CUSTOMER'S APPROVAL SHEET

CUSTOMER	APPROVED		
SUPPLIER	DRAWN	CHECK	APPROV.

Contents

Feature

- **1/3.1" Sony GLOBAL Shutter CMOS sensor**
  3.28M Pixels (Total)
  3.20M Pixels (Active)

- **40x Optical Zoom**
  Built-in 40x optical zoom lens is highly reliable.
  It features auto focus, auto iris, auto D&N, zoom function.

- **Full HD Resolution**
  1920x1080p 60/50/30/25fps
  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&night environment.

- **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 make specific areas of the scene from view.

- **On Screen Display**
  This camera supports the OSD function. And so, the camera can be controlled by selecting text displayed on the monitor screen.

- **Intelligent motion detection**
  You can transmits 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.

Feature

- **Output**
  Digital output : LVDS
  Analog output : CVBS

- **Protocol**
  This camera supports the multi-protocol (VISCA, PELCO-D, PELCO-P)

Cautions

- **Power Supply**

  This camera must always be operated a 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 dust place
  - 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

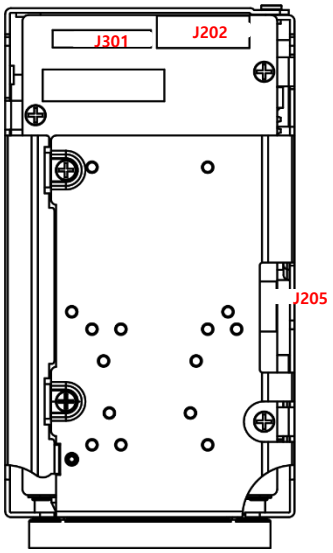
Model	MC-G305			
Image Sensor	1/3.1" Sony IMX900-AQR-C CMOS Sensor			
Total Pixels	2064(H) x 1592(V) = 3.28M pixels			
Effective pixels	2064(H) x 1552(V) = 3.20M pixels			
Active pixels	2064(H) x 1552(V) = 3.20M pixels			
Scanning system	Progressive Scan			
Sync. System	Internal			
Resolution	Digital : 1080p 60/50/30/25fps, 720p 60/5030/25fps Analog : CVBS			
Min. illumination (50%)	Color(1/30s, 48dB) :0.1 lux , BW(1/30s, 48dB) : 0.01 lux Color DSS(1/1s, 48dB) : 0.01 lux , BW DSS(1/1s, 48dB) : 0.001 lux			
Video Output	Digital : LVDS (Single / Dual) Analog : CVBS			
S/N Ratio	more than 50dB (AGC off)			
Lens				
Lens type	40x Day & Night Zoom Lens			
Zoom Ratio	Optical x40, Digital x32 Zoom			
Focal Length	f = 4.25mm ~ 170.0mm			
Aperture Ratio	F1.6 (wide) ~ F4.95 (tele)			
Angle of View (D, H, V)	Wide	70.9°	63.6°	38.5°
	Tele	2.04°	1.77°	1.00°
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) ~ 1/40,000 sec			
AGC (Ext-trigger)	0 ~ 10 steps			
Iris (Ext-trigger)	Close ~ F1.6			
Day&Night (Ext-trigger)	Day / Night			
Zoom/Focus				
Focus Mode	Auto / One Push / Manual			
Distance	0.1 / 1.5 / 3.0 / 6.0 / 10.0 m			
Zoom Speed	0(Slow) ~ 7(Fast)			
Lens Refresh	One Push / 1day ~ 10days			
E.Zoom	Off / MAX 2x ~ 32x			
Zoom Preset	5 preset			
Exposure				
Mode	Auto / Iris. Priority / Shut. Priority / Manual			
AGC(Gain Control)	0 ~ 10 steps			
Shutter Speed	1/1 ~ 1/40,000 sec			
Iris	Close ~ F16			
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			
Day&Night	Auto / Day / Night / Ext-in			
Night Function Set	Off / On			

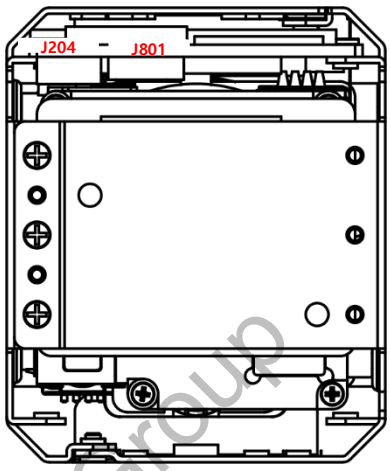
Specification

White Balance	
Mode	Auto / One Push / Manual / Indoor / Outdoor / Auto-Ext
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
Sharpness	0 ~ 15 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
Special Func.	
Defect DET	Off / On
System	NTSC / PAL
HD Format	720p30(25)fps / 720p60(50)fps / 1080p30(25)fps/ 1080p60(50)fps
Comm	ID : 1 ~ 255
	Baud Rate : 2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 bps
	Protocol : Pelco-P / Pelco-D / VISCA
Display	
Disp 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	-10℃ ~ +50℃ (Humidity : 0%RH ~ 90%RH)
Storage Temperature	-20℃ ~ +60℃ (Humidity : 0%RH ~ 90%RH)
External Dimension	54(W) X 64(H) x 101(D)
Weight	355g

* Note : Design and specifications are subject to change without notice.

Connector





J301					
Pin No.	Name	Level	Pin No.	Name	Level
1	TXOUT3+		21	TXOUT7+	Single out mode : open
2	TXOUT3−		22	TXOUT7-	Single out mode : open
3	TXCLKOUT+		23	TXOUT6+	Single out mode : open
4	TXCLKOUT−		24	TXOUT6-	Single out mode : open
5	TXOUT2+		25	NC	Reset_IN
6	TXOUT2−		26	NC	
7	TXOUT1+		27	TXOUT5+	Single out mode : open
8	TXOUT1−		28	TXOUT5-	Single out mode : open
9	TXOUT0+		29	TXOUT4+	Single out mode : open
10	TXOUT0−		30	TXOUT4-	Single out mode : open
11	GND				
12	TxD	CMOS 5V			
13	RxD	CMOS 5V			
14	DC IN	9 ~ 15V DC			
15	DC IN	9 ~ 15V DC			
16	DC IN	9 ~ 15V DC			
17	DC IN	9 ~ 15V DC			
18	DC IN	9 ~ 15V DC			
19	GND				
20	GND				
Ref.	USL00-30L-C (KEL Cop.)				

Connector

J202					
Pin No.	Name	Level	Pin No.	Name	Level
1	GND		21	DC IN	9 ~ 15V DC
2	TxD	CMOS 5V	22	DC IN	9 ~ 15V DC
3	RxD	CMOS 5V	23	DC IN	9 ~ 15V DC
4	TRIG_IN	External Trigger Input (CMOS 3.3V)	24	DC IN	9 ~ 15V DC
5	GND				
6	STROBE_OUT	Strobe Output (CMOS 3.3V)			
7	GND				
8	ADKEY	OSD Control			
9	IR_ON	CMOS 3.3V			
10	D/N-IN	Day & Night Control Input (Normal : open, Active : 0V)			
11	NC				
12	MD-OUT	Motion Detection output			
13	485-DIR	RS-485 control signal			
14	NC				
15	GND				
16	+5V				
17	GND				
18	CVBS-OUT	Composite Video Output			
19	GND				
20	DC IN	9 ~ 15V DC			
Ref.	05002HR-24J05 (YEONHO)				

J204		
Pin No.	Name	Level
1	GND	
2	CVBS-OUT	Composite Video Output
Ref.	12505WR-02 (YEONHO)	

Connector

J205 : Connector For Upgradig Camera Program		
Pin No.	Name	Description
1	JMODE	
2	JTCK	JTAG Upgrade Clock
3	JTDI	JTAG Upgrade Data Input
4	JTDO	JTAG Upgrade Data Output
5	JTMS	JTAG Upgrade Chip Selector
6	GND	
Ref.	10019HR-06 (YEONHO)	

Connector

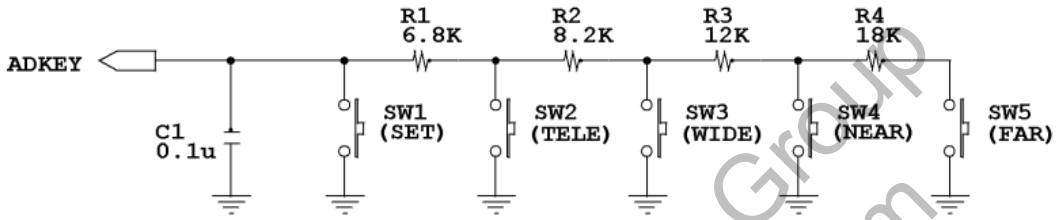
1. D&N IN (J202-10)

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

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

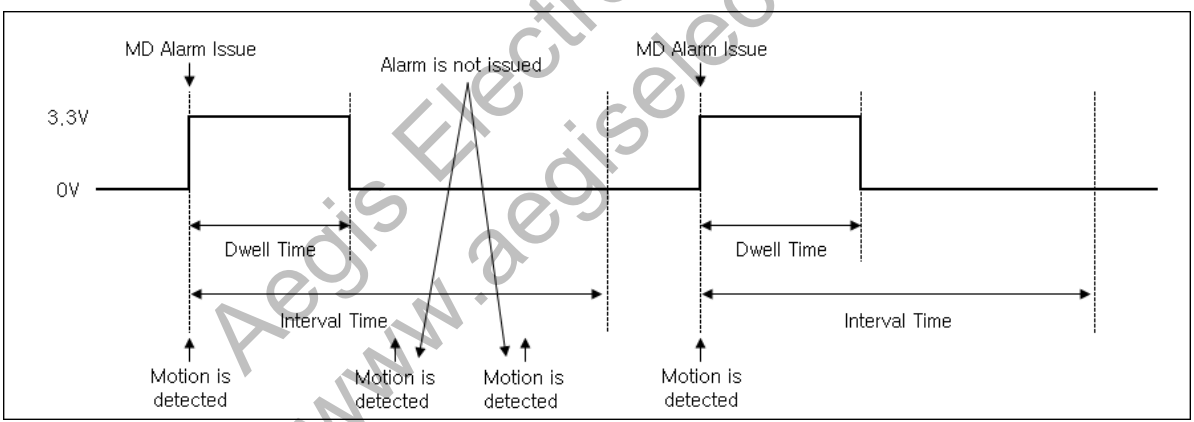
2. AD KEY (J202-8)

The external wired remote controller connecter.



3. MD (J202-12)

Port giving signal output of Motion Detection Alarm

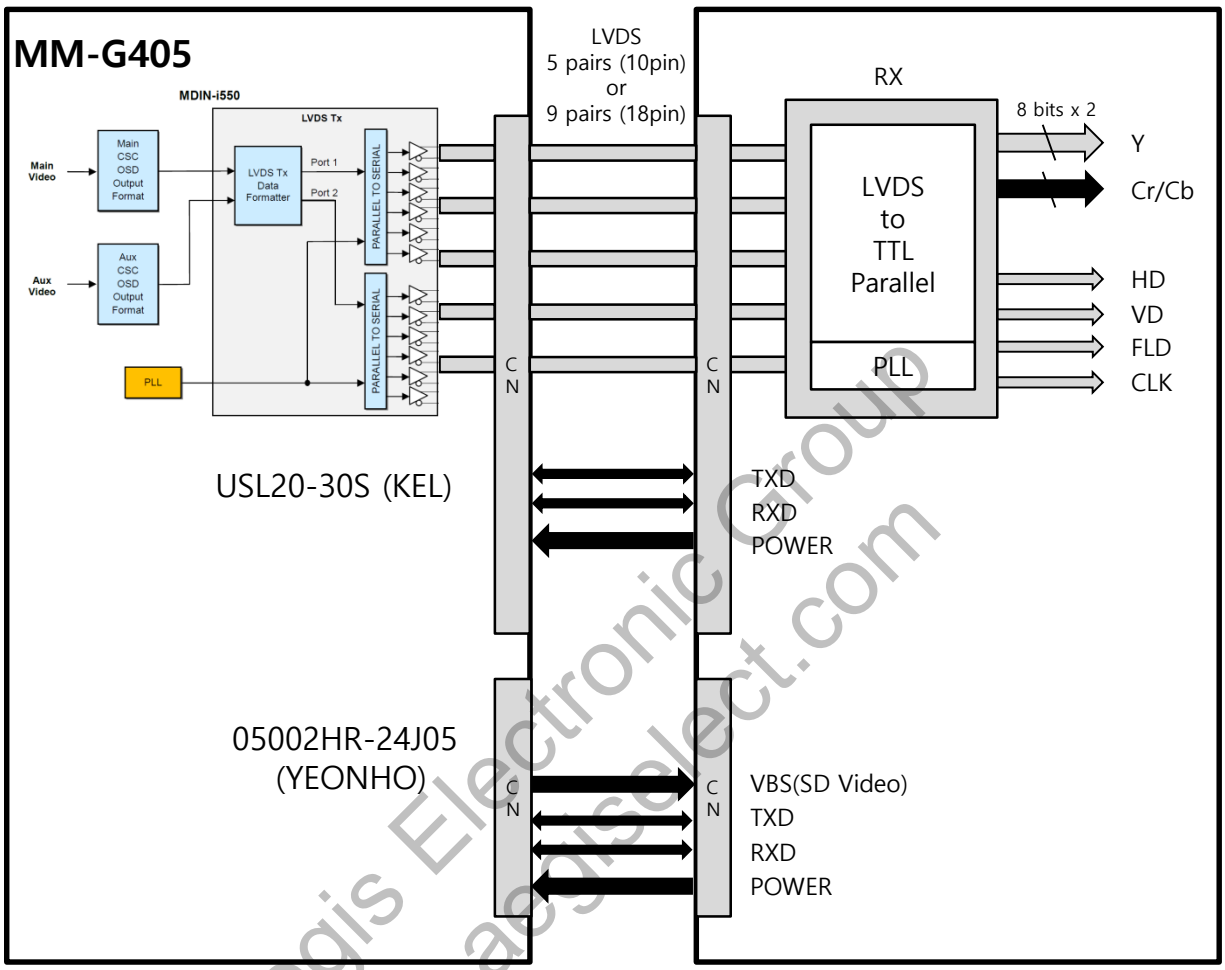


4. 485-DIR (J302-13)

