



English

Camera link I/F

2M Resolution CMOS

B/W Power over Camera Link

VCC-GC21U11PCL

Product Specification
& Operational Manual

CIS Corporation

Table of Contents

	PAGE
1. Scope of Application	3
2. Handling Precautions	3
3. Product Outline	5
4. Specification.....	5
4.1. General Specification	5
4.2. Camera Output Signal Specification	7
4.3. CMOS Spectral Response (Representative Value)	8
4.4. Video Output Format	9
5. Function Settings.....	10
6. External Connector Pin Assignment.....	13
6.1. Camera Link Connector 12226-1100-00PL (SUMITOMO 3M).....	13
6.2. Power LED	13
7. Timing Chart	14
7.1. Horizontal Synchronous Signals Timing (2Tap Base Configuration mode: 70fps).....	14
7.2. Vertical Synchronous Signals Timing (2Tap Base Configuration Mode: 70fps)	14
7.3. Horizontal Synchronous Signals Timing (4Tap Medium Configuration Mode: 140fps) *Initial Setting	15
7.4. Vertical Synchronous Signals Timing (4Tap Medium Configuration Mode: 140fps).....	15
7.5. Horizontal Synchronous Signals Timing (8Tap Full Configuration Mode: 280fps)	16
7.6. Vertical Synchronous Signals Timing (8Tap Full Configuration Mode: 280fps)	16
7.7. Fixed Trigger Shutter Mode	17
7.8. Pulse Width Trigger Shutter Mode.....	18
8. Partial Scan Mode	19
9. Remote Communication Function.....	21
10. Initial Settings	22
11. CMOS Optical Axis Accuracy	23
12. Dimensions	24
13. Cases for Indemnity (Limited Warranty)	25
14. CMOS Pixel Defect	25
15. Product Support	25

1. Scope of Application

This is to describe VCC-GC21U11PCL, 2M resolution, Power over Camera Link B/W CMOS Camera.

All specifications contained herein are subject to change without prior notice. Reproduction in whole or in part is prohibited.

2. Handling Precautions

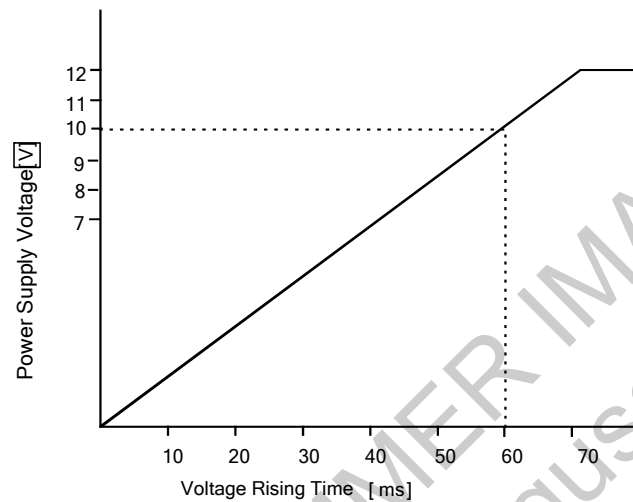
The camera must not be used for any nuclear equipments or aerospace equipments with which mechanical failure or malfunction could result in serious bodily injury or loss of human life. Our warranty does not apply to damages or defects caused by irregular and/or abnormal use of the product.

Please observe all warnings and cautions stated below.

Our warranty does not apply to damages or malfunctions caused by neglecting these precautions.

- Do not use or store the camera in the following extreme conditions:
 - Extremely dusty or humid places.
 - Extremely hot or cold places (operating temperature -5°C to $+45^{\circ}\text{C}$)
 - Close to generators of powerful electromagnetic radiation such as radio or TV transmitters.
 - Places subject to fluorescent light reflections.
 - Places subject to unstable (flickering, etc.) lighting conditions.
 - Places subject to strong vibration.
- Remove dust or dirt on the surface of the lens with a blower.
- Do not apply excessive force or static electricity that could damage the camera.
- Do not shoot direct images that are extremely bright (e.g., light source, sun, etc.), and when camera is not in use, put the lens cap on.
- Follow the instructions in Chapter 6, "External connector pin assignment" for connecting the camera. Improper connection may cause damages not only to the camera but also to the connected devices.
- Confirm the mutual ground potential carefully and then connect the camera to monitors or computers. AC leaks from the connected devices may cause damages or destroy the camera.
- Do not apply excessive voltage. (Use only the specified voltage.) Unstable or improper power supply voltage may cause damages or malfunction of the camera.

- The voltage ripple of camera power DC +12V $\pm$ 10% shall be within $\pm$ 50mV. Improper power supply voltage may cause noises on the video signals.
- The rising time of camera power supply voltage shall be less than +10V, Max 60ms. Please avoid noises like chattering when rising.



- Precautions to observe when using partial mode.
At vertical partial scan mode, the smaller the value of read-out lines setting is set, the faster the camera exposure output speed goes, and the more the power consumption is required at the same time.
Power requirement of when the minimum read-out line is set with partial scan will be approx 1.5 times more than the one with full frame scan. Naturally, heat of the camera will be increased. Especially when the read-out line is set in the range of 100 lines to 1 line, heat dissipation is recommended to install the camera.

Installation recommended.

- Install the camera to the place with ambient temperature under 40 °C.
- Install the camera to a metallic component.

3. Product Outline

VCC-GC21U11PCL is a Power over Camera Link interfaced and 2M resolution industrial black and white video camera module. 2M pixels CMOS sensor with diagonal length 12.775mm is utilized. Entire pixels can be read out within 1/140s at Medium Configuration output.

Features

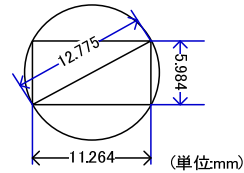
- ☐ Global shutter CMOS sensor is utilized.
- ☐ Camera Link Base, Medium, and Full Configuration are supported.
- ☐ Fixed trigger shutter mode, pulse width trigger shutter mode are operable.
- ☐ Full frame rates and video output format are as follows.

2Tap Base Configuration Mode	70fps	8bit/10bit
4Tap Medium Configuration Mode	140fps	8bit/10bit
8Tap Full Configuration Mode	280fps	8bit
Factory Setting: 4 Tap Medium	140fps	8bit

- ☐ Free Software
 - CIS control panel software for evaluation purpose only is downloadable via our web.

4. Specification

4.1. General Specification

(1) Pickup Device	Device Type	Diagonal Length 12.775mm, Global Shutter type, B/W CMOS			
	Effective pixel number	2048(H) x 1088(V)			
	Unit cell size	5.5μm(H) x 5.5μm(V)			
	Image Circle	ϕ 12.775mm 			
(2) Video Output Frequency	Pixel Clock	80 MHz			
	2Tap Base Configuration Mode:	Horizontal frequency:	77.519 kHz	Horizontal clock	1032 CLK
		Vertical frequency:	70.217 Hz	Scanning lines	1104 H
	4Tap Medium Configuration Mode:	Horizontal frequency:	155.039 kHz	Horizontal clock	516 CLK
(3) Sync. System	8Tap Full Configuration Mode:	Horizontal frequency:	310.078 kHz	Horizontal clock	258 CLK
		Vertical frequency:	280.867 Hz	Scanning lines	1104 H
(4) Video Output	Internal Sync. System. 2Tap Base Configuration 4Tap Medium Configuration (Initial Setting) 8Tap Full Configuration				
(5) Resolution	1088 TV Lines				
(6) Output Format	Sensor AD	10bit			
	Camera Link output	8bit / 10bit (Fixed to 8bit at Full Configuration mode.) Monochrome output.			

