



English

**VISION:elite™**  
6M CMOS Color (RAW)  
Camera Link Camera  
**VCC-FC41SX29CL**

**Product Specification**  
**& Operational Manual**

**CIS Corporation**

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## 1. Scope of Application

This is to describe VCC-FC41SX29CL, 6M CMOS Color (RAW) Camera Link 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.

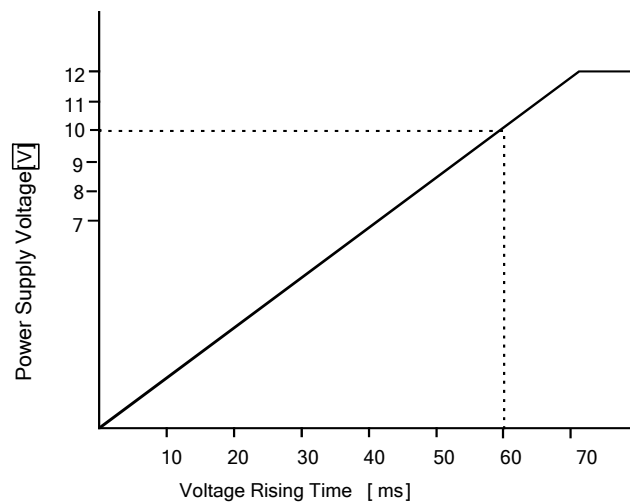
Our warranty does not apply to damages or defects caused by irregular and/or abnormal use of the product.

Please observe all warnings and cautions stated below.

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

- Rolling Shutter system is adopted to VCC-FC41SX29CL so that electrical charge cannot be swept out at one time to reset. Due to this rolling shutter system, images out-of-exposure signal period will be superimposed. To avoid the superimposed images, please keep shooting conditions dark or give sufficient stroboscopic lighting source when shooting.
- Do not use or store the camera in the following extreme conditions:
  - Extremely dusty or humid places.
  - Extremely hot or cold places (operating temperature  $-5^{\circ}\text{C}$  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 typeapter 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±10% shall be within ±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.



In case of abnormal operation, contact the distributor from whom you purchased the product.

### 3. Product Outline

VCC-FC41SX29CL is a camera link interfaced, high-resolution industrial color video camera module utilizing a 1/1.8 type, 6M pixels, CMOS image sensor. Entire pixels can be read out within approx. 1/60s.

#### Features

- Rolling shutter system is adopted to the CMOS sensor of VCC-FC41SX29CL. To capture the images without distortion, interlock lightings with camera exposure signal output.
- Shutter speed can be set from 1/60sec ~ 1/120,000sec at fixed trigger shutter mode, and at pulse width trigger shutter mode.
- Frame rates are as follows.

60 fps mode	60fps at full frame scan mode
	60fps ~ 537fps at partial scan mode (Valid only at trigger mode.)
15 fps mode	15fps at full frame scan mode
	15fps ~ 134fps at partial scan mode (Valid only at trigger mode.)

#### Bundled Items

- Camera
- CIS Control Panel Software (For evaluation and demonstration purpose). ※
- ※ Please ask for the details or download it from our web.