Port giving output of TxD/RxD direction in RS-485 communication

- TxD : High (+3.3V)
- RxD : Low (Ground)

Interface



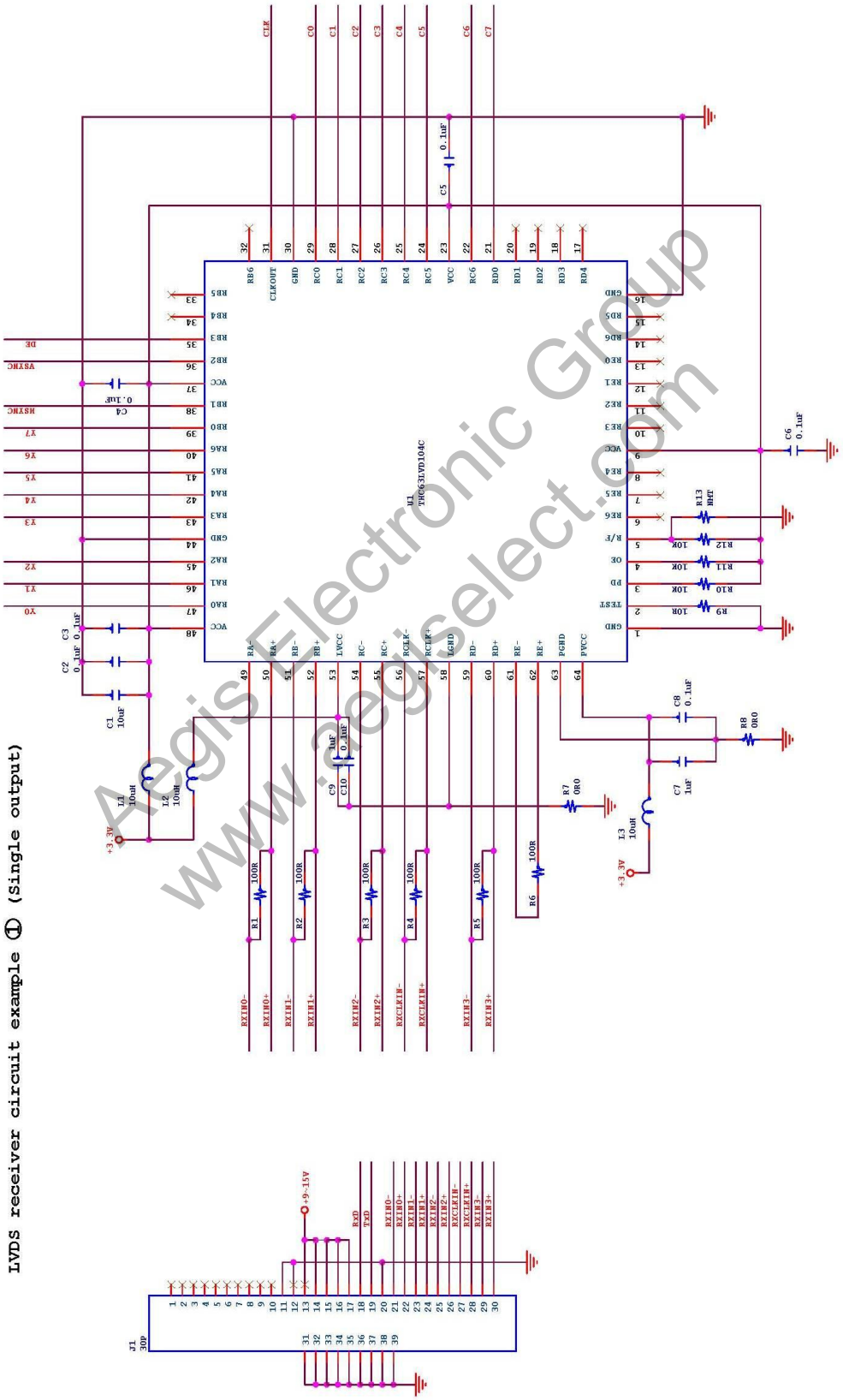
The MM-G405 uses the LVDS transmitter IC chip. The LVDS receiver IC (THC63LVD1024, THC63LVD104C, BU90R102) is recommended.

Recommended connectors and cables.

- Cable : #42 thin coaxial cable
- Connector : USL20-30S (KEL)

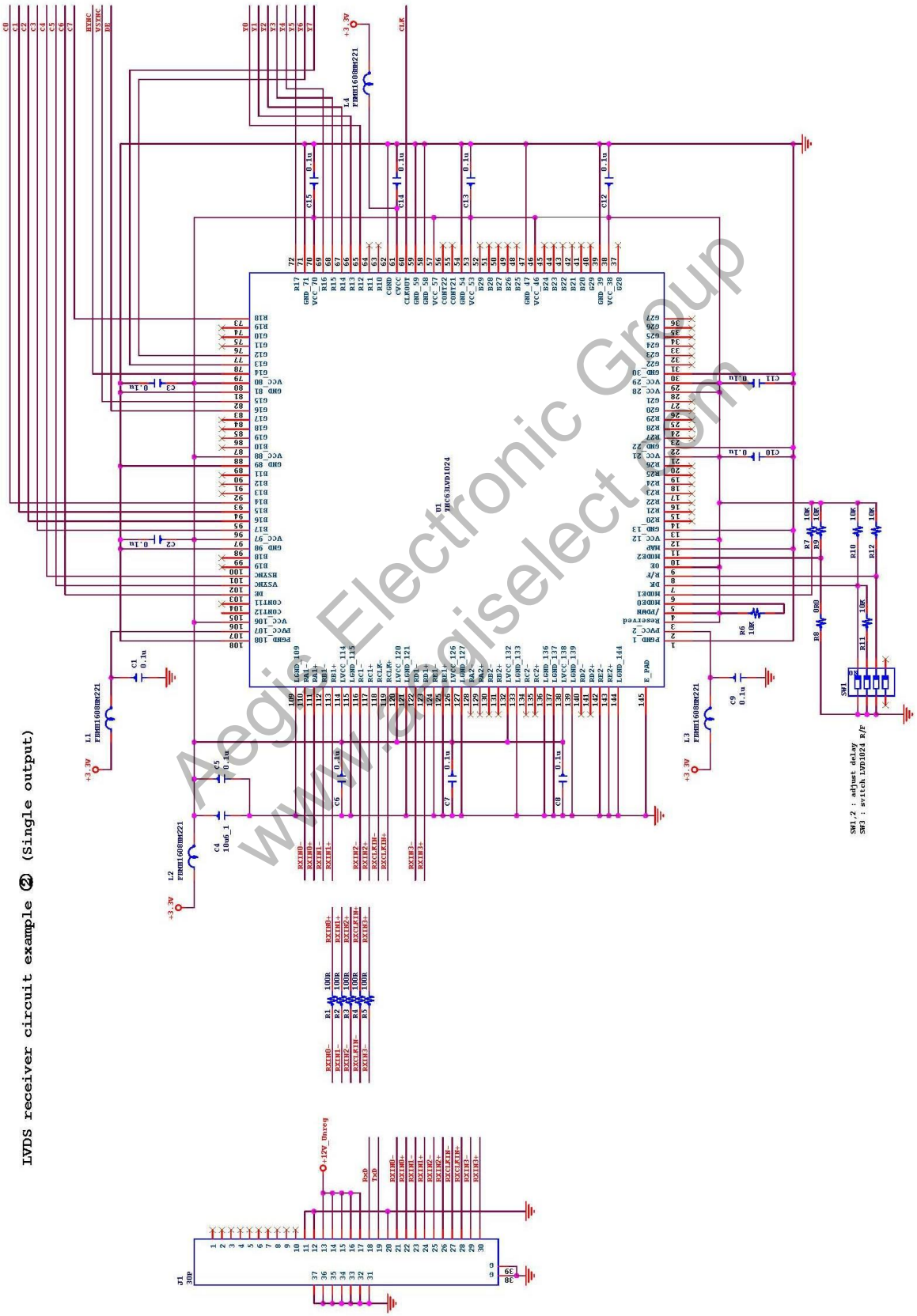
LVDS receiver circuit

THC63LVD104C circuit example (Single output)



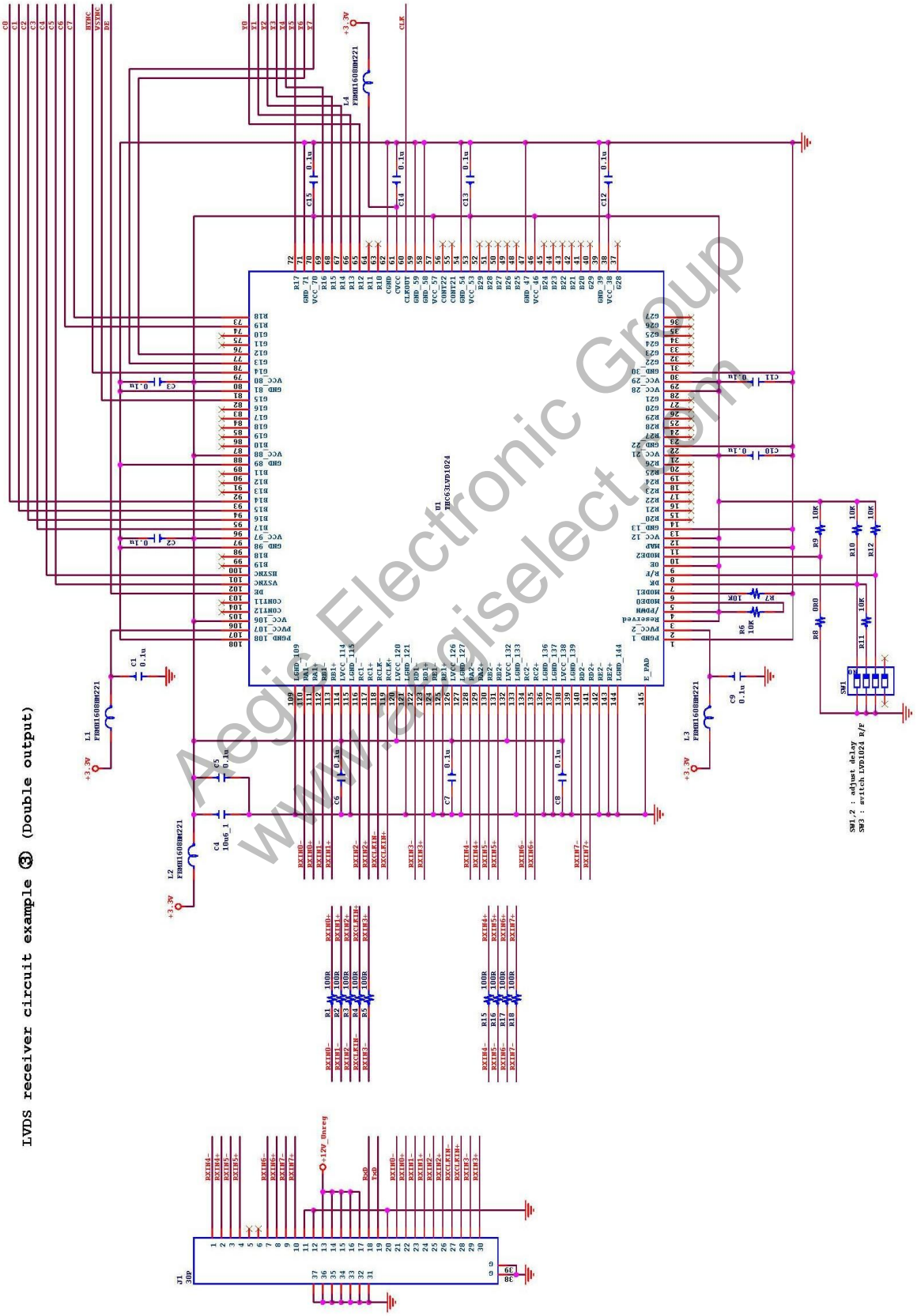
LVDS receiver circuit

THC63LVD1024 circuit example (Single output)

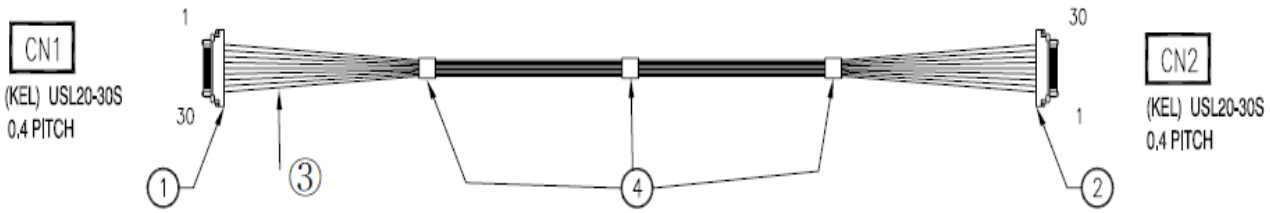


LVDS receiver circuit

THC63LVD1024 circuit example (Double output)