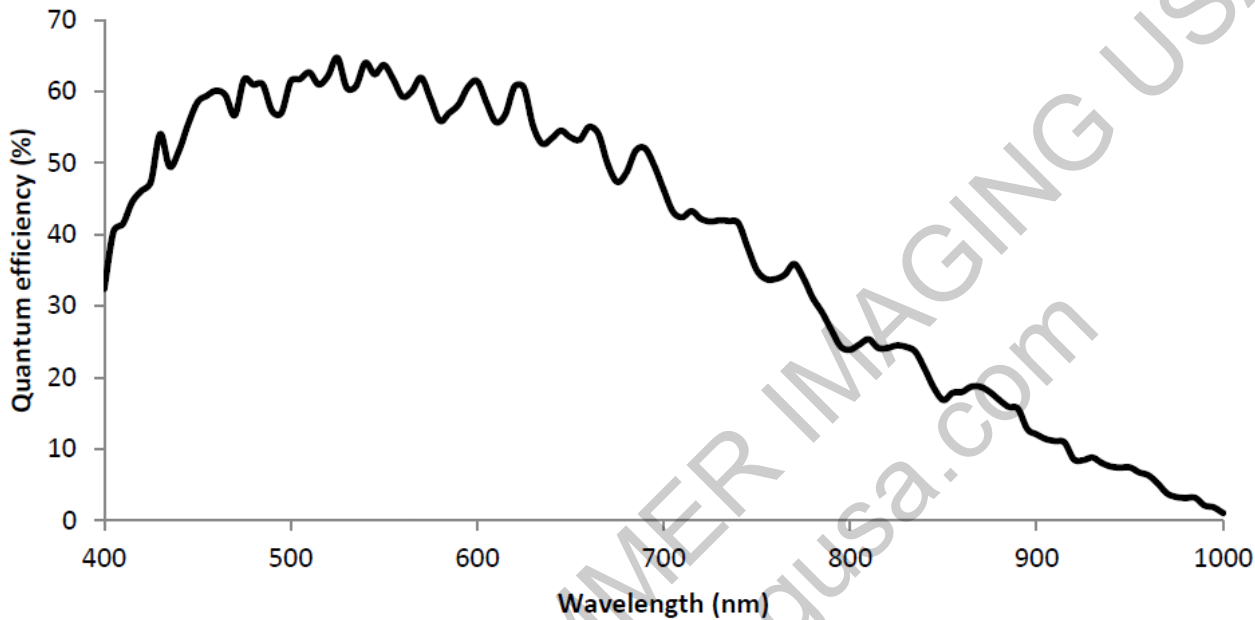
(7) Sensitivity	F5.6 400lx (at Shutter speed 1/140s (OFF), Gain 0dB, and Medium Configuration mode)	
(8) Minimum illumination	F1.4 9.0lx (at Shutter speed 1/140s (OFF), Gain +12dB, and Medium Configuration mode)	
(9) Dust or stains in optical system	No dust or stain shall be detected on the testing screen with setting the camera aperture at F16.	
(10) Power requirements	PoCL	
(11) Power consumption	2.7W (4Tap Medium Configuration mode, Full frame scan output): Initial setting. 4.0W (8Tap Full Configuration mode, Partial scan 100lines output)	
(12) Dimensions	Refer to overall dimension drawing. (H:29mm W:29mm D:45mm excluding projection)	
(13) Weight	Approx. 75g	
(14) Lens mount	C Mount * Refer to overall dimension drawing.	
(15) Optical axis accuracy	Refer to drawing for CMOS Optical Axis Accuracy.	
(16) Gain variable range	0dB ~ +12dB (Guaranteed range)	
(17) Shutter speed variable range	OFF ~ 1/50000s	
(18) Trigger shutter mode	Fixed Shutter Trigger Mode/ Pulse Width Shutter Trigger Mode	
(19) Partial Scan	Full Frame Scan ~ 1 line (1 line / step)	
(20) Safety/Quality standards	UL: Conform to UL Standard including materials and others. CE: EN55022:2010 Class A for Emission EN61000-6-2:2005 for Immunity RoHS: Conform to RoHS. FCC: To be applied to FCC Class A digital Device This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.	
(21) Durability	Vibration	Acceleration : 98m/s ² (10G)
		Frequency : 20~200 Hz
		Direction : X,Y, and Z 3 directions
		Testing time : 120min for each direction
	Shock	No malfunction shall be occurred with 980m/s ² (100G) for ±X,±Y, and ±Z, 6 directions. (without package)
(22) Operation Environment	Temperature	Performance guaranteed temperature: 0°C~+40°C Camera operation guaranteed temperature: -5°C~+45°C ※ All the specifications specified in this manual is guaranteed under performance guaranteed temperature. ※ All the camera functions operate normally under operation guaranteed temperature.
	Humidity	RH 20~80% with no condensation.
(23) Storage Environment	Temperature	-25°C~+60°C
	Humidity	RH 20~80% with no condensation.

4.2. Camera Output Signal Specification

(1) Video output data	Effective Video Output	2048(H) × 1088(V)	At full frame scan mode
(2) Sync. Signal output	LVAL FVAL DVAL SP	Camera Link output (LVDS):	Optical Pulse
(3) Camera Control Signals input	CC2•CC3•CC4	Camera Link Input (LVDS)	
(4) Trigger Input	Polarity	Positive/Negative Selectable	Polarity is selectable with Address 011
	Pulse Width	1HD (min.) ~ Approx. 2 frames	
		•2Tap Base Configuration mode : 1HD (12.9us)	
		•4Tap Medium Configuration mode : 1HD (6.45us)	
		•8Tap Full Configuration mode : 1HD (3.225us)	
		Functionally, no upper limitation is set but noises such as dark noises and shadings might be noticeable at long time exposure.	
	Trigger Input : CC1	Camera Link input (LVDS)	
(5) Serial Communication	SerTC (Serial to Camera) SerTFG (Serial to Frame Grabber)	Camera Link input (LVDS) Camera Link output (LVDS)	
(6) Video Signals	White Clip Level	At Digital 10bit : 3FFh At Digital 8bit : FFh	
	Setup Level	At Digital 10bit : under 004h At Digital 8bit : under 01h (Condition: Gain 0dB)	
	Dark Shading	At Digital 10bit : Both horizontal and vertical should be under ±00Fh. At Digital 8bit : Both horizontal and vertical should be under 03h. (Condition: Gain 0dB)	

※ 2 seconds shall be waited after turning on power to get the camera operate properly.

- 4.3. CMOS Spectral Response (Representative Value)
* Lens characteristics and luminous source characteristics are not considered.

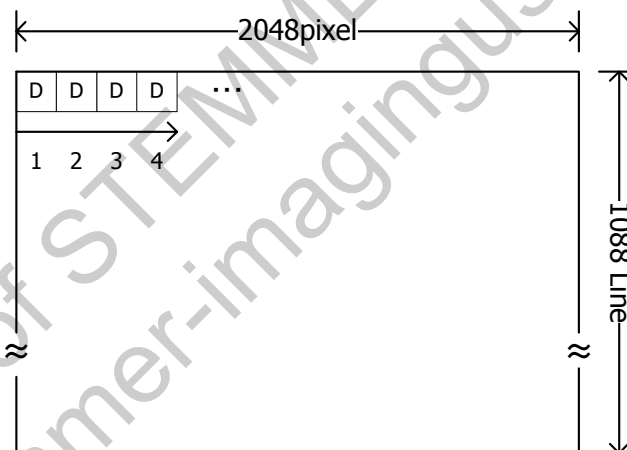


4.4 Video Output Format

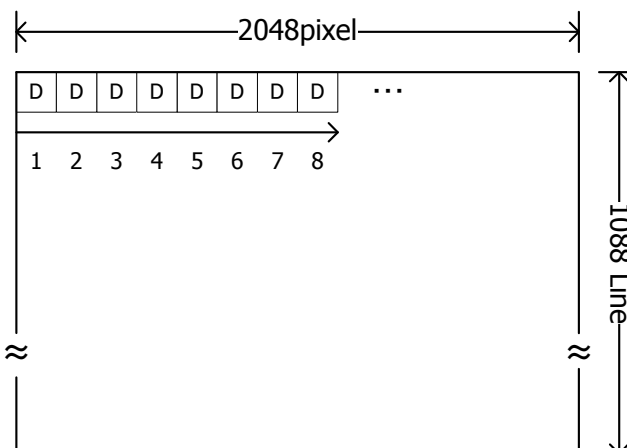
(1) 2Tap Base Configuration Mode : 38fps



(2) 4Tap Medium Configuration Mode : 75fps (Initial Setting)



(3) 8Tap Full Configuration Mode : 150fps



5. Function Settings

(Camera functions can be set with serial communications.)