## 4. Specification

### 4.1. General Specification

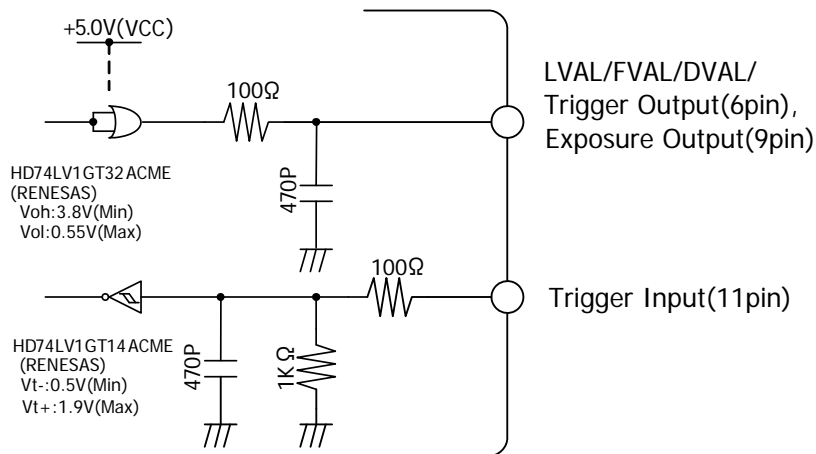
(1) Pickup device	Device Type	1/1.8 type Bayer Color CMOS		
	Effective Pixels	2928(H) × 2184(V)		
	Unit Cell Size	2.50 μm(H) × 2.50 μm(V)		
	Chip Size	9.618mm(H) × 8.618mm(V)		
(2) Video output frequency	60fps Mode:	Pixel Clock	72MHz	
		Horizontal Frequency	138.462 kHz	Horizontal Pixel Clock: 520CLK
		Vertical Frequency	Full Frame Scan Mode:	Scanning lines 2310 H
			59.940 Hz	
			Partial Scan Mode:	Scanning Lines 258~2310H
			60~537Hz	
	15fps Mode:	Pixel Clock	54MHz	
		Horizontal Frequency	34.615 kHz	Horizontal Pixel Clock: 1560CLK
		Vertical Frequency	Full Frame Scan Mode:	Scanning lines 2310 H
			14.985 Hz	
			Partial Scan Mode:	Scanning Lines 258~2310H
			15~134Hz	
(3) Sync. system	Internal Sync. System			
(4) Video output standard	60fps Mode:	Camera Link 6Taps output (Base Configuration x 2)		
		•6Taps Separated Output Format		
		•6Taps Interleaved Output Format		
	15fps Mode:	Camera Link 2Taps output (Base Configuration x 1)		
		•2Taps Interleaved Output Format		
(5) Resolution	2100TV lines			
(6) Resolving power	60fps Mode:	8bit RAW		
	15fps Mode:	8bit / 10bit RAW		
(7) Sensitivity	60fps Mode:	F2.0 2000lx (Shutter Speed: 1/60s(OFF), Gain: 0dB)		
	15fps Mode:	F5.6 2000lx (Shutter Speed: 1/15s(OFF), Gain: 0dB)		
(8) Minimum illumination	60fps Mode:	F1.4 80 lx (Shutter Speed: 1/15s(OFF), Gain: +18dB)		
	15fps Mode:	F1.4 20 lx (Shutter Speed: 1/60s(OFF), Gain: +18dB)		
(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	DC+12V±10% (Max voltage not to exceed 15V.)		12pins circular connector.	
(11) Power consumption	1.8W (At DC+12V IN)			
(12) Dimension	Refer to overall dimension drawing (Clause 12) (H:44mm W:44mm D:41mm excluding projection)			
(13) Mass	Approx. 120g			
(14) Lens Mount	C Mount ※ Refer to overall dimension drawing			
(15) Optical axis accuracy	Refer to drawing for CMOS Optical Axis Accuracy (Clause 11)			
(16) Gain variable range	Analog Gain: 0dB~+12dB, Digital Gain: -6dB~+6dB (Guaranteed Range)			
(17) White balance adjustment guaranteed range	2800~9000K (Manual White Balance Guaranteed Range)			
(18) Shutter speed variable range	60fps Mode:	1/60 ~ 1/120000s (1H step)		
	15fps Mode:	1/15 ~ 1/34000s (1H step)		
(19) Trigger Mode	•Fixed Shutter Trigger Mode/Fixed Shutter Trigger Mode (Pseudo-reset shutter)			
	•Pulse Width Shutter Trigger Mode/Pulse Width Shutter Trigger Mode (Pseudo-reset shutter)			

- (20) Safety/Quality standards UL: Conform to UL Standard including materials and others.  
 CE: Emission: EN55022: 2006 (Class B)  
 Immunity: EN61000-6-2: 2005  
 RoHS: Conform to RoHS.  
 FCC: To be applied.
- (21) Durability  
 Vibration Acceleration : 98m/s<sup>2</sup> (10G)  
 Frequency : 20~200 Hz  
 Direction : X,Y, and Z, 3 directions  
 Testing Time : 120 minutes for each direction  
 Shock No malfunction shall be occurred with 980m/s<sup>2</sup> (100G) for ±X, ±Y, and ±Z, 6 directions. (without package)
- (22) Operation environment  
 Performance guaranteed Temperature 0 ~ +40°C RH 20 ~ 80% With no condensation.  
 Operation guaranteed Temperature - 5 ~ +45°C RH 20 ~ 80% With no condensation.  
 ※Performance guaranteed: Specified values in this Specifications are guaranteed.  
 ※Operation guaranteed: Camera functions are operated normally.
- (23) Storage environment -25 ~ +60°C RH 20 ~ 80%RH With no condensation.