Cable specifications



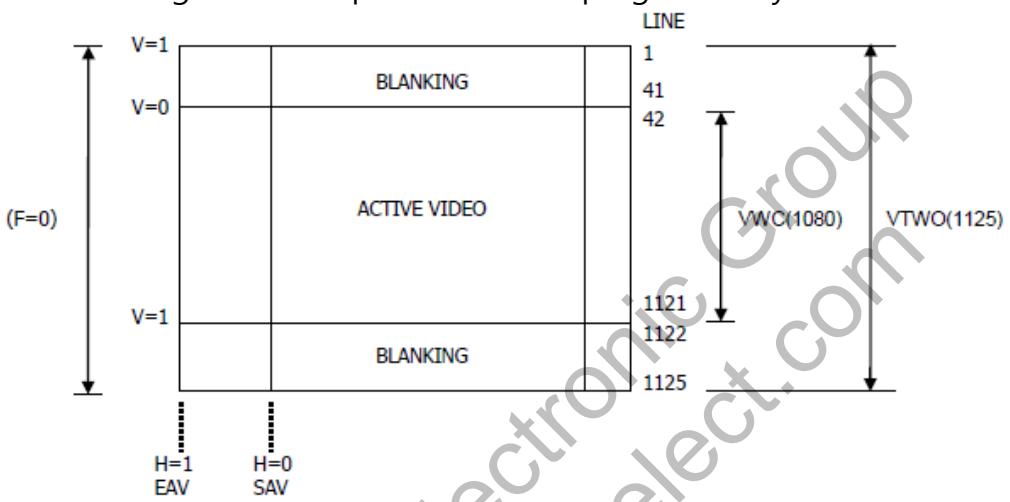
①, ② : Connecting to USL20-30S (KEL)
③ : #42 thin coaxial cable
④ : Binding tape

Timing Chart

1. 1080p

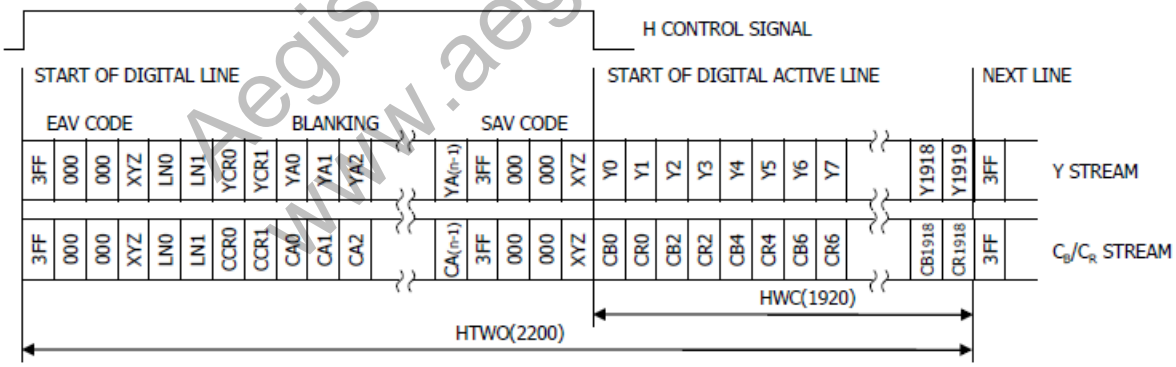
ITU-R BT.1120 also includes progressive scan formats with 1080 active lines, with Y'C'BC'R 4:2:2 sampling at pixel rates of 74.25MHz (30/25fps) or 148.5MHz (60/50fps). The following diagrams show horizontal and vertical timing for 1080-line progressive systems.

① Frame timing relationship for 1080-line progressive systems.

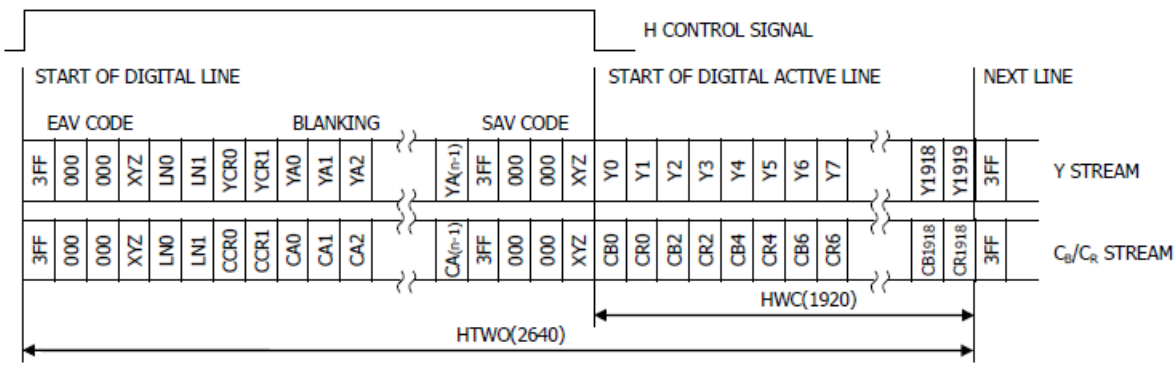


② Data stream over one video line

- 1080p 60/30fps



-1080p 50/25fps

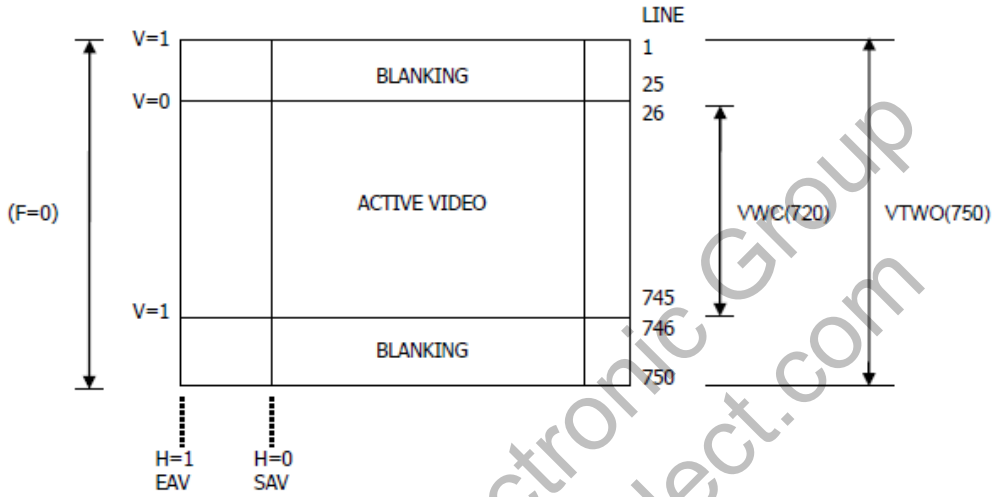


Timing Chart

2. 720p

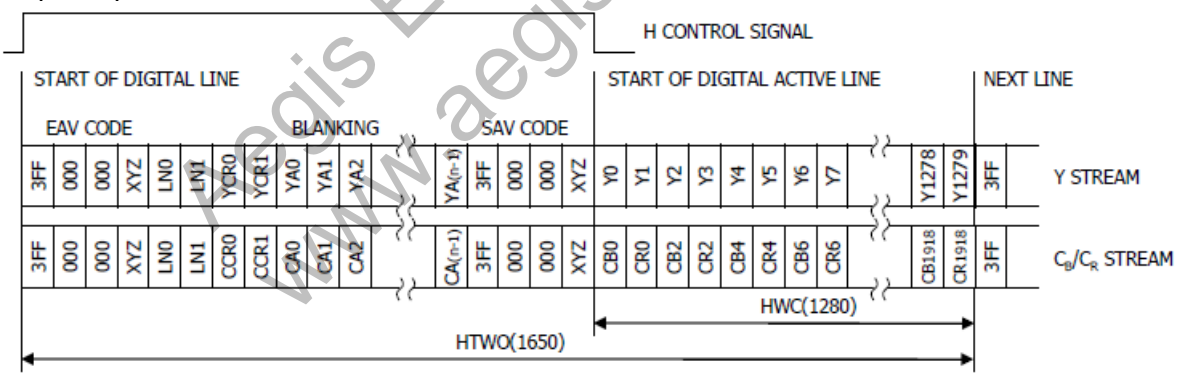
ITU-R BT.1120 also includes progressive scan formats with 720 active lines, with Y'C'BC'R 4:2:2 sampling at pixel rates of 74.25MHz. The following diagrams show horizontal and vertical timing for 720-line progressive systems.

① Frame timing relationship for 720-line progressive systems.

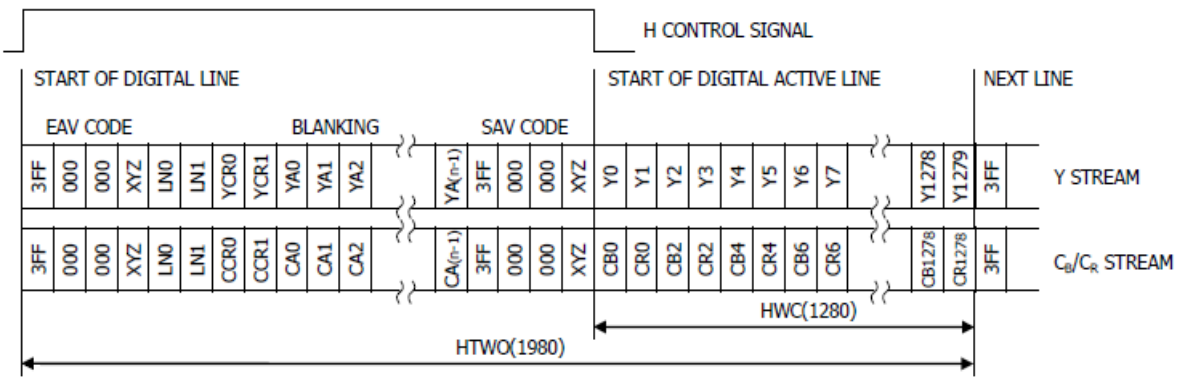


② Data stream over one video line

- 720p 60fps

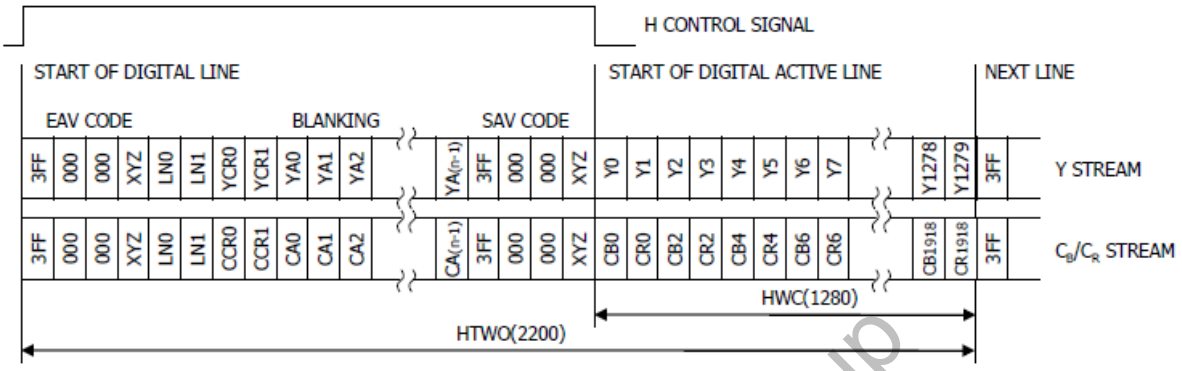


- 720p 50fps

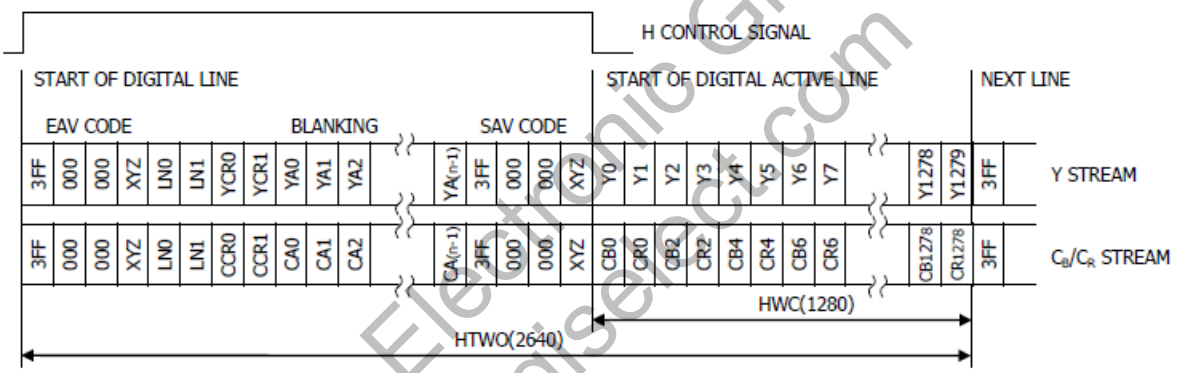


Timing Chart

- 720p 30fps



- 720p 25fps



Timing Chart

4. EAV and SAV Sequence

The EAV and SAV sequences are shown in Table A. The status word is defined as:

F = "0" or "1" (Selectable)
V = "1" during vertical blanking
H = "0" at SAV, H = "1" at EAV
P3–P0 = protection bits
P3 = V ⊕H
P2 = F ⊕H
P1 = F ⊕V
P0 = F ⊕V ⊕H

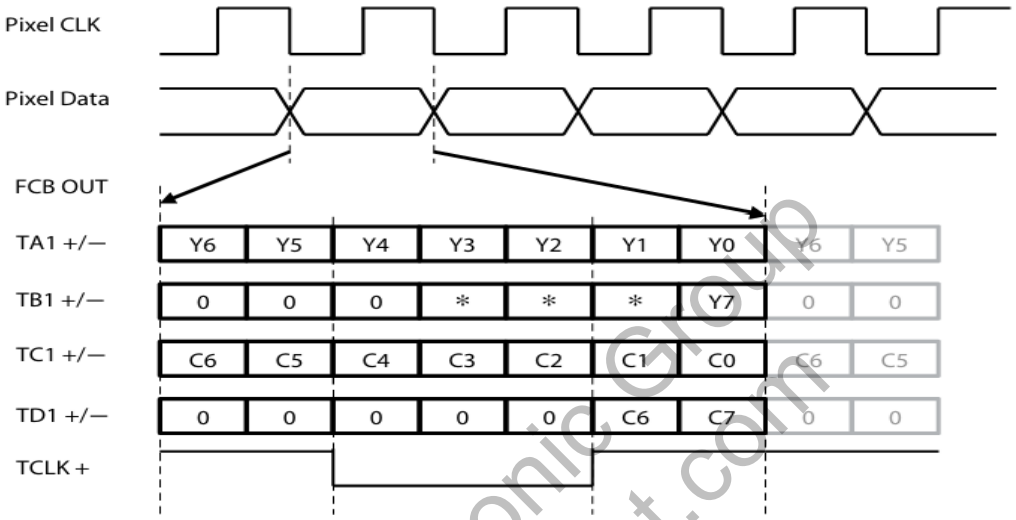
	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
Preamble	1	1	1	1	1	1	1	1	1	1
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
Status word	1	F	V	H	P3	P2	P1	P0	0	0

Table A.