Function	Address	Data																																																																								
Gain	001	0: 0 dB : Fixed Gain 1: + 3 dB : Fixed Gain 2: + 6 dB : Fixed Gain 3: + 12 dB : Fixed Gain 4: Manual Gain: over 0~+12dB (Refer to Address 032 and 033.)																																																																								
Shutter	002	<table><tr><td></td><td>2Tap Mode</td><td>4Tap Mode</td><td>8Tap Mode</td></tr><tr><td>0:</td><td>1/70s(OFF)</td><td>1/140s(OFF)</td><td>1/280s(OFF)</td></tr><tr><td>1:</td><td>1/140s</td><td>1/140s(OFF)</td><td>1/280s(OFF)</td></tr><tr><td>2:</td><td>1/280s</td><td>1/280s</td><td>1/280s(OFF)</td></tr><tr><td>3:</td><td>1/350s</td><td>1/350s</td><td>1/350s</td></tr><tr><td>4:</td><td>1/500s</td><td>1/500s</td><td>1/500s</td></tr><tr><td>5:</td><td>1/750s</td><td>1/750s</td><td>1/750s</td></tr><tr><td>6:</td><td>1/1000s</td><td>1/1000s</td><td>1/1000s</td></tr><tr><td>7:</td><td>1/2500s</td><td>1/2500s</td><td>1/2500s</td></tr><tr><td>8:</td><td>1/5000s</td><td>1/5000s</td><td>1/5000s</td></tr><tr><td>9:</td><td>1/7500s</td><td>1/7500s</td><td>1/7500s</td></tr><tr><td>10:</td><td>1/10000s</td><td>1/10000s</td><td>1/10000s</td></tr><tr><td>11:</td><td>1/15000s</td><td>1/15000s</td><td>1/15000s</td></tr><tr><td>12:</td><td>1/20000s</td><td>1/20000s</td><td>1/20000s</td></tr><tr><td>13:</td><td>1/30000s</td><td>1/30000s</td><td>1/30000s</td></tr><tr><td>14:</td><td>1/30000s</td><td>1/40000s</td><td>1/40000s</td></tr><tr><td>15:</td><td>1/30000s</td><td>1/40000s</td><td>1/50000s</td></tr><tr><td>16:</td><td colspan="3">Manual Shutter (Refer to Address 036 and 037.)</td></tr></table>		2Tap Mode	4Tap Mode	8Tap Mode	0:	1/70s(OFF)	1/140s(OFF)	1/280s(OFF)	1:	1/140s	1/140s(OFF)	1/280s(OFF)	2:	1/280s	1/280s	1/280s(OFF)	3:	1/350s	1/350s	1/350s	4:	1/500s	1/500s	1/500s	5:	1/750s	1/750s	1/750s	6:	1/1000s	1/1000s	1/1000s	7:	1/2500s	1/2500s	1/2500s	8:	1/5000s	1/5000s	1/5000s	9:	1/7500s	1/7500s	1/7500s	10:	1/10000s	1/10000s	1/10000s	11:	1/15000s	1/15000s	1/15000s	12:	1/20000s	1/20000s	1/20000s	13:	1/30000s	1/30000s	1/30000s	14:	1/30000s	1/40000s	1/40000s	15:	1/30000s	1/40000s	1/50000s	16:	Manual Shutter (Refer to Address 036 and 037.)		
	2Tap Mode	4Tap Mode	8Tap Mode																																																																							
0:	1/70s(OFF)	1/140s(OFF)	1/280s(OFF)																																																																							
1:	1/140s	1/140s(OFF)	1/280s(OFF)																																																																							
2:	1/280s	1/280s	1/280s(OFF)																																																																							
3:	1/350s	1/350s	1/350s																																																																							
4:	1/500s	1/500s	1/500s																																																																							
5:	1/750s	1/750s	1/750s																																																																							
6:	1/1000s	1/1000s	1/1000s																																																																							
7:	1/2500s	1/2500s	1/2500s																																																																							
8:	1/5000s	1/5000s	1/5000s																																																																							
9:	1/7500s	1/7500s	1/7500s																																																																							
10:	1/10000s	1/10000s	1/10000s																																																																							
11:	1/15000s	1/15000s	1/15000s																																																																							
12:	1/20000s	1/20000s	1/20000s																																																																							
13:	1/30000s	1/30000s	1/30000s																																																																							
14:	1/30000s	1/40000s	1/40000s																																																																							
15:	1/30000s	1/40000s	1/50000s																																																																							
16:	Manual Shutter (Refer to Address 036 and 037.)																																																																									
Trigger Shutter Mode	004	0: Normal Shutter Mode (Trigger OFF) 1: Fixed Trigger Shutter Mode (Shutter speed can be set with address 002.) 2: Pulse Width Trigger Shutter Mode (Shutter speed can be set with trigger pulse width.)																																																																								
Trigger Polarity	011	0: Positive 1: Negative																																																																								
Output Data Selection	013	0: 8bit Output 1: 10bit output (10bit cannot be output at 8Tap Full Configuration mode.)																																																																								
Partial Scan Mode	015	0: Full Frame Scan Mode 1: Partial Scan Mode																																																																								
Output image flip vertical	021	0: Normal 1: Flip Vertical																																																																								
Gain CC Control ON/OFF	023	0: OFF 1: ON (Gain and WB can be controlled via CC2, CC3, and CC4.)																																																																								

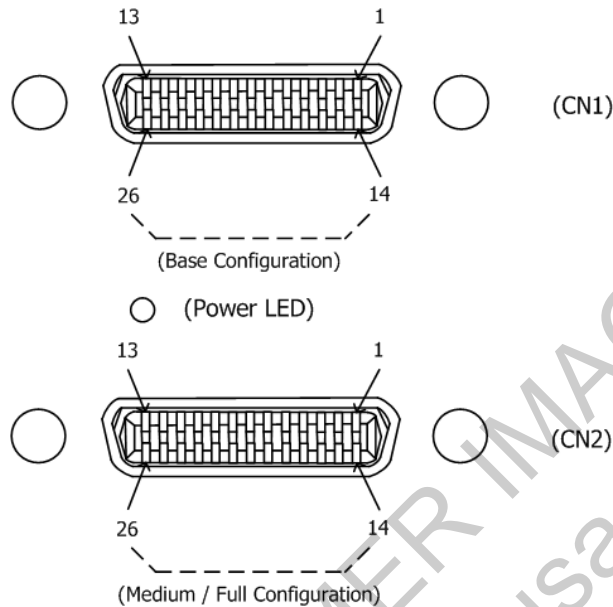
Function	Address	Data
Table Selection for Gain CC Control	024	0~7: CC2 CC3 CC4 0: L L L 1: H L L 2: L H L 3: H H L 4: L L H 5: H L H 6: L H H 7: H H H
Table Read/Write for Gain CC Control	025	0: Nop 1: Table Read 2: Table Write Manual Gain (Address 032&033) is written in to the table specified with Address 024. 3: Clear Table
Baud Rate	030	0: 9600bps 1: 19200bps 2: 38400bps 3: 57600bps 4: 115200bps
Camera Mode	031	0: 8Tap Full Configuration Mode (280fps) 1: 4Tap Medium Configuration Mode (140fps) 2: 2Tap Base Configuration Mode (70fps)
Manual Gain	032&033	0~767: 0:0dB ~767:+12dB
Manual Shutter	036&037	0~1087: 2Tap mode: Shutter Speed = $16.641\mu s + (1088 - (036\&037)) \times 12.9\mu s$ Min. value 0: 14.052ms(1/70s), Max. value 1087: 29.541us(1/30000s) 4Tap mode: Shutter Speed = $16.641\mu s + (1088 - (036\&037)) \times 6.45\mu s$ Min. value 0: 7.034ms(1/140s), Max. value 1087: 23.091us(1/40000s) 8Tap mode: Shutter Speed = $16.641\mu s + (1088 - (036\&037)) \times 3.225\mu s$ Min. value 0: 3.525ms(1/280s), Max. value 1087: 19.866us (1/50000s) ※Set the data of the address 002 to 016.
Cursor Indication ON/OFF	058	0: OFF 1: ON
Cursor X Address	061&060	0~2047:
Cursor Y Address	063&062	0~1087:
Partial scan start position 1	064&065	0~1087:
Partial scan start position 2	066&067	0~1087:
Partial scan start position 3	068&069	0~1087:
Partial scan start position 4	070&071	0~1087:
Partial scan start position 5	072&073	0~1087:
Partial scan start position 6	074&075	0~1087:
Partial scan start position 7	076&077	0~1087:
Partial scan start position 8	078&079	0~1087: ※ Set the data of the address 015 to 001.

Function	Address	Data
Partial scan effective line numbers 1	080&081	1~1088: Set 0 when not in use.
Partial scan effective line numbers 2	082&083	1~1088: Set 0 when not in use.
Partial scan effective line numbers 3	084&085	1~1088: Set 0 when not in use.
Partial scan effective line numbers 4	086&087	1~1088: Set 0 when not in use.
Partial scan effective line numbers 5	088&089	1~1088: Set 0 when not in use.
Partial scan effective line numbers 6	090&091	1~1088: Set 0 when not in use.
Partial scan effective line numbers 7	092&093	1~1088: Set 0 when not in use.
Partial scan effective line numbers 8	094&095	1~1088: Set 0 when not in use. ※ Set the data of the address 015 to 001.
Initial Settings	126	Input 083 to set the camera back to the initial settings.
Data Save	127	Input 083 to save the data to EEP-ROM.

※ The data set with 2 Byte shall be set with High Byte (even address) first, then set with Low Byte (odd address). The camera rewrites the internal register when receiving Low Byte.

6. External Connector Pin Assignment

6.1. Camera Link Connector 12226-1100-00PL (SUMITOMO 3M)



Connector (CN1)

Pin No.		Pin No.	
1	GND / +12V(PoCL)	14	GND
2	X0-	15	X0+
3	X1-	16	X1+
4	X2-	17	X2+
5	Xclk-	18	Xclk+
6	X3-	19	X3+
7	SerTC+	20	SerTC-
8	SerTFG-	21	SerTFG+
9	CC1- (Trigger IN -)	22	CC1+ (Trigger IN +)
10	CC2+	23	CC2-
11	CC3-	24	CC3+
12	CC4+	25	CC4-
13	GND	26	GND / +12V(PoCL)

Connector (CN2)

Pin No.		Pin No.	
1	NA	14	GND
2	Y0-	15	Y0+
3	Y1-	16	Y1+
4	Y2-	17	Y2+
5	Yclk-	18	Yclk+
6	Y3-	19	Y3+
7	100 Ω	20	Terminated
8	Z0-	21	Z0+
9	Z1-	22	Z1+
10	Z2-	23	Z2+
11	Zclk-	24	Zclk+
12	Z3-	25	Z3+
13	GND	26	NA