4.2. Camera Output Signal Specification

(1) Video output data	Effective Video out		2880(H) × 2184(V)	At Full Frame Scan Mode
(2) Sync. Signal I/O	LVAL/FVAL/DVAL	: 6 pin	12 pins circular connector	Switchable with Address 034
	/Trigger output		(LVTTL output)	
	LVAL		Camera Link output (LVDS)	
	FVAL			
DVAL				
(3) Trigger Input	SP (Exposure Signal)			
	Polarity		Positive/Negative Selectable	Selectable with Address 011
	Pulse width	: 60fps mode	8.222 μs ~ 16.677ms	
		: 15fps mode	29.889 μs ~ 66.706ms	
(4) Exposure Signal Output	Trigger input	: 11 pin	12 pins circular connector	Selectable with Address 012
			(LVTTL Input)	
		: CC1	Camera Link Input (LVDS)	
	Polarity		Positive/Negative Selectable	Selectable with Address 035
(5) Serial Communications	Exposure Signal output	: 9 pin	12 pins circular connector	
			(LVTTL Output)	
Video Output Signal	SerTC (Serial to Camera)		Camera Link Input (LVDS)	
	SerTFG (Serial to Frame Grabber)		Camera Link Output (LVDS)	
	White Clip Level		At Digital 8bit	: FFh
	Setup Level		At Digital 8bit	: 00h
	Dark Shading		At Digital 8bit	: Under ±04h for both horizontal and vertical. (Conditions: Gain 0dB)

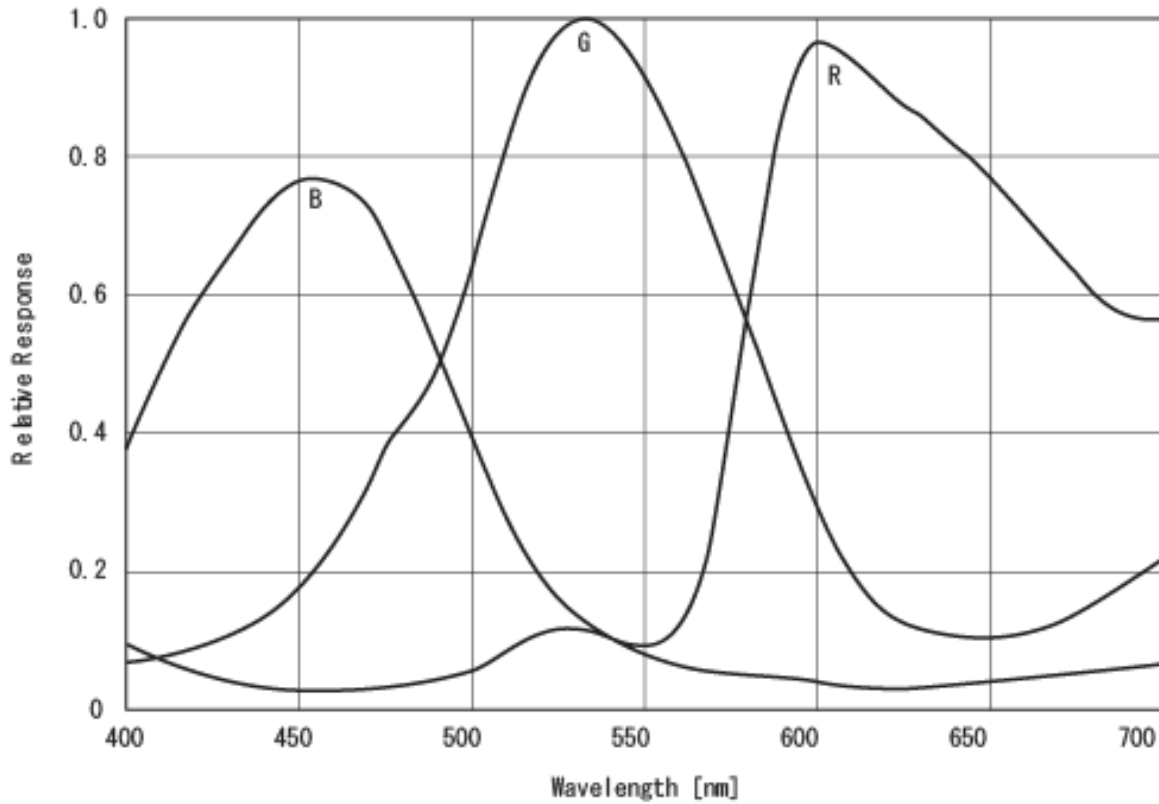
※ 5 seconds shall be waited after turning on power to get proper camera operation.