Pixel data format

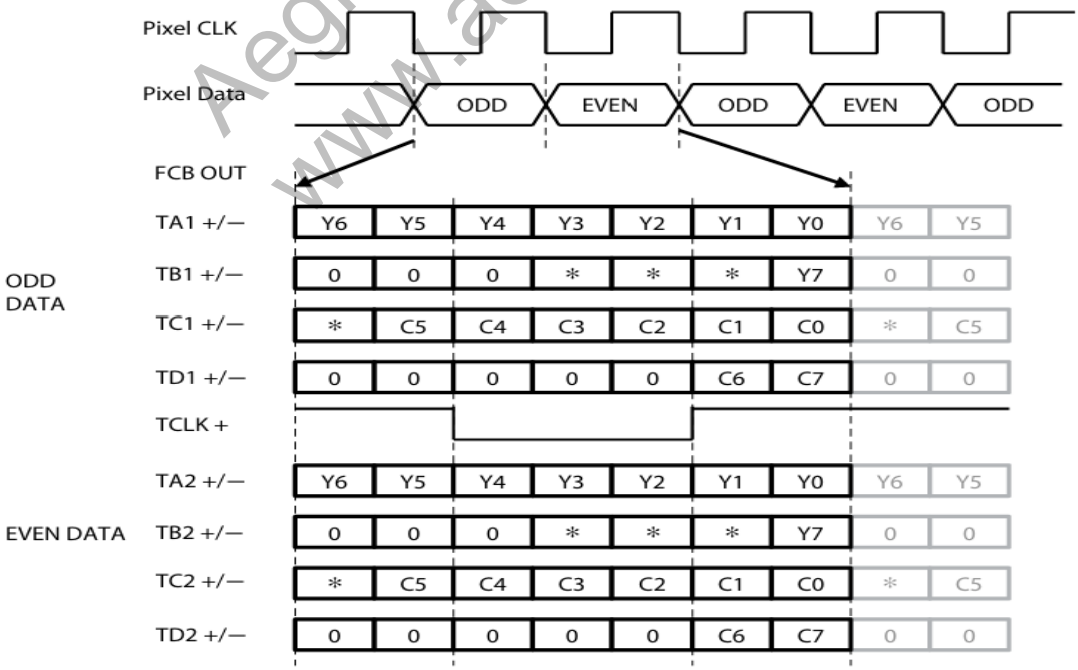
1. Output format (Single mode)

① Single mode



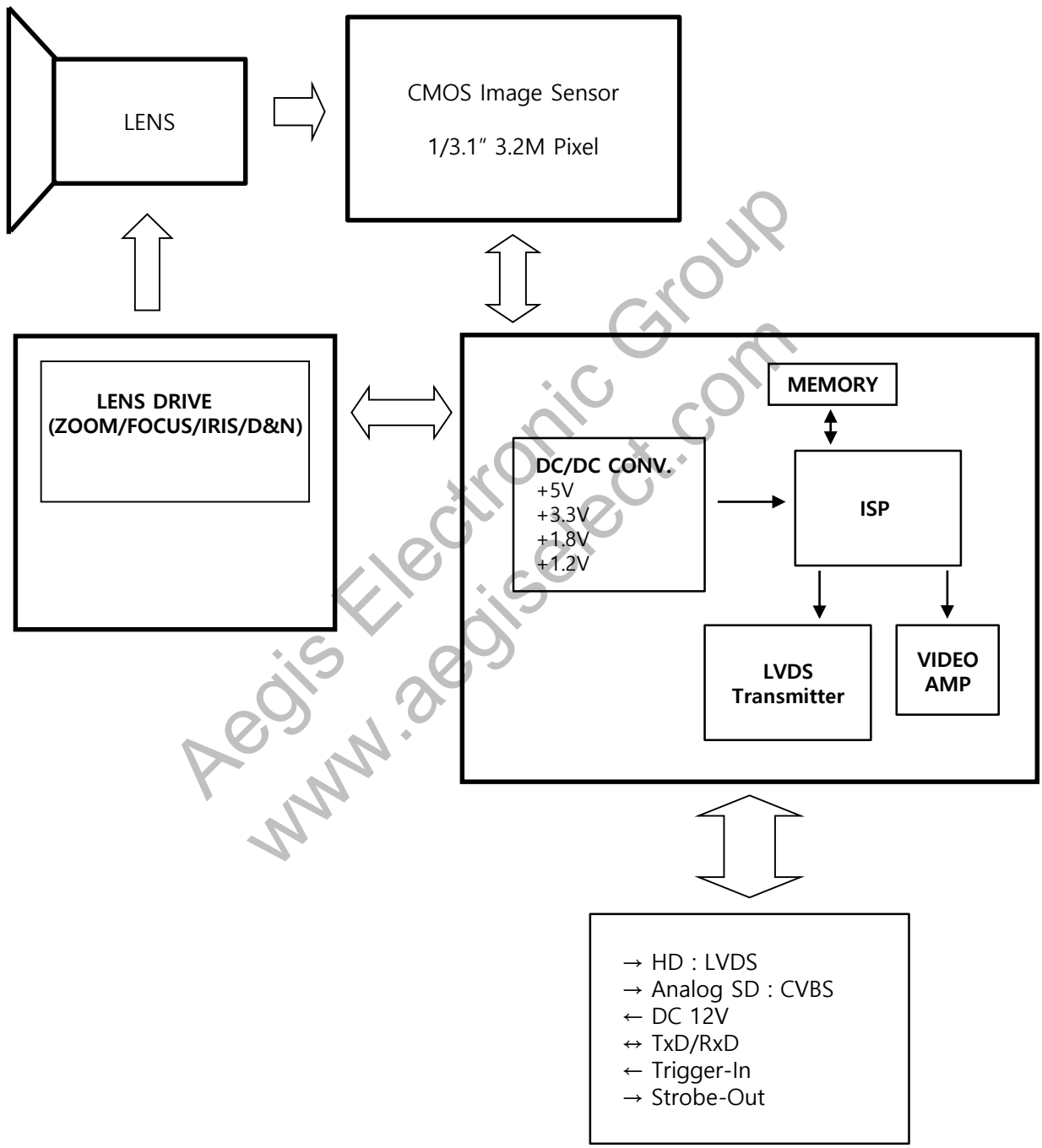
* Please ignore the value which can be "0" or "1".

② Dual mode



* Please ignore the value which can be "0" or "1".

Block Diagram

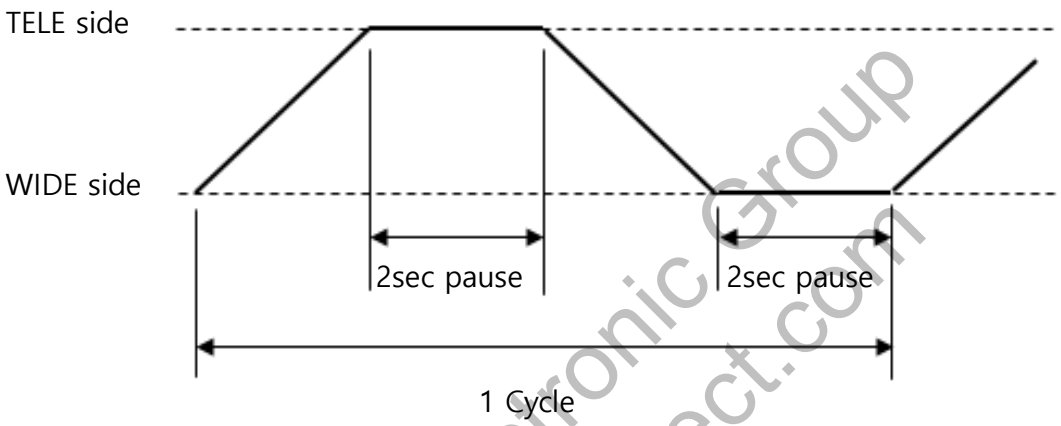


Reliability

Reliability and Environment Condition

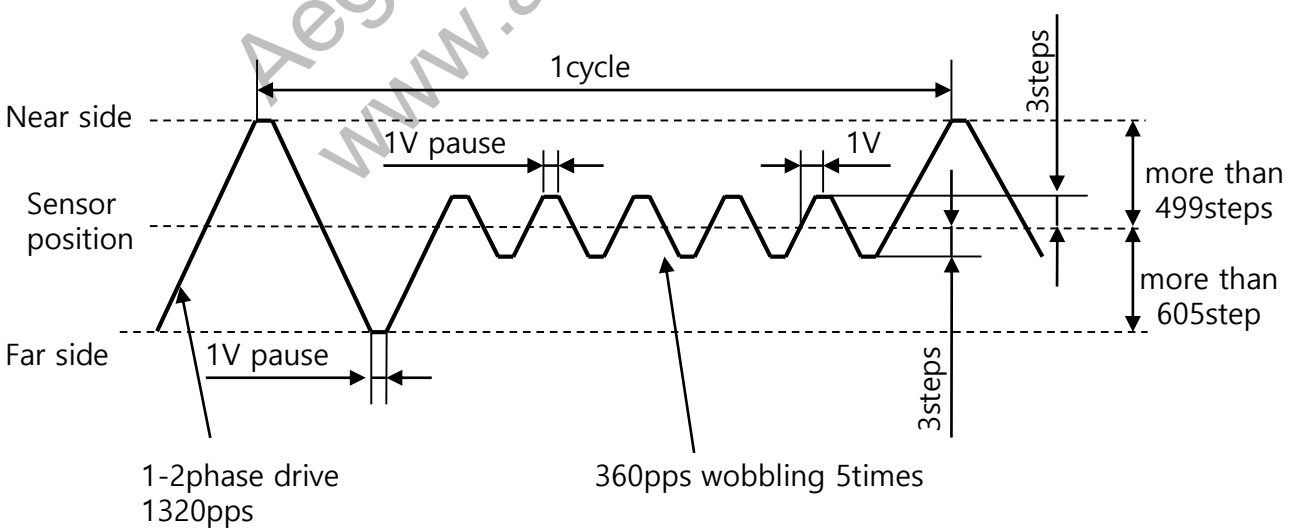
1. Zoom

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



2. Focus

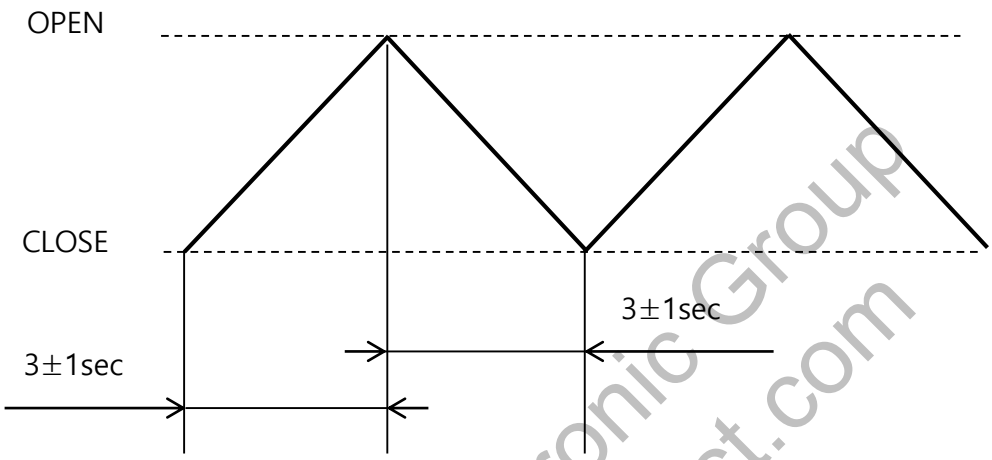
① Focus operation cycle : 2,000,000cycles
② Operation condition : See below
③ Test condition : Normal temperature