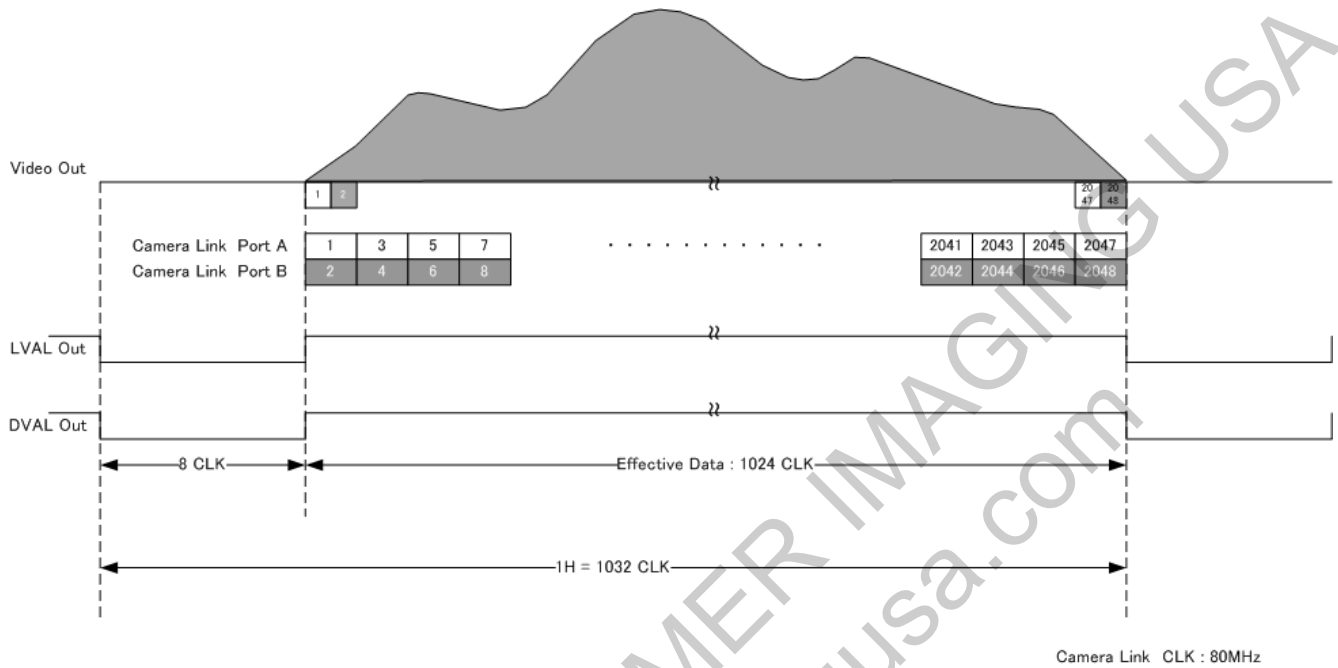
6.2. Power LED

- (1) Power LED is lit when power is supplied to the camera via the frame grabber board.

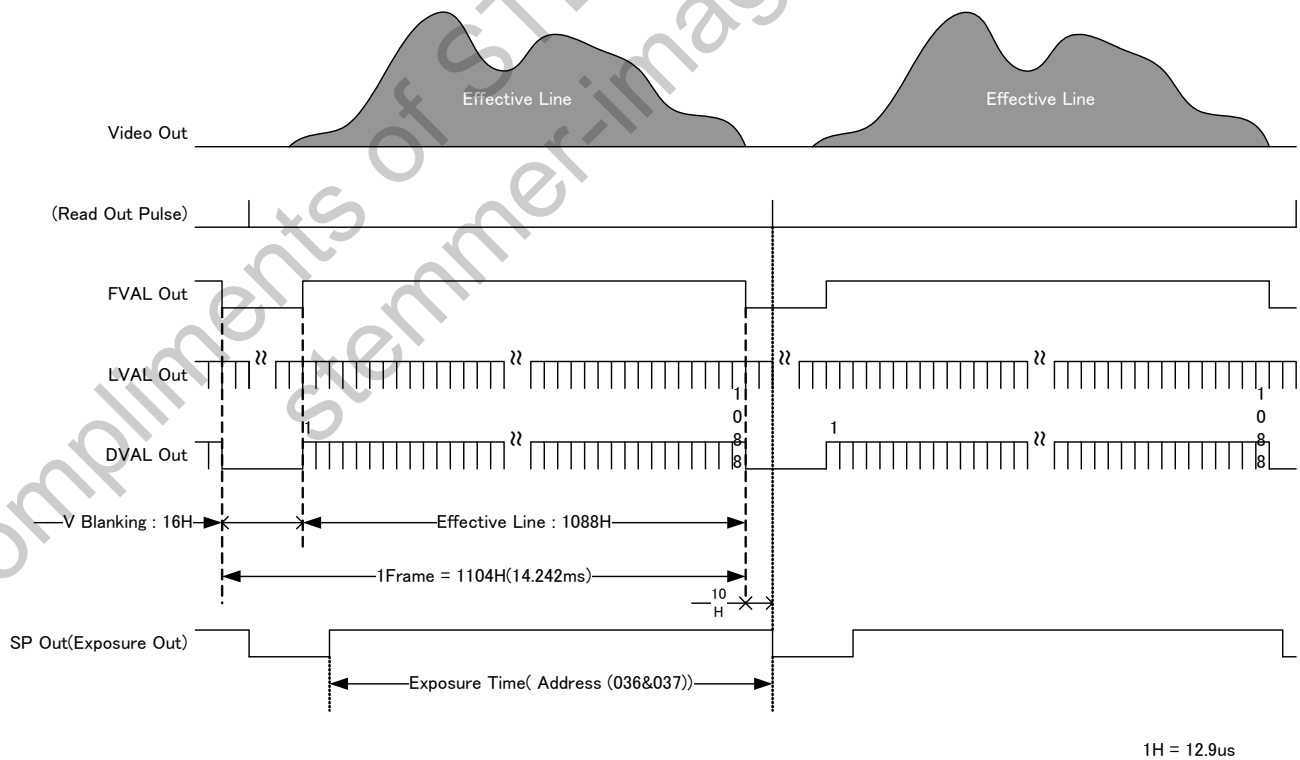
※Power to the camera shall be supplied only via CN1 of the Base connector side. CN1 power line of the Medium or Full configuration connector side shall be kept open. Do not plug and unplug the camera link cables since it may cause the camera malfunction.

7. Timing Chart

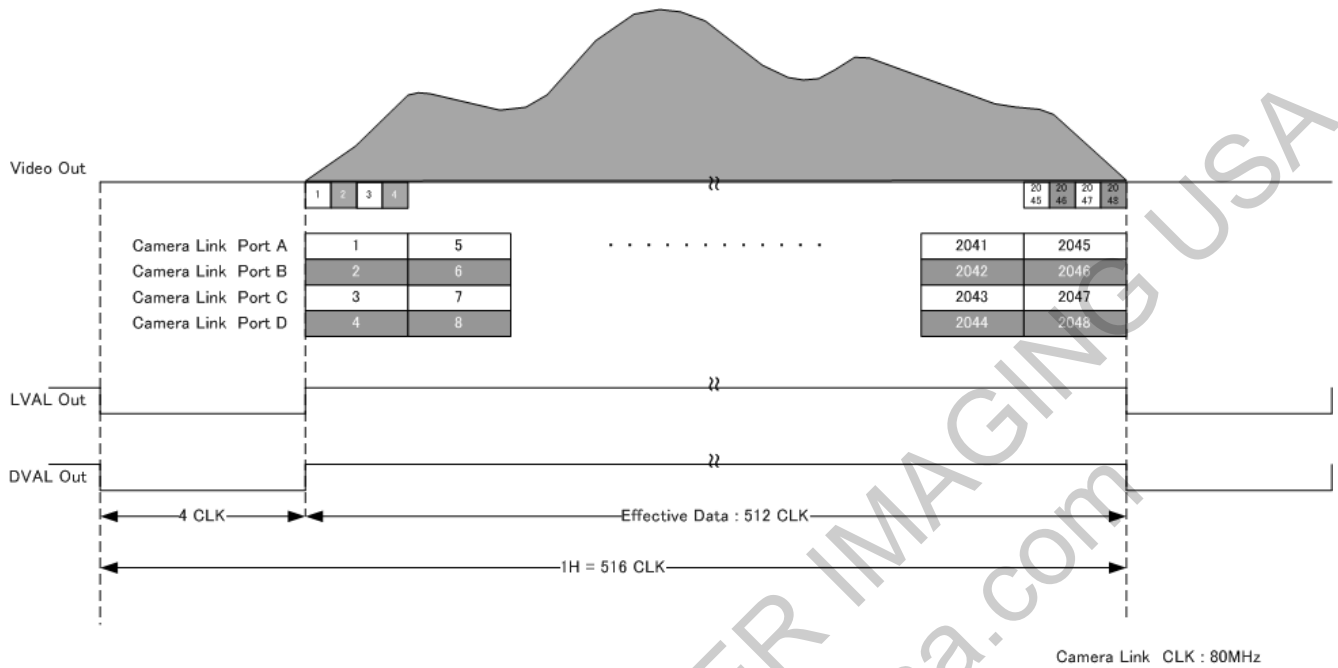
7.1. Horizontal Synchronous Signals Timing (2Tap Base Configuration mode: 70fps)