12pins circular connector at rear, IO Interface

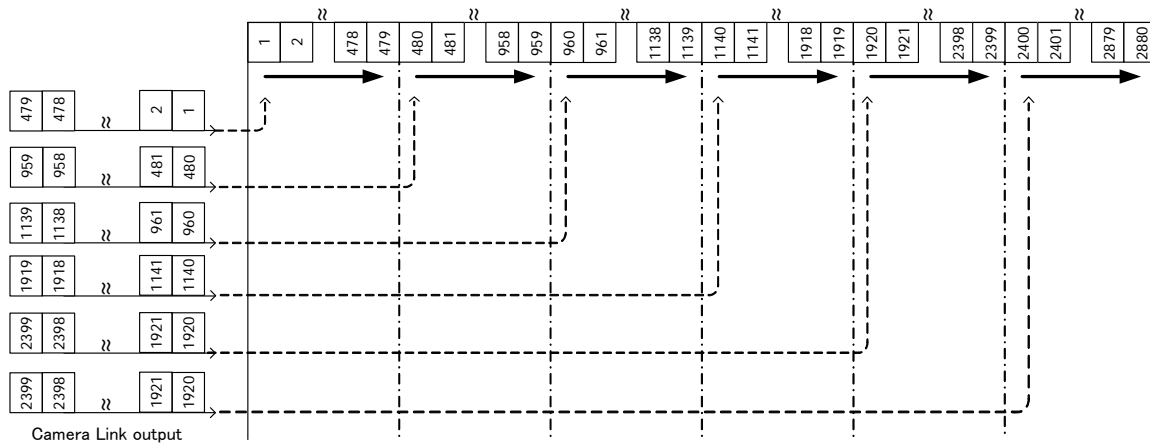
## 4.3. Spectral Response (Representative Value)

※ Lens characteristics, IR cut filter, and luminous source characteristics are not considered.