Reliability

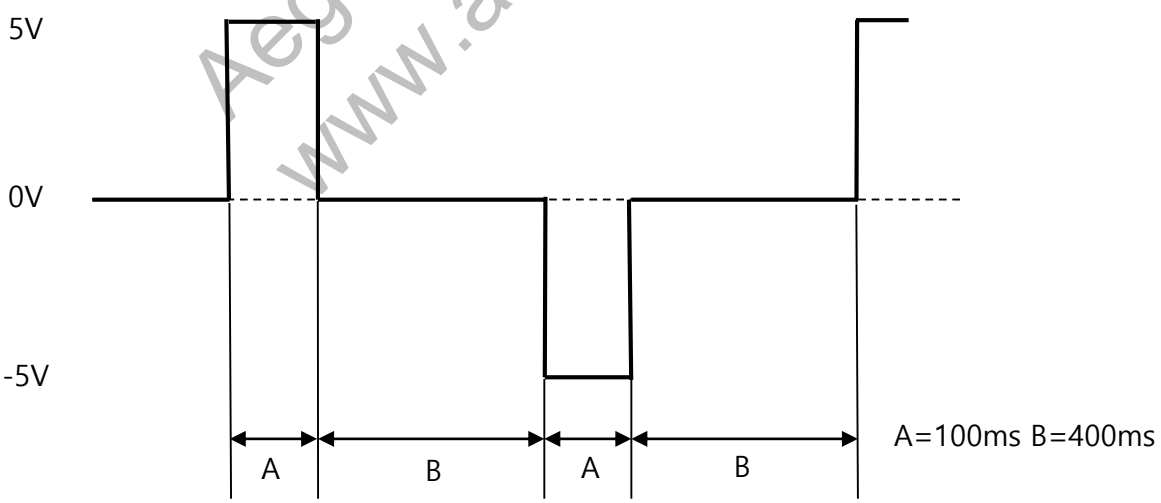
3. Auto-Iris

① Auto-iris operation cycle: 500,000 cycles
② Operation condition : See below
③ Test condition : Normal temperature



4. IR-Cut Filter

① IRCF operation cycle: 20,000 cycles
② Operation condition : See below
③ Test condition : Normal temperature



Function

1. Zoom

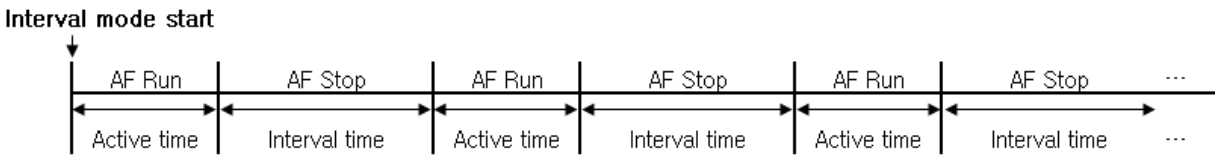
● Max. zoom ratio
- Optical Zoom : Max x40
- Digital Zoom : Max x32
- Optical + Digital Zoom : Max x1280

※ DZoom can not be used with the DIS function.

● Digital zoom mode
- Combine 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 initialize the Zoom and the Focus.

Function

● 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 in 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 does not work 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.

Function

※ 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
    : It 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
    : It 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

Function

5. White Balance

● White Balance mode

- 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 operating 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, the camera malfunction of image ghost can be happened in dark environment.

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 can not turn on.

Function

10. Freeze

It 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.
- Two groups from among 14 colors in each group transparency can be individually set for each or 8 privacy zones.
- Interlocking control with zooming.
- Interlocking control with Pan/Tilt. (Interlock mode)
- Parameters in VISCA Command (Privacy related commands in Command List)

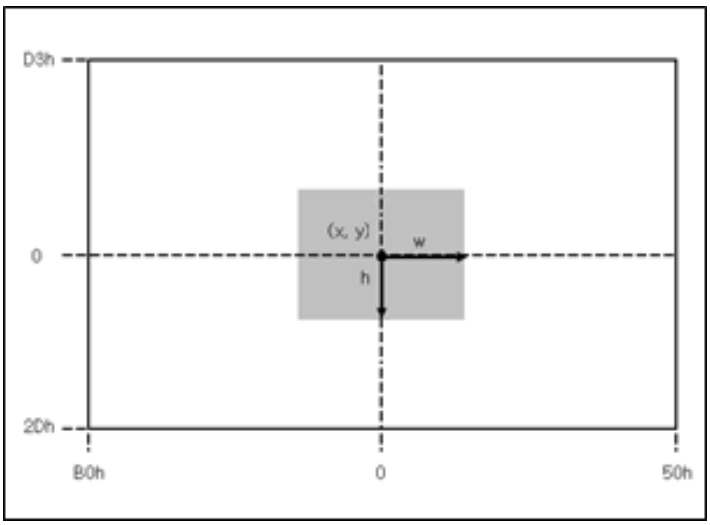
- Mask Number (mm)
  : Mask A = 0 ~ Mask H = 7
  ※ Mask A has highest priority and Mask H has lowest priority

- 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.



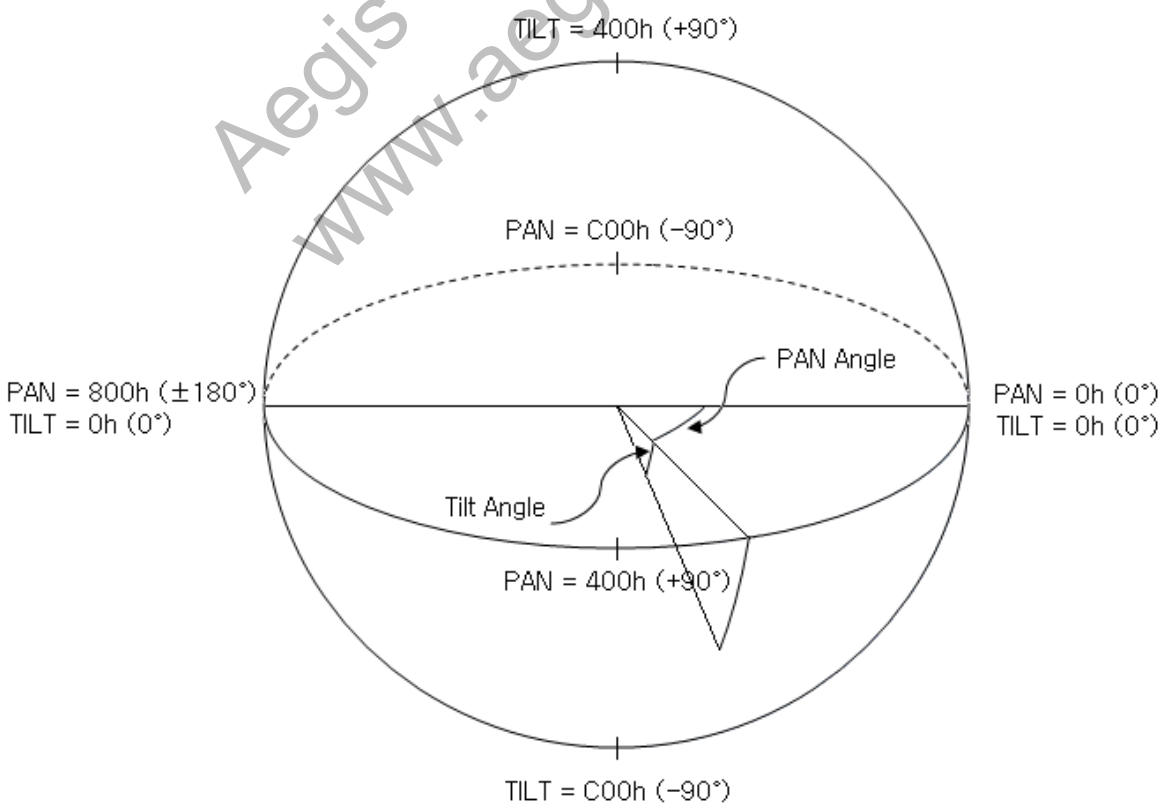
- Mask Size
  : w (rr) = B0h(-50h) ~ 50h
  h (ss) = D3h(-2Dh) ~ 2Dh

Function

- Mask Color

Color		Code(qq, rr)	
		Non-transparency	Transparency
Black		00h	10h
Gray	Light	01 h	11 h
		02 h	12 h
		03 h	13 h
		04 h	14 h
		05 h	15 h
	Dark	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)



Function

12. Motion Detection

It 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.

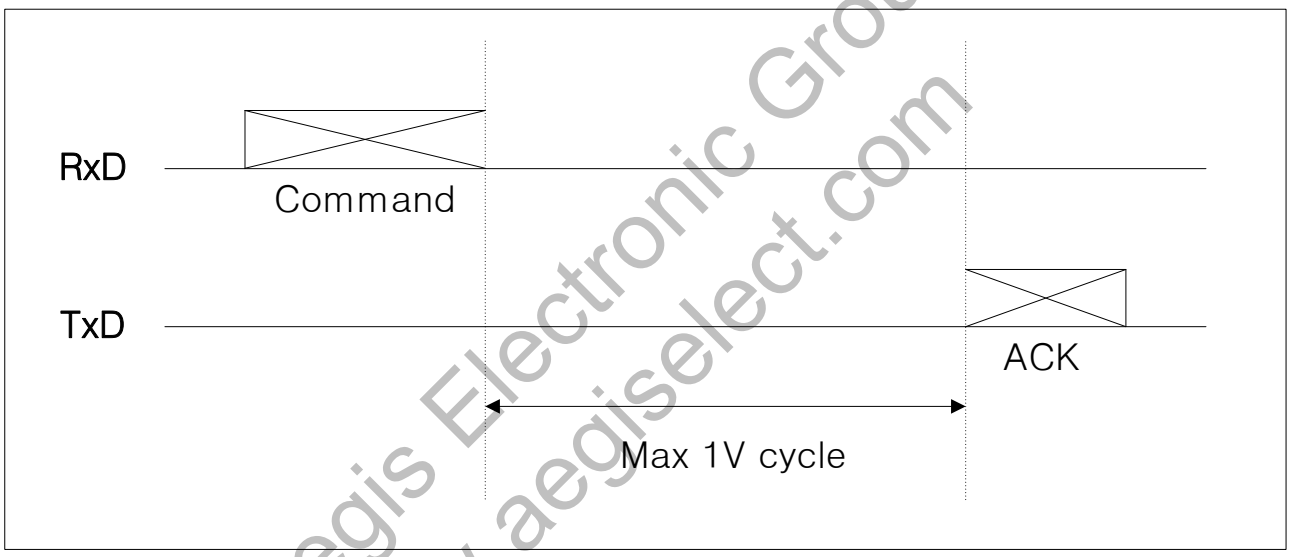
Protocol

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 parameter

- 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

Protocol

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 8bit sum of byte 2 ~ 6 in the message.

Protocol

4. Pelco-P 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.

Protocol

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	×	×	×
	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.

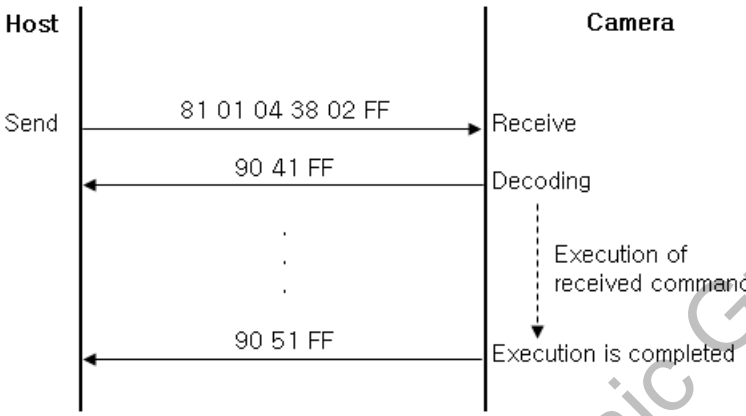
Ack type	Reply packet
Recevie Ack	Y0 4R FF
Compeletion (Commands)	Y0 5R FF
Compeletion (Inquiries)	Y0 50 … FF
Error	Y0 6R SS FF

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

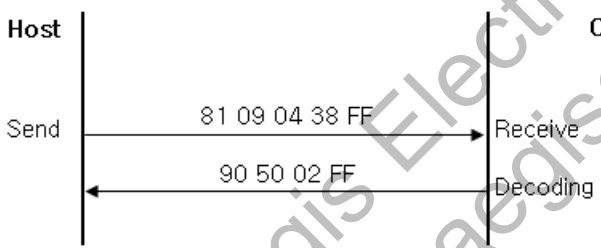
Protocol

● 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)

Command List

< Command >

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	
	Combine 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(1~255), rs : Interval Time(1~255)
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
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

Command List

< Command >

Command Set	Command	Command Packet	Comments
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 slow shutter 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 slow shutter level in day state q : Max slow shutter 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
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

Command List

< Command >

Command Set	Command	Command Packet	Comments
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)
CAM_DWDR	On	8x 01 04 1A 02 FF	DWDR ON/OFF
	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 0p 0q FF	pq : Bright area level of manual mode (0 ~ 10h)
CAM_Defog	On	8x 01 04 65 02 FF	Defog ON/OFF
	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)

Command List

< Command >

Command Set	Command	Command Packet	Comments
CAM_DNR	Mode	8x 01 04 53 pq FF	pq: NR level (0 : Off, 1 ~ Fh : Level 1 to 15, 7Fh : 2D/3D NR independent setting available)
	2D/3D NR independent setting	8x 01 05 53 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_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 : Level (0 ~ 14h)
CAM_ImageBright	Direct	8x 01 05 5E 00 00 0p 0q FF	pq : Level (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 automatically 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
	Burst Off	8x 01 04 72 03 FF	
	IR Detection On	8x 01 04 6E 02 FF	IR detection O/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 ~ 4)
CAM_AutoICRAlarm Reply	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	
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

