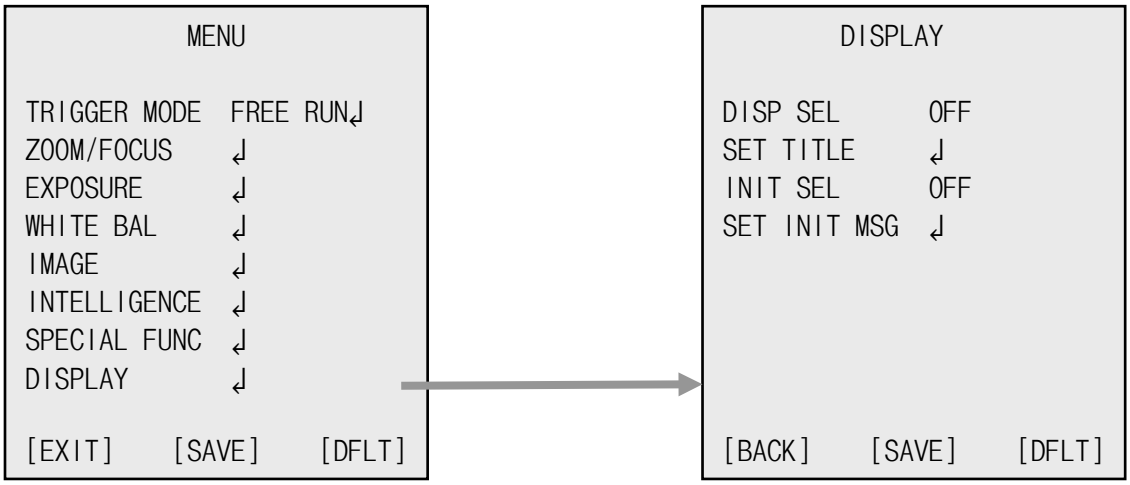
  - ID : Select the camera ID. (1 ~ 255)

  ※ ID is common to UART and RS-485

  - BAUDRATE : Select baud rate for UART.
    (2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200bps)
  - PROTOCOL : Select Protocol for UART
    (VISCA / PELCO-D / PELCO-P)
  - 485 BAUD RATE : Select baud rate for RS-485.
    (2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200bps)
  - 485 PROTOCOL : Select Protocol for RS-486.
    (VISCA / PELCO-D / PELCO-P)
  - UTC : Select whether to enable TVI-UTC communication. (OFF / ON)
  - UTC PROTOCOL : Select Protocol for TVI-UTC. (PELCO-C / HIKVISION-C)
  - UTC FORWARD : Select whether to enable the function to forward the UTC command to UART or RS485. (OFF / ON)
  - UTC FWD PORT : Select the communication port on which to send the UTC command. (UART / RS-485)

  ※ When the UTC Forward function is turned on, the UTC Command is not handled by the camera, but is only forwarded to the communication port (UART or RS485).

◆ DISPLAY



- DISP SEL:

  Select display item.

  ▶ OFF / ON↲
    - ID : OFF / ON
    - TITLE : OFF / ON
    - ZOOM RATIO : OFF / ON
    - SYSTEM MSG : OFF / ON (MD Alarm and Wait message)

- SET TITLE:

  Select camera title menu. (Text edit– max 40 characters).

- INIT SEL:

  Select display initial message.

  ▶ OFF / ON↲
    - ID : OFF / ON
    - BAUDRATE : OFF / ON
    - PROTOCOL : OFF / ON
    - VERSION : OFF / ON
    - INIT MSG : OFF / ON