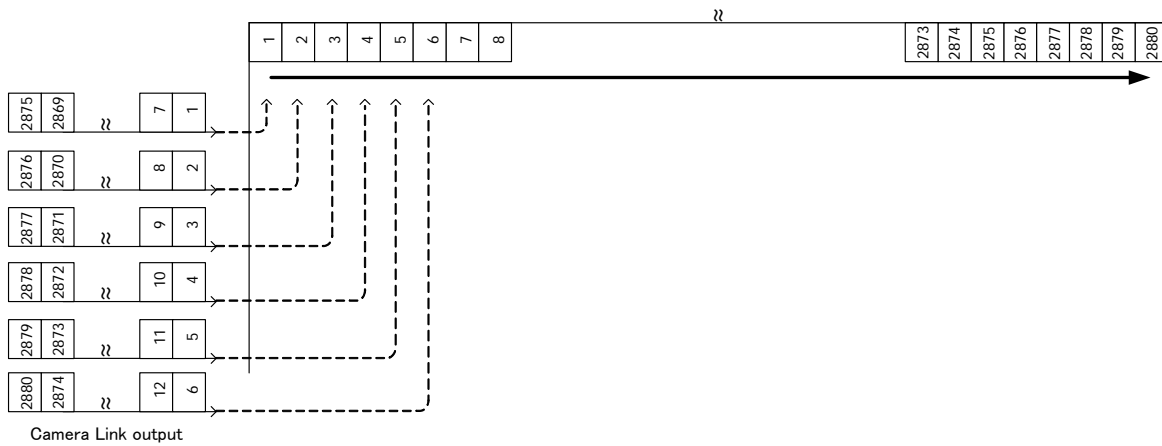


4.4 Video Output Format

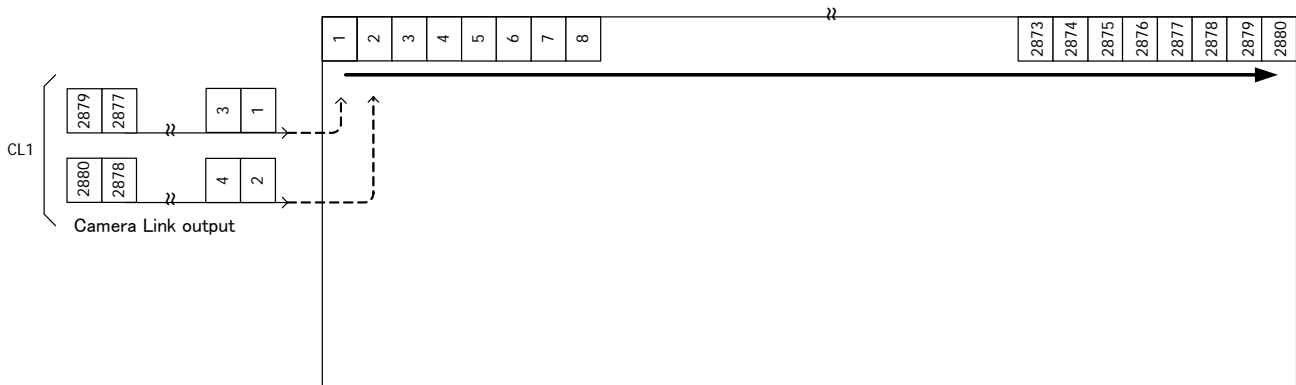
(1) 60fps mode : Base Configuration × 2 6Taps Separated Output Format (Initial Setting)



(2) 60fps mode : Base Configuration × 2 6Taps Interleaved Output Format



(3) 15fps mode : Base Configuration × 1 2Taps Interleaved Output Format



## 5. Function Settings

Camera functions can be set with serial data communications.

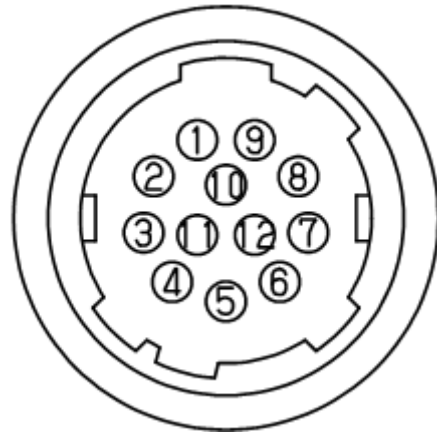
Functions	Address	Data
Gain	001	0: 0 dB : Analog Gain
		1: + 3 dB : Analog Gain
		2: + 6 dB : Analog Gain
		3: + 12 dB : Analog Gain
		4: Manual Gain (Refer to Address 005&006)
Shutter	002	60fps mode (Address 018:001)      15fps mode (Address 018:000)
		0: 1/60s(OFF)                              1/15s(OFF)
		1: 1/90s                                      1/30s
		2: 1/120s                                    1/60s
		3: 1/250s                                    1/90s
		4: 1/500s                                    1/120s
		5: 1/1000s                                   1/250s
		6: 1/1500s                                   1/500s
		7: 1/2500s                                   1/750s
		8: 1/5000s                                   1/1000s
		9: 1/10000s                                   1/1500s
		10: 1/15000s                                   1/2000s
		11: 1/20000s                                   1/2500s
		12: 1/25000s                                   1/5000s
		13: 1/30000s                                   1/10000s
		14: 1/60000s                                   1/15000s
		15: 1/120000s                                   1/34000s
16: Manual Shutter (Refer to Address 009&010)		
White Balance	003	0: THUR
		1: 3200K
		2: Spare
		3: Spare
		4: Manual White Balance (Refer to Address 156, 157, 158, and 159)
Trigger Shutter Mode	004	0: Normal Shutter Mode (Trigger Shutter Mode OFF)
		1: Fixed Trigger Shutter Mode
		2: Pulse Width Trigger Shutter Mode
		3: Fixed Trigger Shutter Mode (60fps Pseudo-reset/15fps Batch-reset shutter)
		4: Pulse Width Trigger Shutter Mode (60fps Pseudo-reset/15fps Batch-reset shutter)
Manual Analog Gain	005&006	0~1023: 0:0dB 1023:+12dB ※Set the data of Address 001 to 004.
Manual Shutter Control	009&010	0~2309: 60fps mode: 1/60s(OFF)~1/120000s
		15fps mode: 1/15s(OFF)~1/34000s
		※Set the data of Address 002 to 016.
		Address 009 MSB and Address 010 LSB make 16bit in total. 60fps mode: Shutter Speed = (2309 - (009&010) + 1) × 7.222 μs 15fps mode: Shutter Speed = (2309 - (009&010) + 1) × 28.889 μs Max. Data = 2309
Trigger Polarity	011	0: Positive Input
		1: Negative Input