Command List

< Command >

Command Set	Command	Command Packet	Comments
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 "nnnnnnnnnnnnn" 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	
CAM_PrivacyZone	SetMask	8x 01 04 76 mm nn 0r 0r 0s 0s FF	mm : Mask settings nn : 00=Modify, 01=New rr : W, ss : H
	Display	8x 01 04 77 pp pp pp pp FF	Mask display On/Off pppppppp : Mask settings (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)

Command List

< Command >

Command Set	Command	Command Packet	Comments
CAM_TriggerMode		8x 01 04 55 0p FF	p : Trigger mode (0:Free run, 1:Ext-trigger)
CAM_TriggerFunction	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
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 position 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, 9Ah) pq : Register value

Command List

< Inquiry Command >

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 (0~14h)
CAM_BGainInq	8x 09 04 44 FF	y0 50 00 00 0p 0q FF	pq : B Gain (0~14h)
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 slow shutter level in day state q : Max slow shutter 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
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 : ExpComp mode in day state q : ExpComp 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)

Command List

< Inquiry Command >

Inquiry Command	Command Packet	Inquiry Packet	Comments
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)
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 : Level (0 ~ 14h)
CAM_ImageBrightInq	8x 09 05 5E FF	y0 50 00 00 0p 0q FF	pq : Level (0 ~ 14h)
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 is changed automatically by AGC gain
		y0 50 06 FF	ICR is changed by external input
CAM_ICRNightFuncSetInq	8x 09 04 51 10 FF	y0 50 02 FF	On
		y0 50 03 FF	Off

Command List

< Inquiry Command >

Inquiry Command	Command Packet	Inquiry Packet	Comments
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)
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)

Command List

< Inquiry Command >

Inquiry Command	Command Packet	Inquiry Packet	Comments
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 0p 0q 0r FF	pq : 0 (0ms) ~ FFh (255ms) r : 0 (0.0ms) ~ 9 (0.9ms)
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)
CAM_StrobeWidthInq (Ext-Trigger mode)	8x 09 04 55 24 FF	y0 50 00 0p 0q 0r FF	pq : 0 (1ms) ~ FEh (255ms) 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 : YY1F6Ah (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

Command List

< Exposure control values >

Shutter Speed

Step (Hex)	NTSC	PAL
10	1/40000	1/40000
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	F1.6
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

Bright

Step (Hex)	IRIS	GAIN
1C	F1.6	48.0dB
1B	F1.6	43.2dB
1A	F1.6	38.4dB
19	F1.6	33.6dB
18	F1.6	28.8dB
17	F1.6	24.0dB
16	F1.6	19.2dB
15	F1.6	14.4dB
14	F1.6	9.6dB
13	F1.6	4.8dB
12	F1.6	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

Command List

< Zoom & Focus control values >

Optical Zoom

Magnification	Zoom Position
x1	0000
x2	1272
x3	1C63
x4	2270
x5	269F
x6	29EE
x7	2C62
x8	2E7F
x9	3069
x10	3224
x11	33AC
x12	3505
x13	3631
x14	3734
x15	3837
x16	392F
x17	39F2
x18	3AA5
x19	3B4C
x20	3BDC
x21	3C5B
x22	3CCE
x23	3D2A
x24	3D75
x25	3DB4
x26	3DF3
x27	3E2D
x28	3E61
x29	3E8F
x40	3EB7
x31	3EE0
x32	3F08
x33	3F2A
x34	3F53
x35	3F70
x36	3F92
x37	3FAF
x38	3FCC
x39	3FE3
x40	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

1000	Over infinity
2000	30m
3000	10m
4000	6m
5000	5m
6000	4m
7000	3m
8000	2.5m
9000	2m
A000	1.5m
B000	1.0m
C000	0.5m
D000	0.2m
E000	0.1m
F000	macro

Command List

Wide/Tele Limit Setting

Wide/Tele Limit Setting Value	Wide Limit		Tele Limit	
Limit Setting Value	Zoom Position	Zoom Ratio	Zoom Position	Zoom Ratio
00	0000	1.00	4000	40.00
10	0198	1.06	3E61	28.10
20	0331	1.13	3CC8	21.98
30	04CA	1.20	3B2F	18.84
40	0663	1.28	3996	16.52
50	07FC	1.36	37FD	14.78
60	0995	1.44	3664	13.21
70	0B2E	1.53	34CC	11.84
80	0CC7	1.62	3333	10.69
90	0E5F	1.72	319A	9.68
A0	0FF8	1.82	3001	8.78
B0	1191	1.93	2E68	7.96
C0	132A	2.05	2CCF	7.20
D0	14C3	2.19	2B36	6.48
E0	165C	2.33	299D	5.90
F0	17F5	2.48	27FF	5.40
FF	1977	2.64	2683	4.97

Command List

< OSD 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		

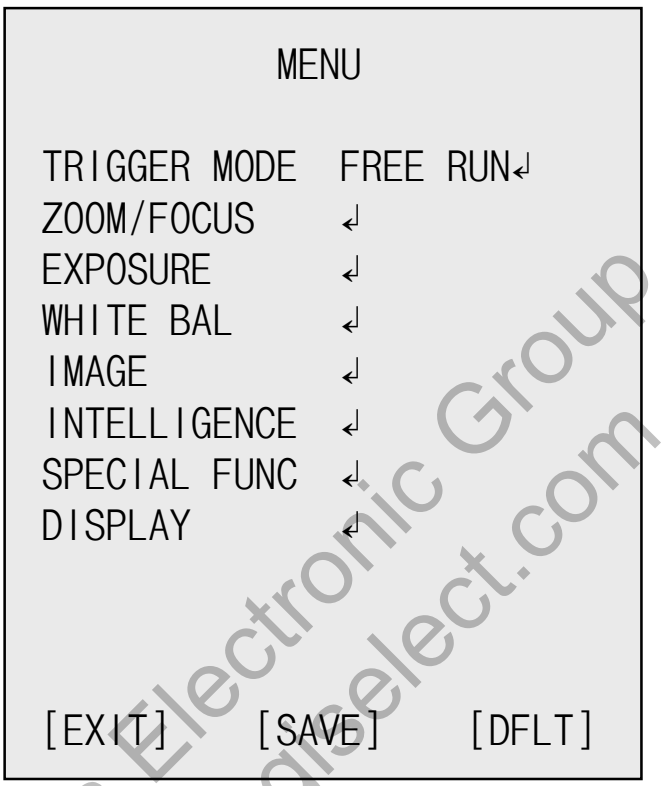
Command List

< Register Setting >

Function	Register No.	Value	
BaudRate	00	10	2400 bps
		11	4800 bps
		00	9600 bps
		01	19200 bps
		02	38400 bps
		03	57600 bps
		04	115200 bps
Zoom Limit	50	00-FF (Iinitial Setting:00)	Wide Limit (0: Disabled)
	51	00-FF (Iinitial Setting:00)	Tele Limit (0: Disabled)
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
		14	1080p/50fps
Output Enabling	73	0	Analog output off
		1	Analog output on
LVDS mode	74	0	Single output
		1	Dual output
HD delay	75	0	Delay disabled
		1	Delay enabled
VD / HD polarity	7A	0	Positive
		1	Negative

OSD Menu

◆ Main Menu

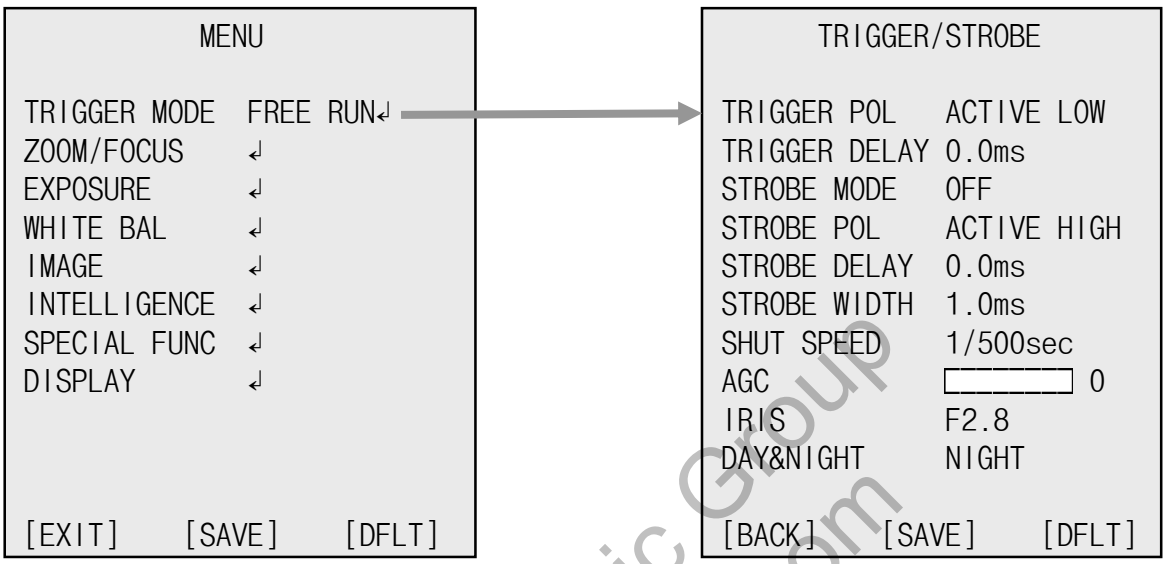


Functions can be setup using "Menu Key Command" of VISCA protocol.
The menu consists of the "Main Menu" and "Sub Menu".
The main menu is displayed where 8 camera functions can be selected.
To the push of each main menu selection, the sub-menu is displayed

If you want save the menu, select [SAVE].
If you want not save the menu, select [EXIT] (After select , Power off -> on)
If you want default the menu, select [DFLT]

OSD Menu

◆ 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 does not work 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

OSD Menu

● 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)

● SHUT 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 , 1/40000sec (※ 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, 1/40000sec
(※ 60 or 50fps mode)

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

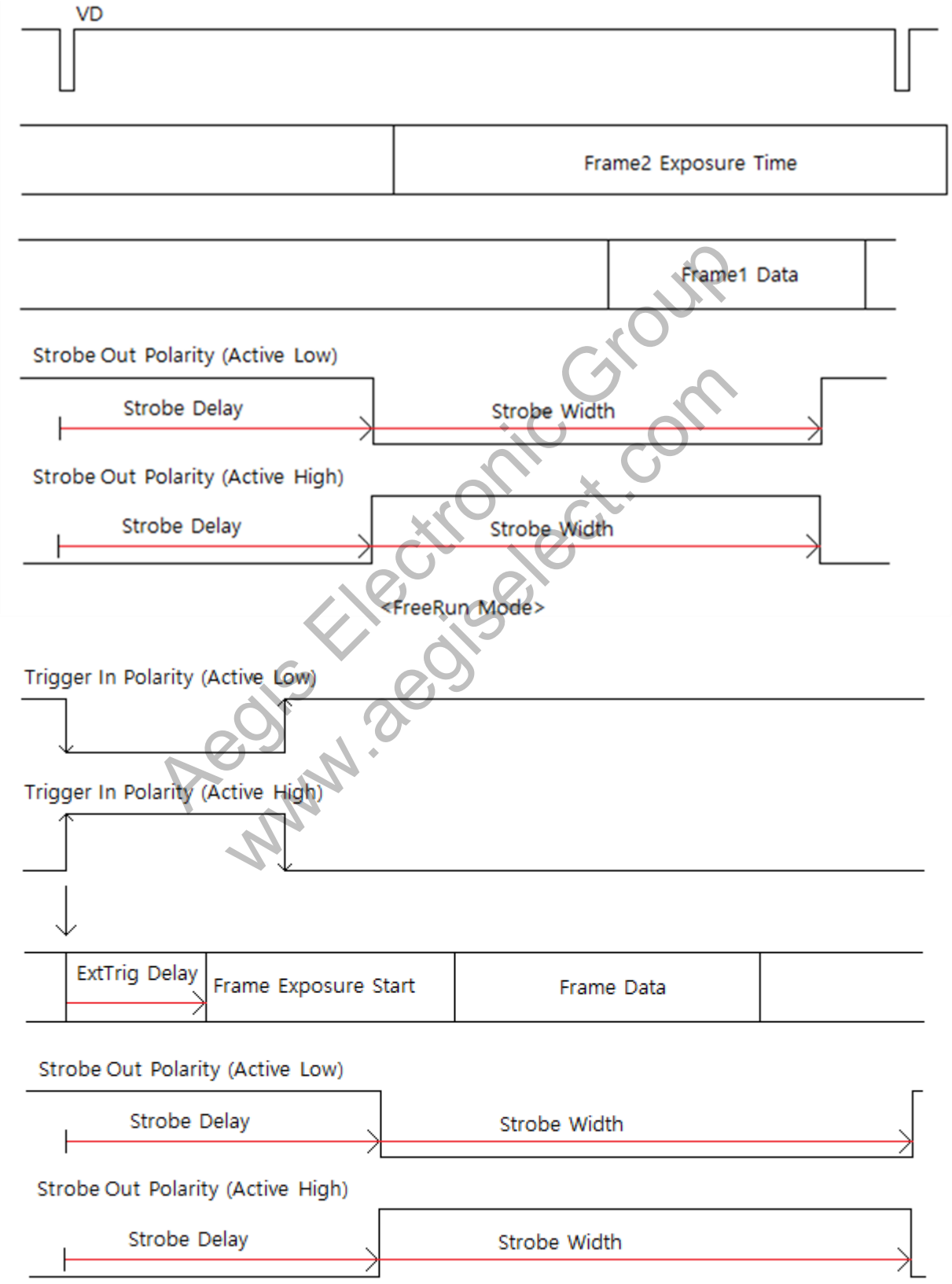
● IRIS
: Set the Manual Iris used only in Ext-Trigger mode.
➢ CLOSE / F1.6 / F1.8 / F2.0 / F2.4 / F2.8 / F3.4 / F4.0 / F4.8 / F5.6 / F6.8 / F8.0 / F9.6 / F11 / F14 / F16

● 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.