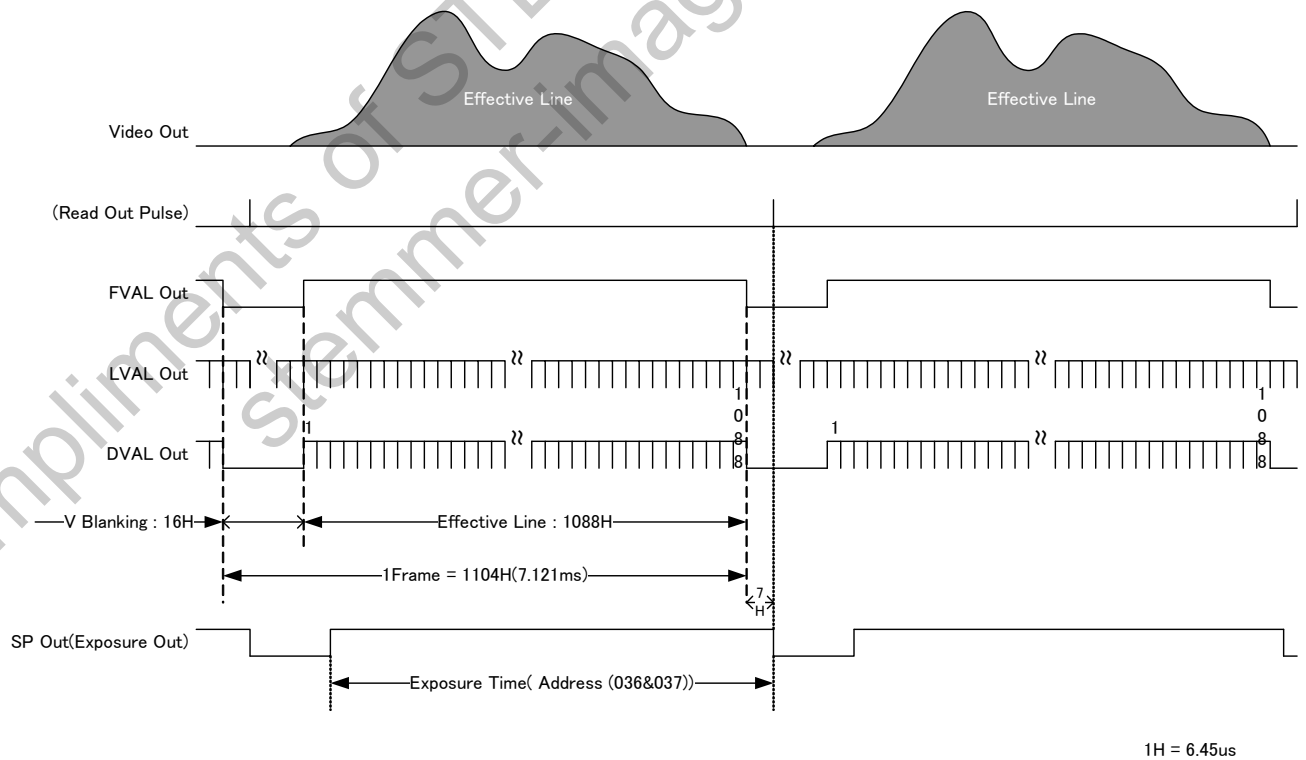
7.2. Vertical Synchronous Signals Timing (2Tap Base Configuration Mode: 70fps)



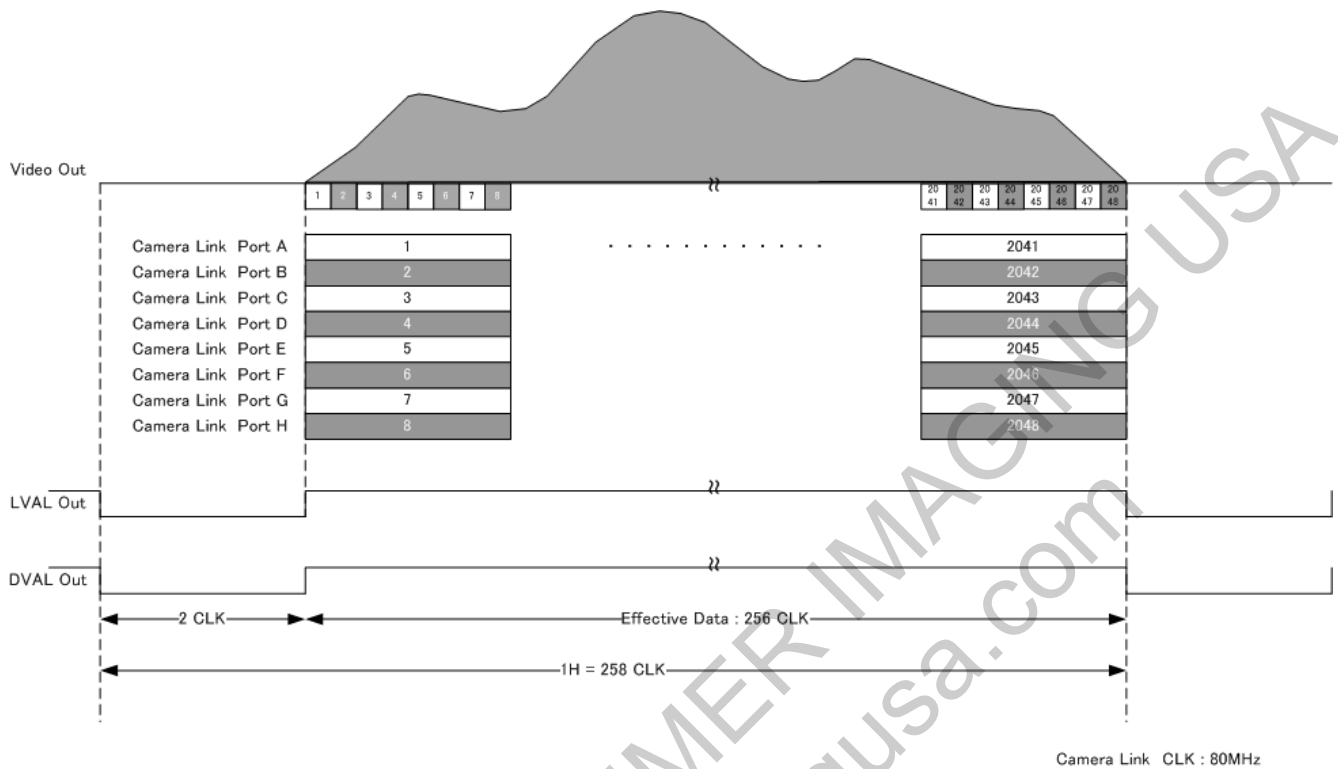
7.3. Horizontal Synchronous Signals Timing (4Tap Medium Configuration Mode: 140fps) *Initial Setting



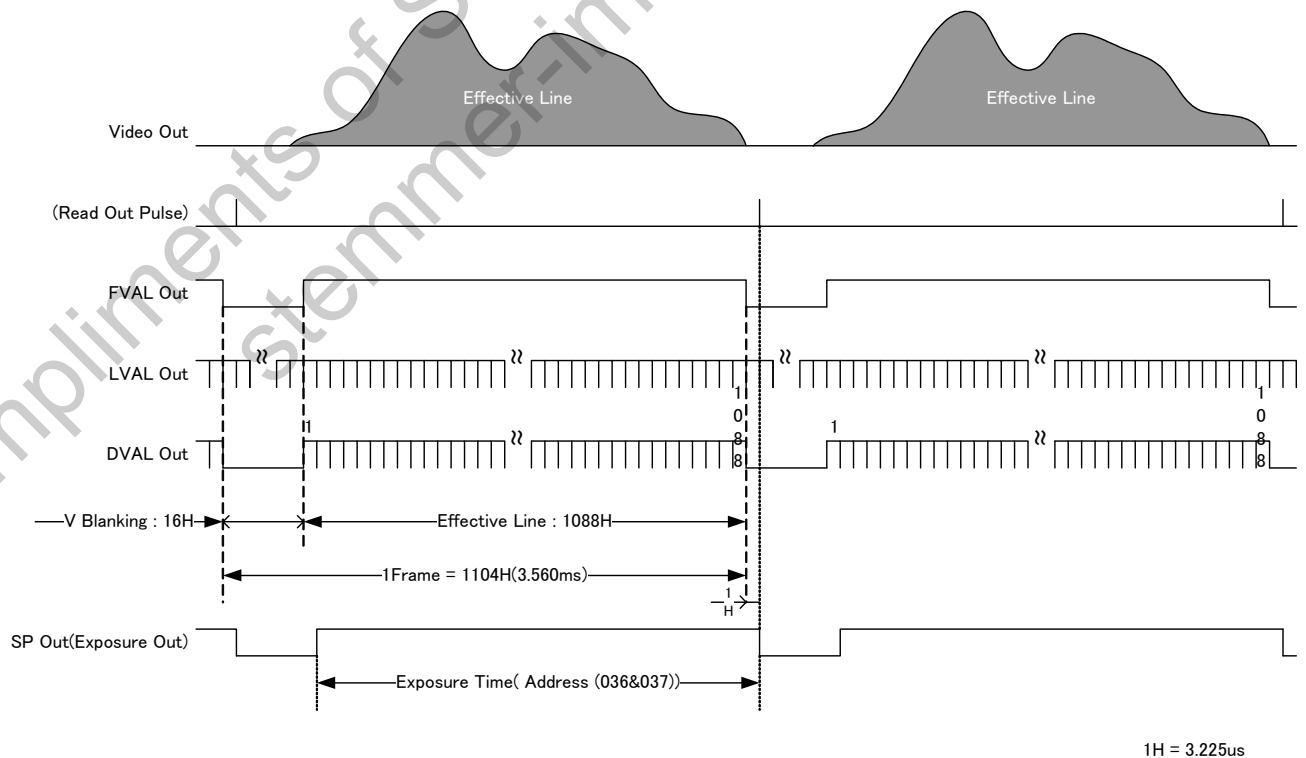
7.4. Vertical Synchronous Signals Timing (4Tap Medium Configuration Mode: 140fps)