Functions	Address	Data
Input Trigger Port Selection	012	0: Camera Link (CC1) Input 1: 12 pins circular connector (11pin) Input
Output Data Selection	013	0: 8bit output (8 bit output is fixed at 60fps mode) 1: 10bit output
Partial Scan Mode	015	0: Full Frame Scan Mode 1: Partial Scan Mode (Operates only at trigger mode)
Partial Scan Start Position	016&017	0~27: ※Set the data of Address 015 to 001. Address 016 MSB and Address 017 LSB make 16bit in total. Start Position: 78 H/step Min. data:0(0 H) /Max. data:27(2106 H) Start Position (016&017) + Effective lines (019&020) should be <= 27.
Camera Mode	018	0: 15fps mode 1: 60fps mode
Partial Scan Effective Lines	019&020	0~27: ※Set the data of Address 015 to 001. Address 019 MSB and Address 020 LSB make 16bit in total. Effective lines: 78 H/step Min. data:0(78 H) /Max. data:27(2184 H) Start Position (016&017) + Effective lines (019&020) should be <= 27.
Partial Scan Total Lines	029&030	0~2309: Read Only Total lines at partial scan mode or full frame scan mode can be set.
12 pins circular connector, No. 6pin output	034	0: LVAL output 1: FVAL output 2: DVAL output 3: Trigger output
Exposure Signal Polarity	035	0: Positive output 1: Negative output
60fps mode Output Format	036	0: 6Taps Interleaved Output Format 1: 6Taps Separated Output Format (Initial Setting)
Manual Digital Gain	128&129	256~1023: 256:-6dB 512:0dB 1023:+6dB ※Set the data of Address 001 to 004.
Manual White Balance R	156&157	256~1023: 256: × 1(0dB)~1023: × 4(+12dB) ※Set the data of Address 003 to 004.
Manual White Balance B	158&159	256~1023: 256: × 1(0dB)~1023: × 4(+12dB) ※Set the data of Address 003 to 004.
Manual White Balance G	186&187	256~1023: 256: × 1(0dB)~1023: × 4(+12dB) ※Set the data of Address 003 to 004.
Data Save	255	Input 083 or 053 to save the data to EEP-ROM.

## 6. External Connector Pin Assignment

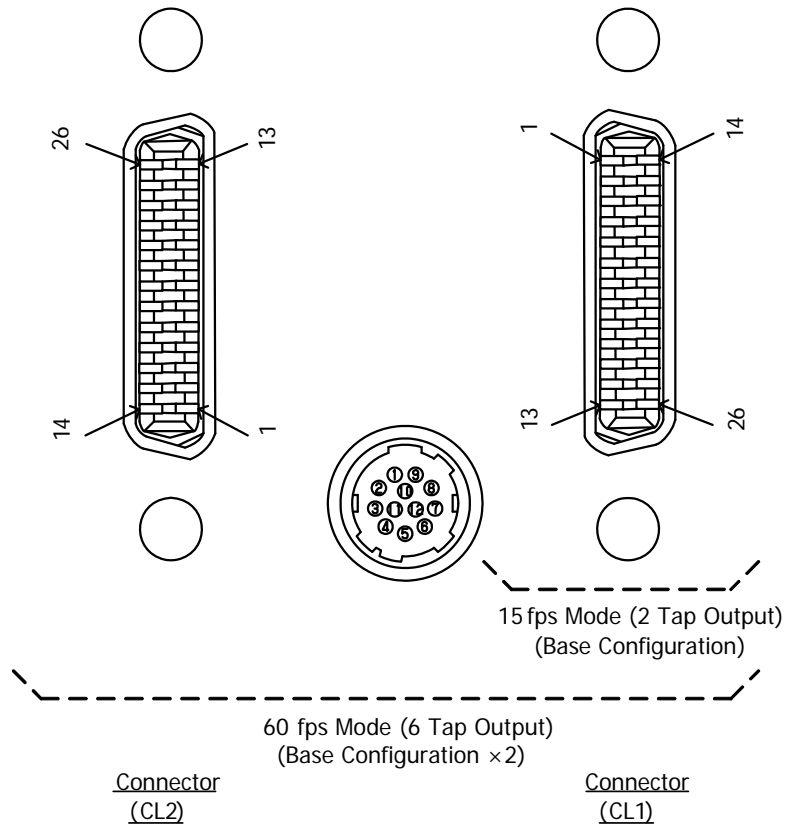
## 6.1. 12 pins Circular Connector HR10-10R-12PA (HIROSE)