OSD Menu

※ Timing chart

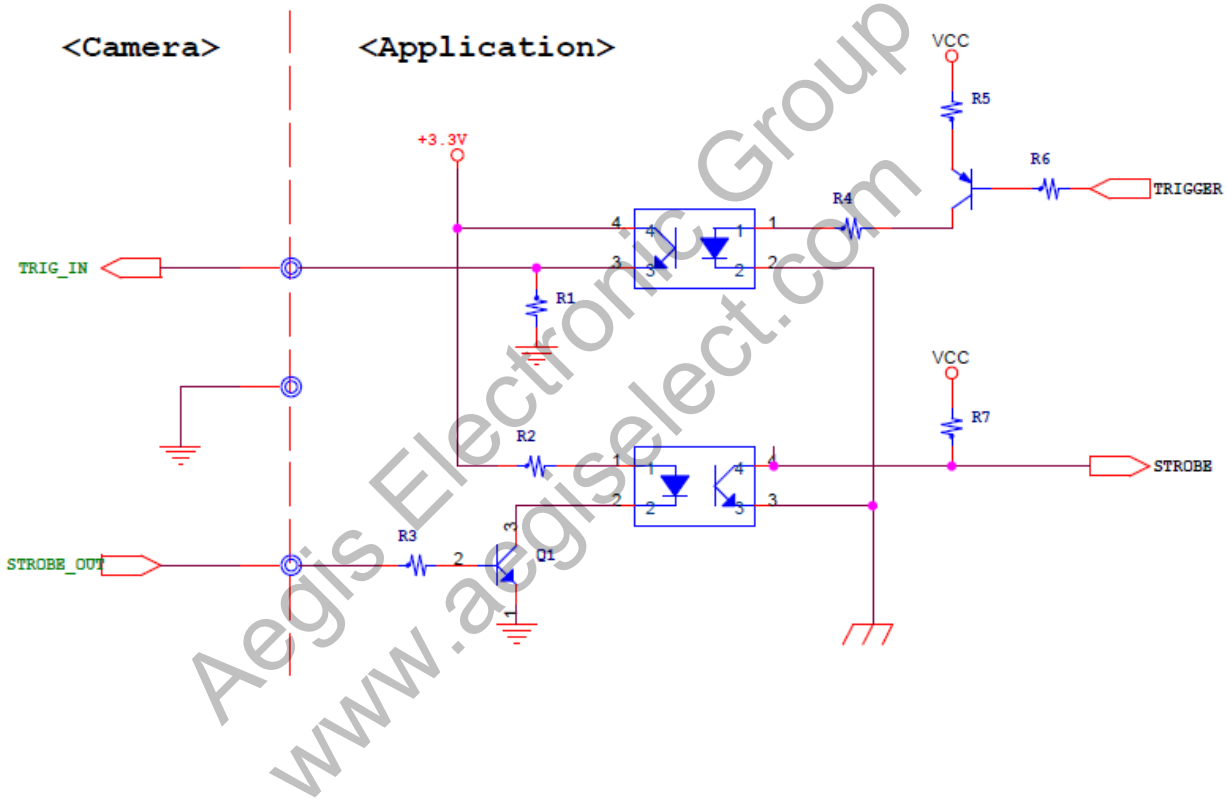


OSD Menu

※ Electrical interface : Trigger and Strobe

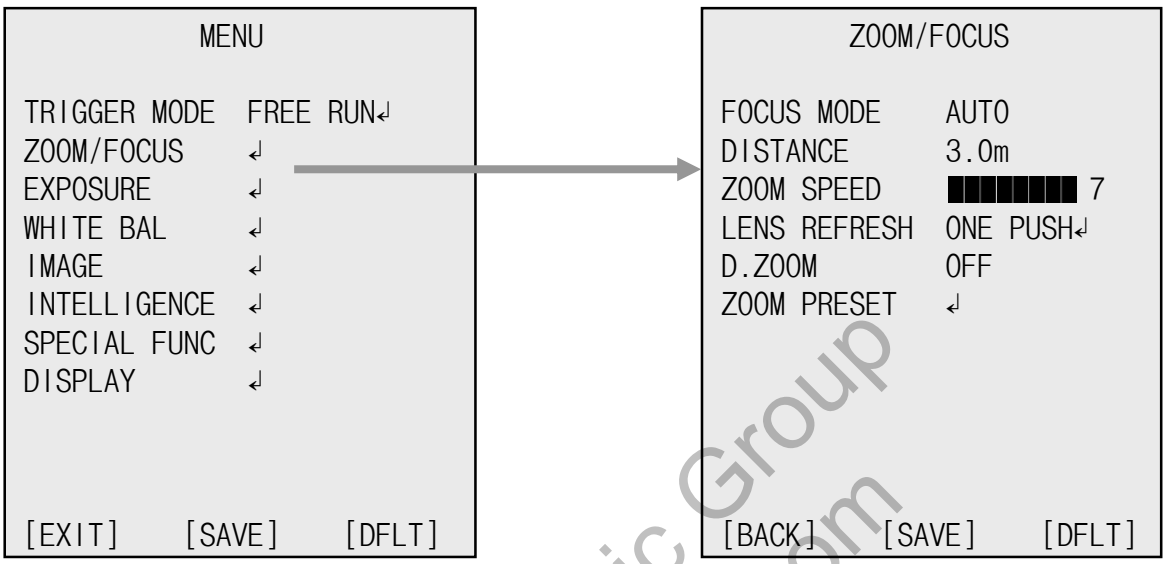
- An input for external triggering of the camera is available at the I/O connector.
  Also a strobe output signal from the camera to control an external flash light is available at the I/O connector.
  The input and output require galvanic isolated from the outside electronics by means of an optocoupler.

- The recommended termination circuitry is drawn below.



OSD Menu

◆ ZOOM / FOCUS



- FOCUS MODE
  : Select auto focus mode.
  ➢ AUTO / ONE PUSH / MANUAL
  ※ In Ext-Trigger Mode, You can not move zoom and focus.

- DISTANCE
  : Select minimum distance in focus between camera and object.
  ➢ 0.5m / 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)

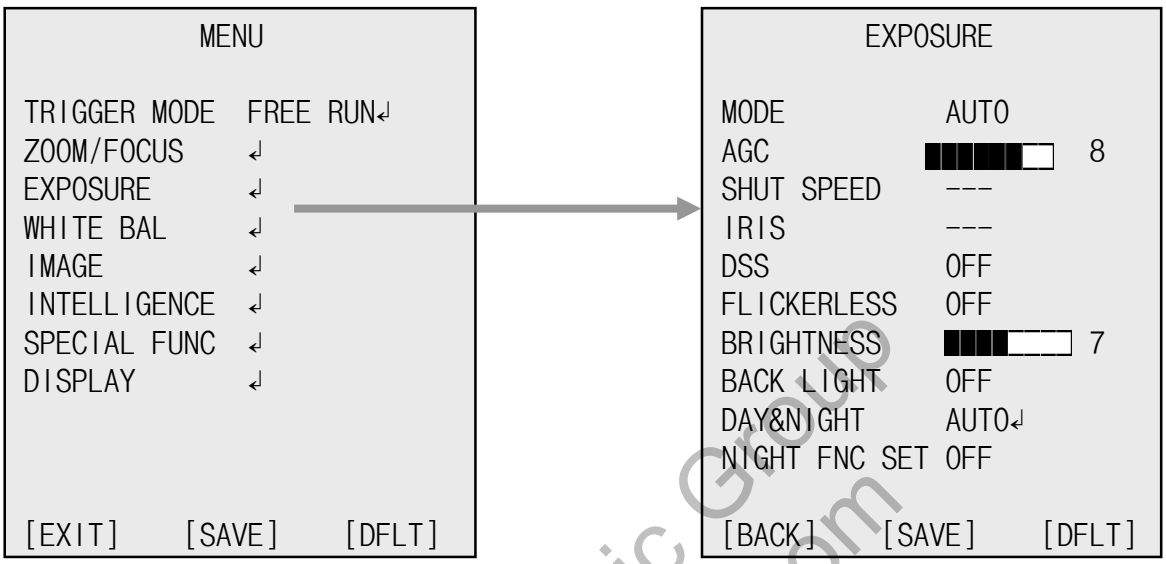
- D.ZOOM
  : Select maximum digital zoom magnification.
  ➢ OFF / MAX x2 ~ x19, x21, x23, x25, x28, x32
  ※ The Digital Zoom can not be used with the DIS function.

OSD Menu

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

OSD Menu

◆ 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

● SHUT 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, 1/40000 sec

● IRIS
: Iris level can be set in IRIS.P or MANUAL mode.
➢ CLOSE / F1.6 / 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)

OSD Menu

● 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

OSD Menu

- 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

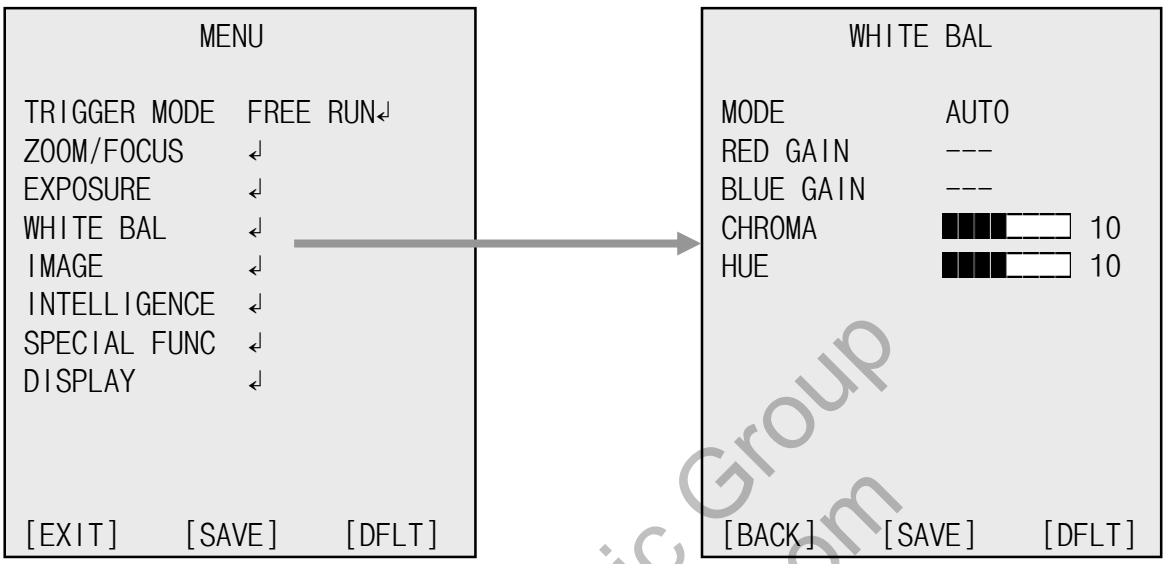
: Select whether or not to use the Night State-Only setting.

- 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, 1/40000 sec
  - IRIS : CLOSE / F1.6 / 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.

OSD Menu

◆ 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

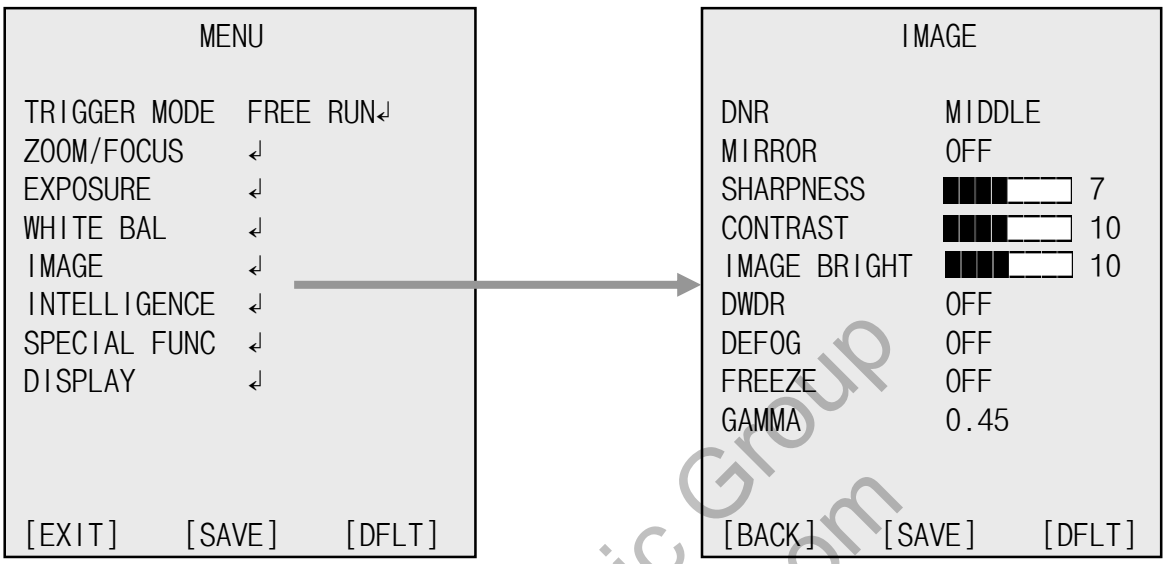
- CHROMA
  : Adjust chroma gain value.
  - ➢ 0 ~ 20 steps

OSD Menu

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

OSD Menu

◆ 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

OSD Menu

● IMAGE BRIGHT
: Adjust image brightness level.
➢ 0 ~ 20 steps

● DWDR
: Select DWDR(Digital 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

※ DWDR can not be used with the Defog function.