7.5. Horizontal Synchronous Signals Timing (8Tap Full Configuration Mode: 280fps)

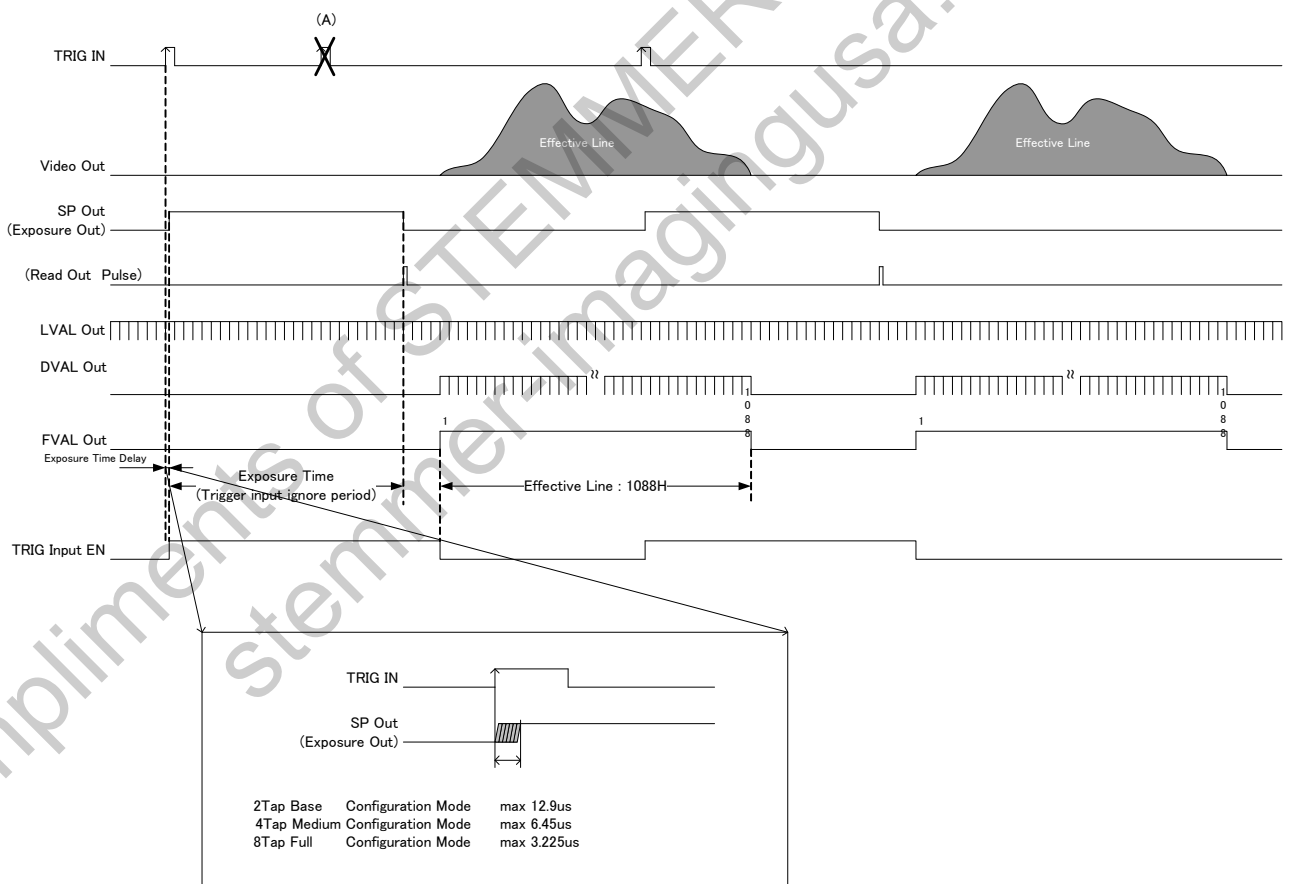


7.6. Vertical Synchronous Signals Timing (8Tap Full Configuration Mode: 280fps)



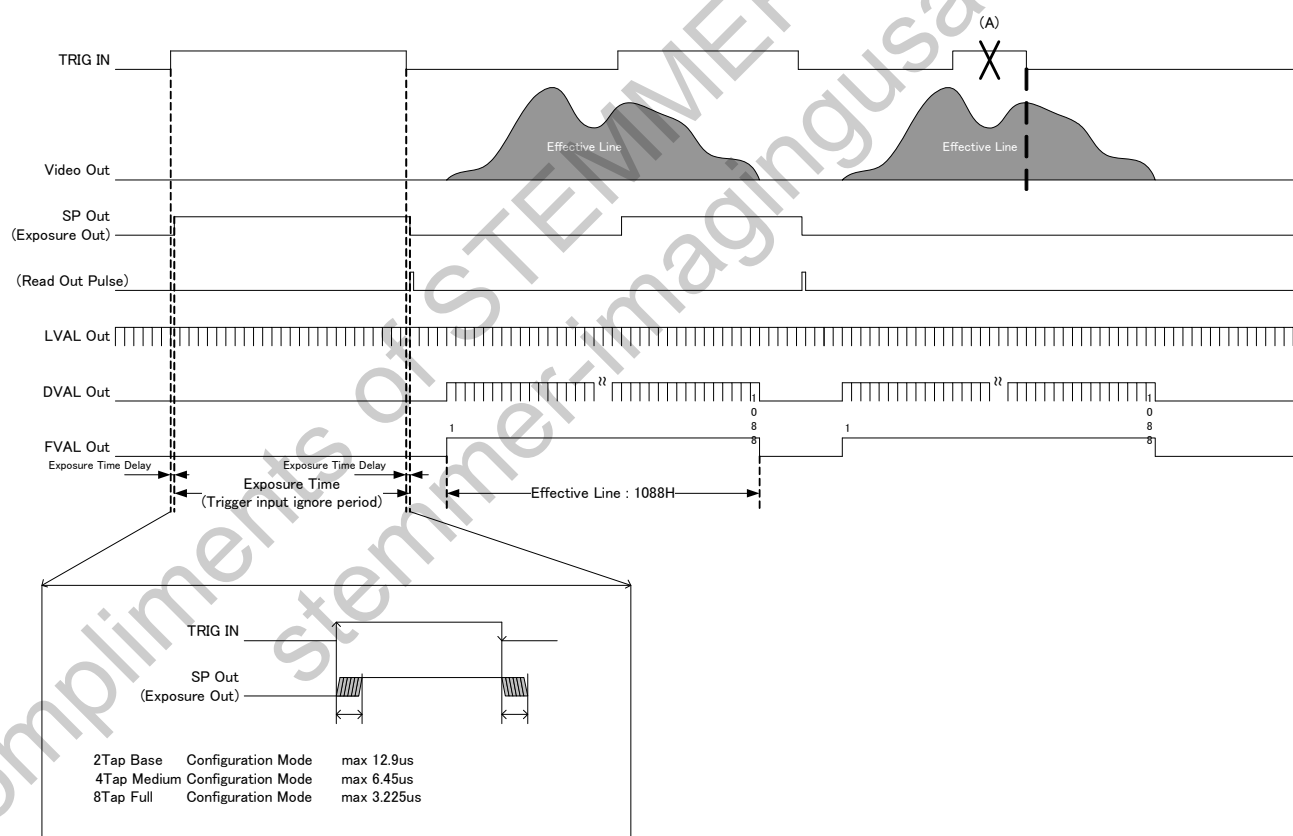
7.7. Fixed Trigger Shutter Mode

- This is the mode to start exposure with external input trigger signals, and set the exposure time with serial commands.
- Trigger operation is H Sync. V-Sync Reset. The delay time (Exposure Time Delay) from detecting trigger edge in the camera to starting exposure is max. 1HD.
- Triggers can be accepted even when outputting video signals. However, trigger signals for exposure to start the next video output prior to the completion of video transmission for the prior video output signals cannot be accepted.
- If the next trigger is input prior to the completion of video transmission for the prior video output signals, the image may be impacted.
- Trigger input during exposure time should be ignored. (Refer to the below A).