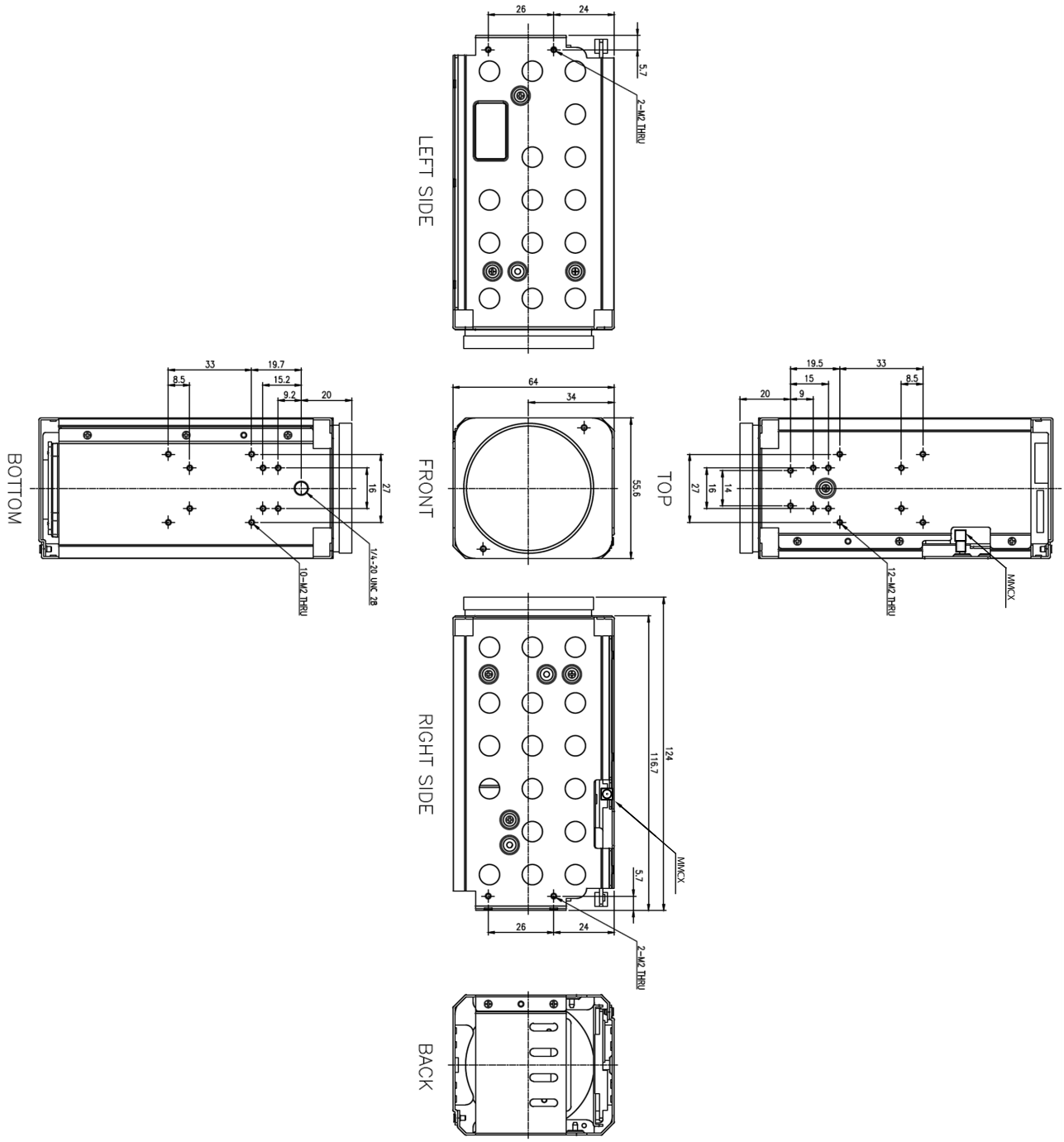
- SET INIT MSG:

  modify initial message. (Text edit – max 40 characters)

  ※ Character Table of Text Edit Mode

  A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
  a b c d e f g h i j k l m n o p q r s t u v w x y z
  , . ( ) { } [ ] 0 1 2 3 4 5 6 7 8 9 * + - / = ~ ! ? " ′

CAMERA DIMENSIONS



APPROVALS

Active Silicon makes the following approval statements:	
CE	In accordance with the CE Marking regulations, the **Harrier 36x AF-Zoom SDI Camera** is not a finished product and is supplied for further integration into a finished product that will be CE marked by the final manufacturer/integrator. Therefore, no CE marking or Declaration of Conformity is required or allowed.
RoHS3	This product is compliant with the RoHS3 requirements (Directive 2015/863/EU).
REACH	Please contact Active Silicon for the latest formal REACH declaration (EC 1907/2006).
EMC	This product is designed to be compliant with the following requirements when housed in a suitable enclosure: • EN 55022:2010 (Class A) and EN 55024:2010 (EU Directive 2014/30/EU Electromagnetic Compatibility • FCC Rules for Class A digital devices

ORDERING INFORMATION

PART NUMBER	***DESCRIPTION***
AS-CAM-36SGHD-A	Harrier 36x AF-Zoom SDI Camera with global shutter (SDI/EX-SDI)
AS-CAM-36LGHD-A	Harrier 36x AF-Zoom Camera with global shutter (LVDS/EX-SDI)

Headquarters:

Active Silicon Ltd
1 Waterside Court, Waterside Drive,
Langley, Berks, SL3 6EZ, UK.

Tel: +44 (0)1753 650600
Email info@activesilicon.com
Website: www.activesilicon.com

North America:

Active Silicon, Inc.
479 Jumpers Hole Road, Suite 301,
Severna Park, MD 21146, USA.

Tel: +1 410-696-7642
Email: info@activesilicon.com
Website: www.activesilicon.com

July 2024 Harr36x AFZ-SDI-Cam (w Apr21 v1.01)
Details subject to change at any time.