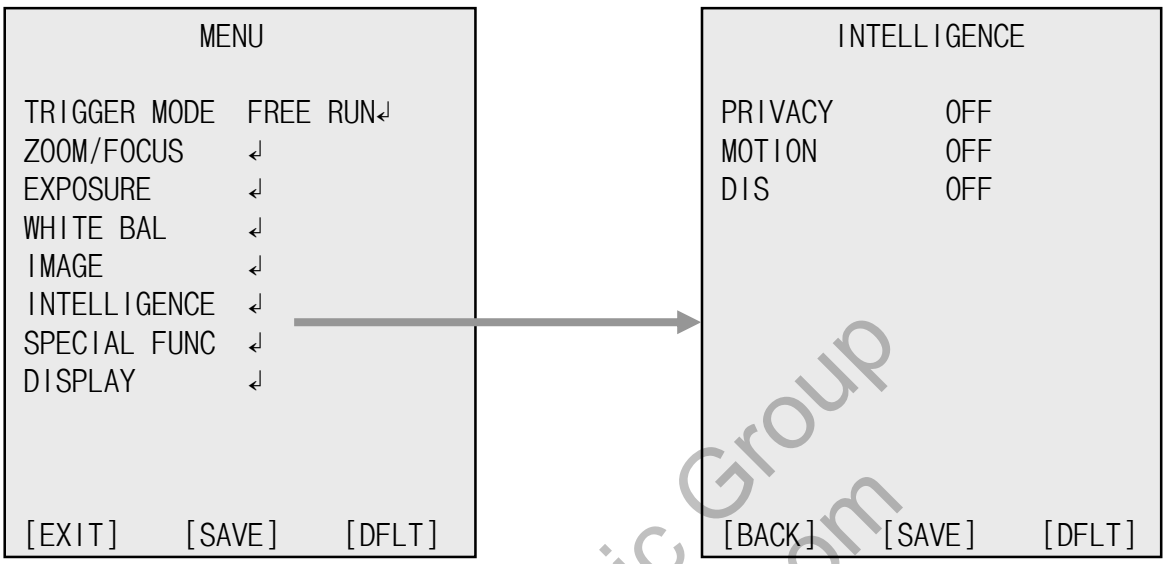
● DEFOG
: Carry out defog function.
➢ OFF
➢ AUTO↲
► AUTO LEVEL : HIGH, MIDDLE, LOW
➢ MANUAL
► LEVEL : 0 ~ 8

● 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

OSD Menu

◆ 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 an 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 about changing MD mode. (0 ~ 255sec)

► ZOOM PRESET : Select Motion Zoom Preset Mode and Position. (OFF / ON↲)

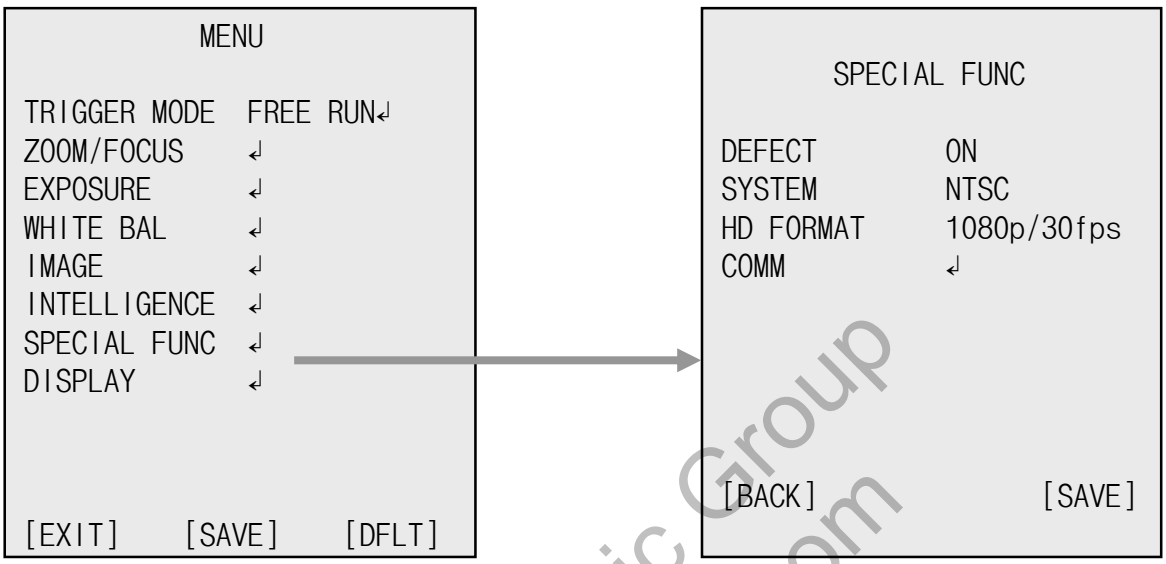
OSD Menu

- DIS
  : Select Digital Image Stabilizer mode.
  ➢ OFF / ON

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

OSD Menu

◆ SPECIAL FUNC



● DEFECT
: Select Defected Pixel Compensation mode.
※ Select "OFF↲" and press "Set key" to run bad pixel detection process.
➢ OFF↲ / ON

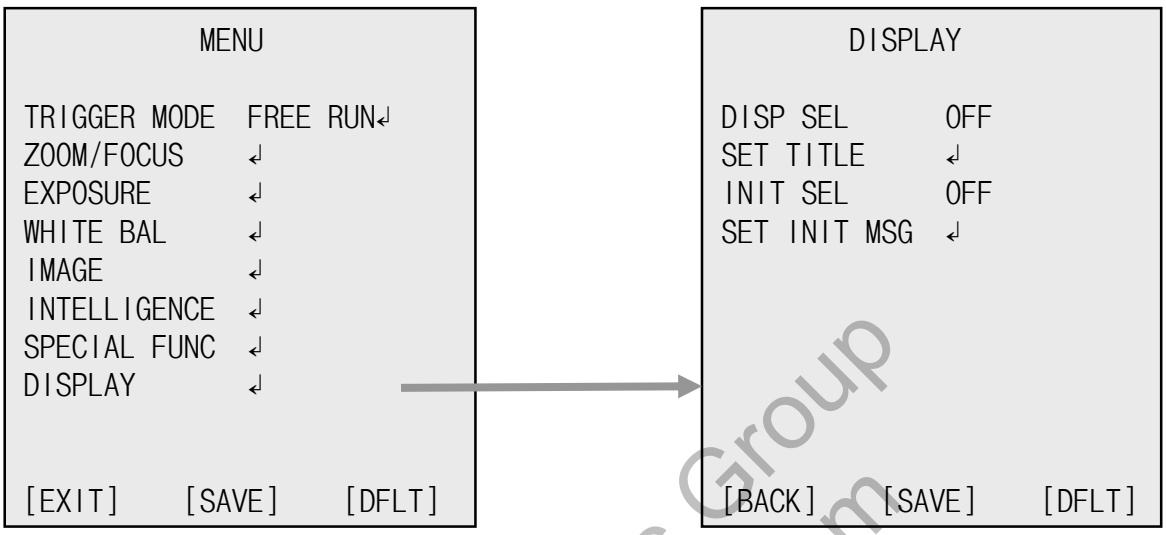
● SYSTEM
: Select system frequency.
➢ NTSC(30/60fps) / PAL(25/50fps)

● HD FORMAT
: Select Digital output.
➢ 720p/30(25)fps, 1080p/30(25)fps, 1080p/60(50)fps

● COMM
: Set up the camera ID, baud rate, protocol.
► ID : Select the camera ID. (1 ~ 255)
► BAUD RATE : 2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200bps
► PROTOCOL : VISCA / PELCO-D / PELCO-P

OSD Menu

◆ 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

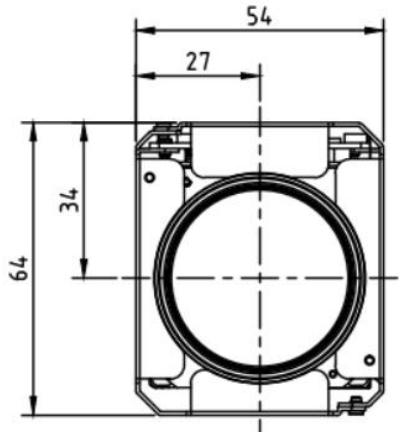
- SET INIT MSG
  : modify initial message. (Text edit – max 40 characters)

OSD Menu

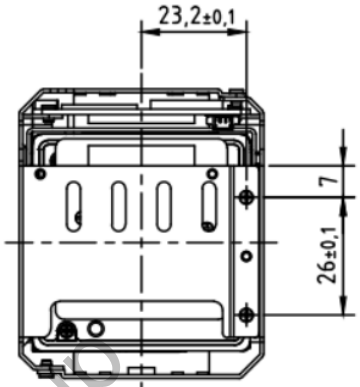
※ Character Table of Text edit Mode

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 * + - / = ~ ! ? " ‘

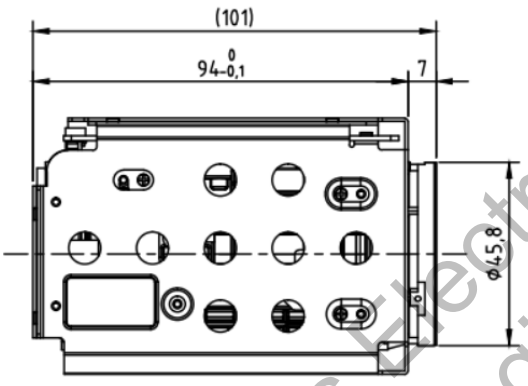
Drawing



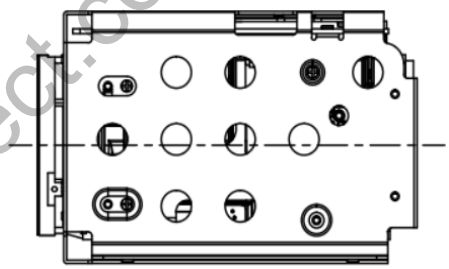
FRONT



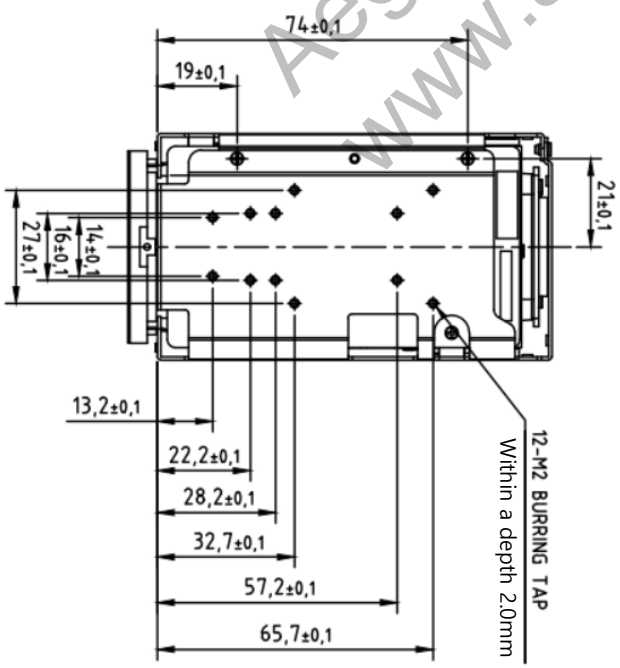
BACK



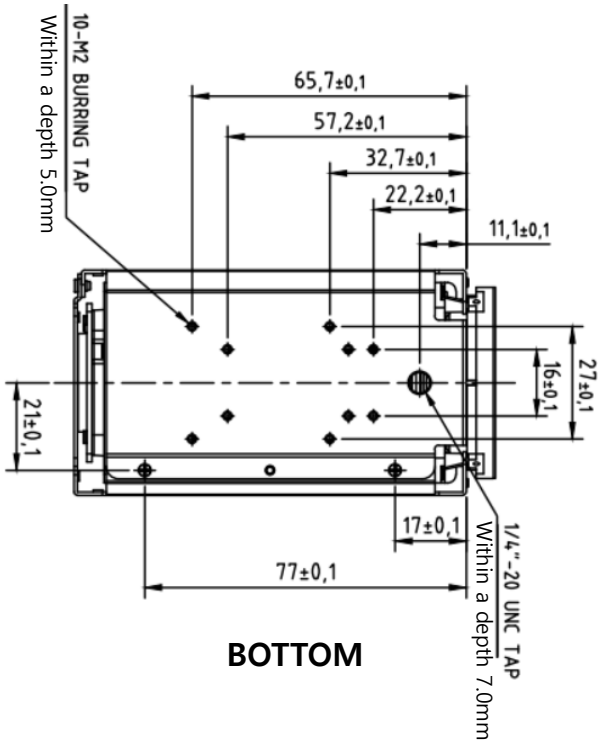
LEFT



RIGHT



TOP



BOTTOM

Revision History

Date	Version	Description	Author
2025/09/05	v1.00	Initial draft	Sh.Park
2025/11/17	V1.01	Pixel data format Modify (P.20)	Sh.Park