7.8. Pulse Width Trigger Shutter Mode

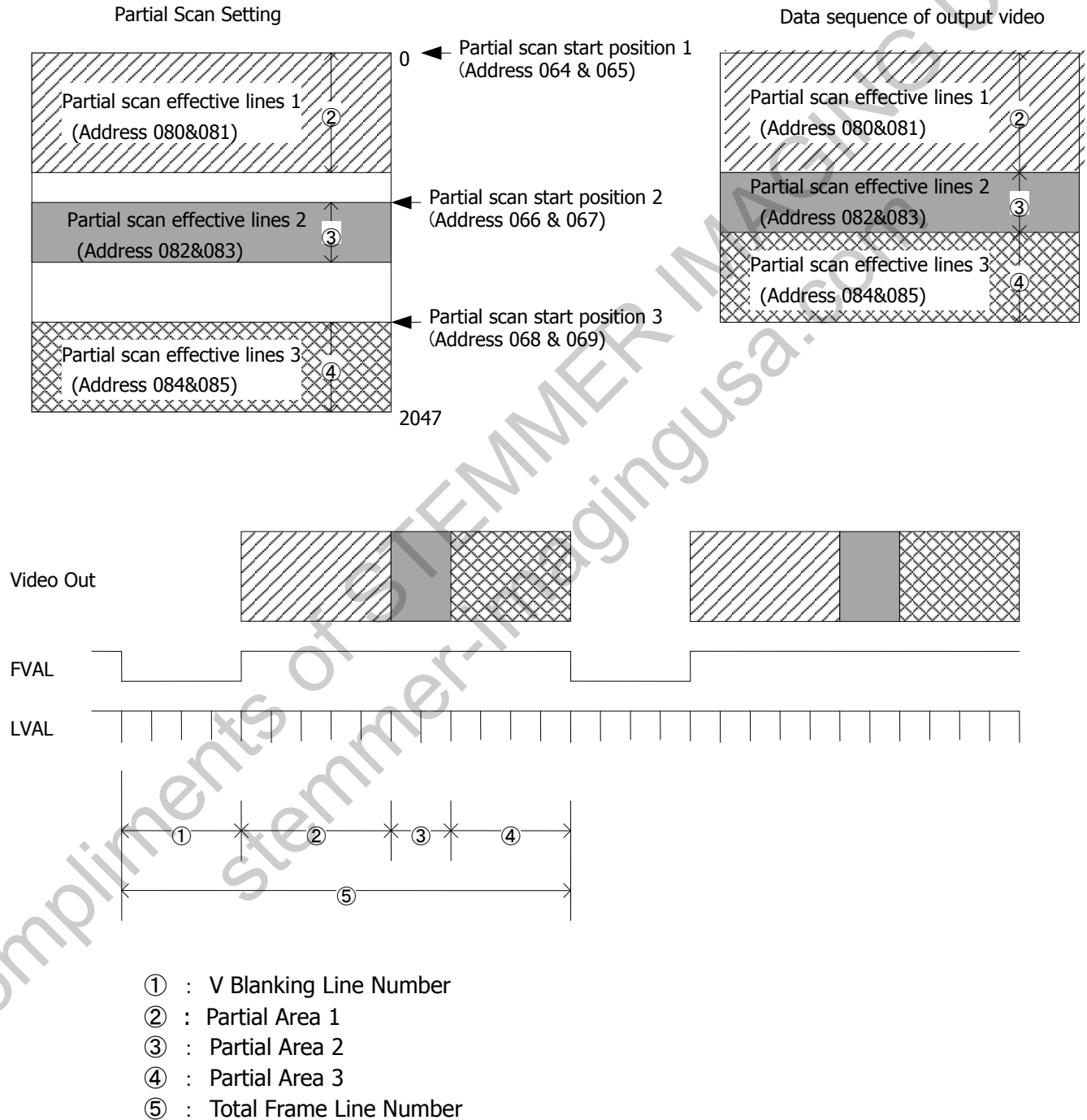
- This is the mode to start exposure with external input trigger signals, and set the exposure time with pulse width of the trigger signals.
- Trigger operation is H Sync. V-Sync Reset. The delay time (Exposure Time Delay) from detecting trigger edge in the camera to starting exposure, and from detecting trigger end edge to completing exposure is max. 1HD.
- Pulse width is min. 1HD to approx. 2 frames. Functionally, there is no upper limitation, but noises such as dark noises and shadings may be noticeable at long time exposure.
- Triggers can be accepted even when outputting video signals. However, trigger signals for exposure to start the next video output prior to the completion of video transmission for the prior video output signals cannot be accepted.
- If the next trigger is input prior to the completion of video transmission for the prior video output signals, the image may be impacted.



8. Partial Scan Mode

- Maximum 8 partial areas can be set by serial commands.

Example : 3 partial areas to be set.



- ☐ When setting several partial scan areas, please set the start position and effective lines trying not to overlap the areas.
- ☐ When setting several areas, please set the areas in the numerical order of starting position.
- ☐ Entire frame line numbers = V blanking line numbers (16H fixed) +

Partial effective lines 1 + Partial effective lines 2 + ... + Partial effective lines 8

Note that "Sum total of partial effective line numbers (except V blanking lines) $\leq$ 1088" should be met.

- ☐ Frame rate = 1 / (Entire frame line numbers x Time for 1 line)

Time for 1 line

Camera Mode	Time for 1 Line
2Tap Base Configuration Mode	12.9us
4Tap Medium Configuration Mode	6.45us
8Tap Full Configuration Mode	3.225us

- ☐ Setting Example

	Effective Lines	Entire Frame Lines	Frame Rate (Entire frame lines)		
			2Tap Mode	4Tap Mode	8Tap Mode
1(Min)	1 H	17H	4560fps	9120fps	18240fps
.	.	.	.	.	.
Vertical:VGA equivalent	480 H	496H	156fps	313fps	625fps
.	.	.	.	.	.
Vertical:XGA equivalent	768 H	784H	99fps	198fps	396fps
.	.	.	.	.	.
Vertical:SXGA equivalent	1024 H	1040H	75fps	149fps	298fps
.	.	.	.	.	.
1104 (Max:Full Frame)	1104 H	1088H	70fps	140fps	280fps

- ☐ Line numbers at partial scan setting can be set from 1 line. However, consumption current will increase several hundreds mA more so that the margin of camera power capacity shall be considered.

9. Remote Communication Function

Via camera link cable, the camera can be controlled.

(1) The settings for RS232C

Baud rate : 9600bps (Initial Setting)
 19200bps, 38400bps, 57600bps, 115200bps
 Data : 8bit
 Stop bit : 1bit
 Parity : None
 XON/XOFF : Not controlled

* Baud rate can be changed with address 030. Please reboot the camera after changing baud rate setting.

(2) Control code

- The total control code is 14 bytes, which conforms to ASCII code.
- The control code consists of camera No. process code, remote controller address, remote controller data, and CR. Execute Read/Write through PC, and the camera will reply the data.

1	2	3	4	5	6	7th Byte	8	9	10	11	12	13	14
Camera No.						Process code	Remote controller address			Remote controller data			CR
000000: fixed						"R" Read mode	Please refer to the address table of Section 5. Function Settings.			000~255			0 Dh
						"W" Write mode							
						"C" Camera mode							

Camera number

Camera No. is fixed with 6 bytes numerical strings, "000000".

Process code

Input any one of R, W, or C to the process code.

R (read mode) is to read the data of remote controller address.

Please be noted to set any dummy data (000~255) to 11th ~13th, since a command shall consists of 14 bytes.

W (write mode) is to write the data to the remote controller address.

Please be noted that the data cannot be saved into EEPROM of the camera.

(Reboot the camera, and the data is reset to the initial setting.)

To save the data into EEPROM, please refer to Section 5. Function Settings.

C is the code to send the data back from the camera.

Note: Do not set code C when sending the data from PC side.

X is the code to respond when error is detected by the camera side.

Details of the detected error can be checked with 4 lines of the 3rd to 6th byte.

0101: Abnormal address value

0102: Abnormal command

0103: Abnormal data value

0104: Abnormal data length (over 14byte)

Remote controller address

Note: Do not write the data into the address other than specified, since it may cause the damages or malfunction of the camera.

Remote controller data

Set the decimal number (000~255) for the remote controller data. Please be noted to set any dummy data at read control mode.

CR

Be sure to input "CR" to confirm the end of the command.

※ Note: The data set with 2 Byte shall be set with High Byte (even address) first, then set with Low Byte (odd address). The camera rewrites the internal register when receiving Low Byte.

(3) Data Save

Input data 083 or 053 into the address 127 to save the data to EEP-ROM.

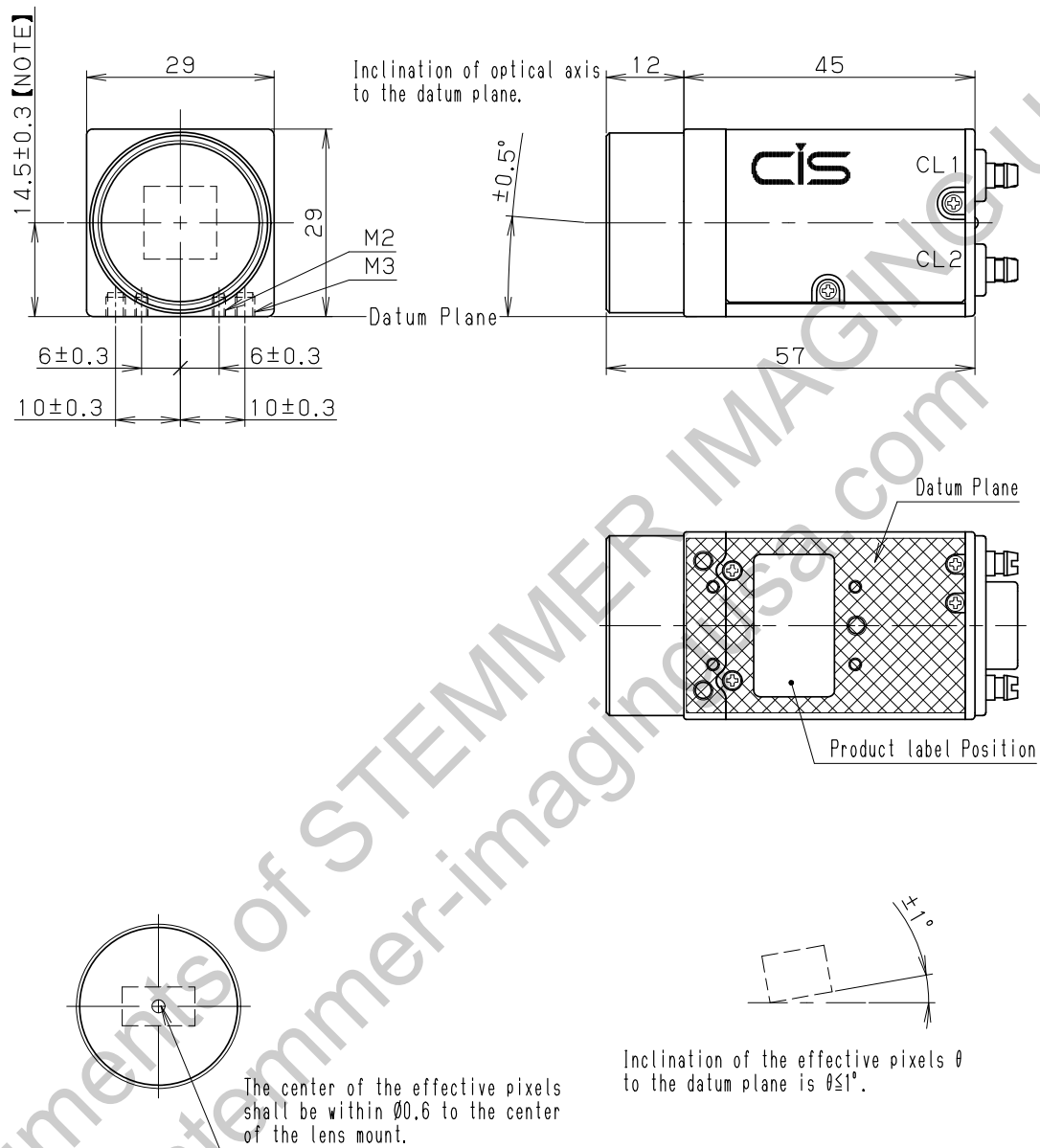
(4) Initial Settings

Input data 083 or 053 into the address 126 to return to the initial settings.

10. Initial Settings

Function	Address	Data
Gain	001	0: 0dB
Shutter	002	0: 1/140s(OFF)
Trigger Shutter Mode	004	0: Normal Shutter Mode (Trigger OFF)
Trigger Polarity	011	0: Positive
Output Data Selection	013	0: 8bit output
Partial Scan Mode	015	0: Full Frame Scan Mode
Output Image Flip Vertical	021	0: Normal
Gain CC Control ON/OFF	023	0: OFF
Baud Rate	030	0: 9600bps
Camera Mode	031	1: 4Tap Medium Configuration Mode

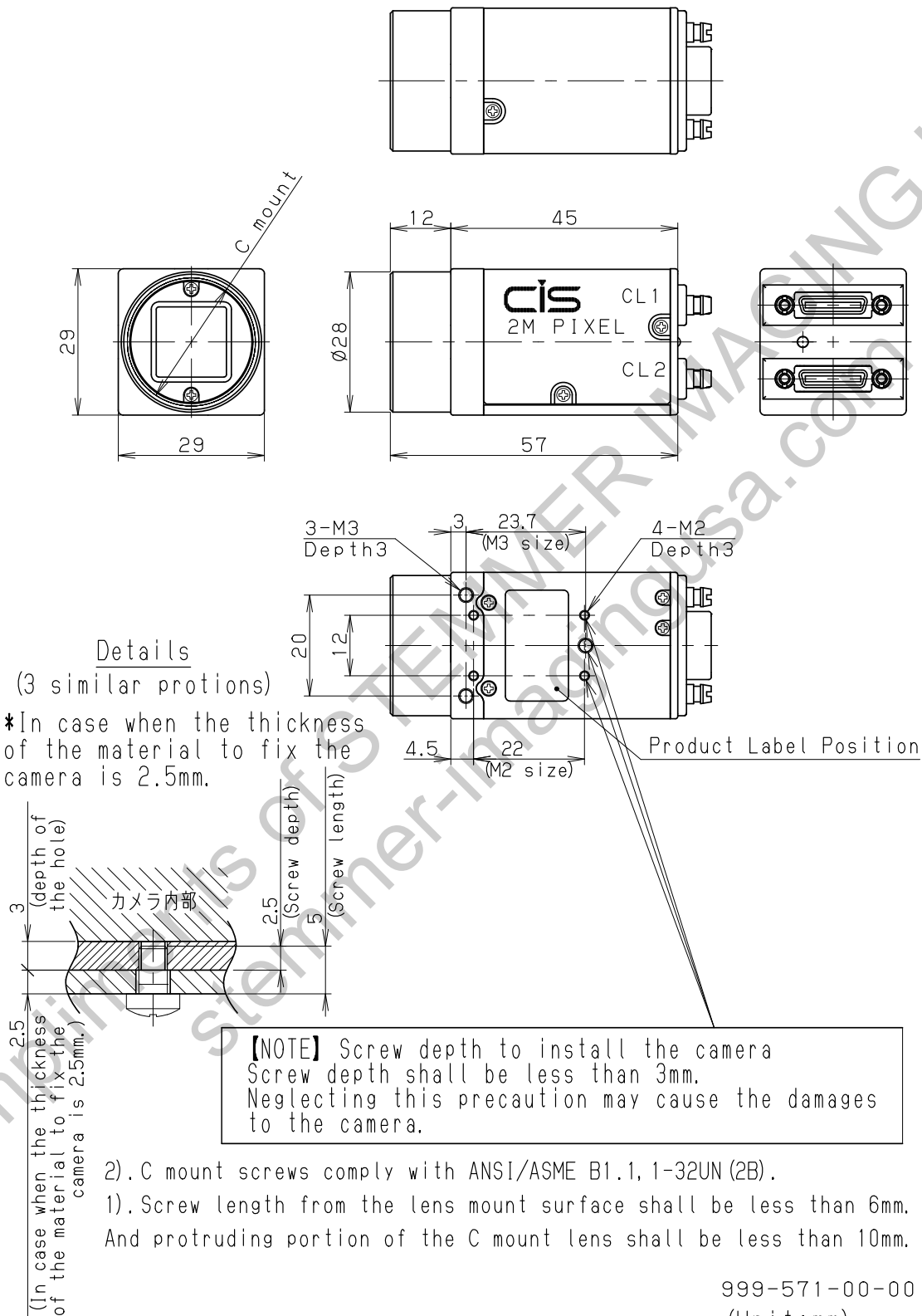
11. CMOS Optical Axis Accuracy



Note) Dimensions from the datum plane to the center of the lens mount.

910-021-00-00
(Unit:mm)

12. Dimensions



13. Cases for Indemnity (Limited Warranty)

We shall be exempted from taking responsibility and held harmless for damage or losses incurred by the user in the following cases.

- In case damage or losses are caused by fire, earthquake, or other acts of God, acts by third party, deliberate or accidental misuse by the user, or use under extreme operating conditions.
- In case indirect, additional, consequential damages (loss of business interests, suspension of business activities) are incurred as result of malfunction or non-function of the equipment, we shall be exempted from responsibility for such damages.
- In case damage or losses are caused by failure to observe the information contained in the instructions in this product specification & operation manual.
- In case damage or losses are caused by use contrary to the instructions in this product specification & operation manual.
- In case damage or losses are caused by malfunction or other problems resulting from use of equipment or software that is not specified.
- In case damage or losses are caused by repair or modification conducted by the customer or any unauthorized third party (such as an unauthorized service representative).
- Expenses we bear on this product shall be limited to the individual price of the product.

14. CMOS Pixel Defect

CIS compensates the noticeable CMOS pixel defects found at the shipping inspection prior to our shipment. On very rare occasions, however, CMOS pixel defects might be noted with time of usage of the products.

Cause of the CMOS pixel defects is the characteristic phenomenon of CMOS itself and CIS is exempted from taking any responsibilities for them. Should you have any questions on CMOS pixel defects compensation, please contact us.

15. Product Support

When defects or malfunction of our products occur, and if you would like us to investigate on the cause and repair, please contact your distributors you purchased from to consult and coordinate.