Pin No.	
1	GND
2	DC +12V IN
3	GND
4	N/A
5	GND
6	LVAL/FVAL/DVAL/Trigger Output ※1
7	N/A
8	GND
9	Exposure Signal Output
10	N/A
11	Trigger Input
12	GND



※ LVAL/FVAL/DVAL/Trigger Output are selectable with Address 034.

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



Connector (CL2)

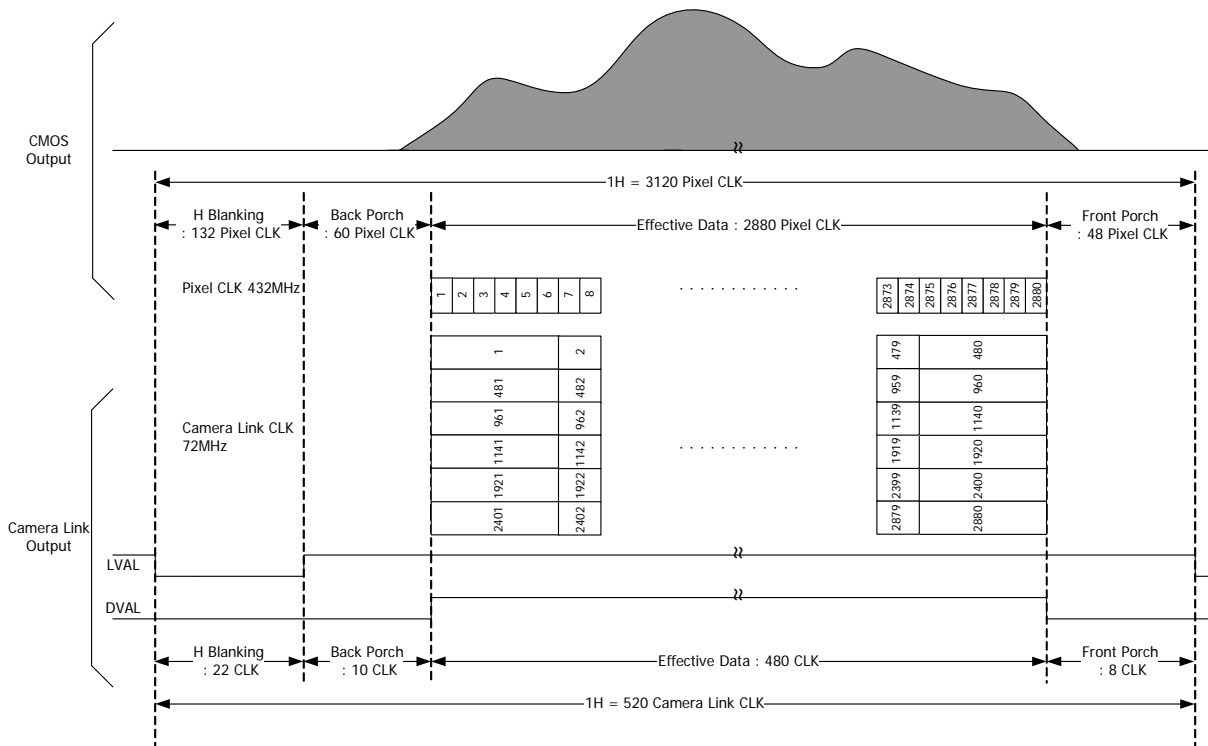
Pin No.		Pin No.	
1	GND	14	GND
2	Y0-	15	Y0+
3	Y1-	16	Y1+
4	Y2-	17	Y2+
5	Yclk-	18	Yclk+
6	Y3-	19	Y3+
7	100Ω	20	Terminated
8	NC	21	NC
9	NC	22	NC
10	NC	23	NC
11	NC	24	NC
12	NC	25	NC
13	GND	26	GND

Connector (CL1)

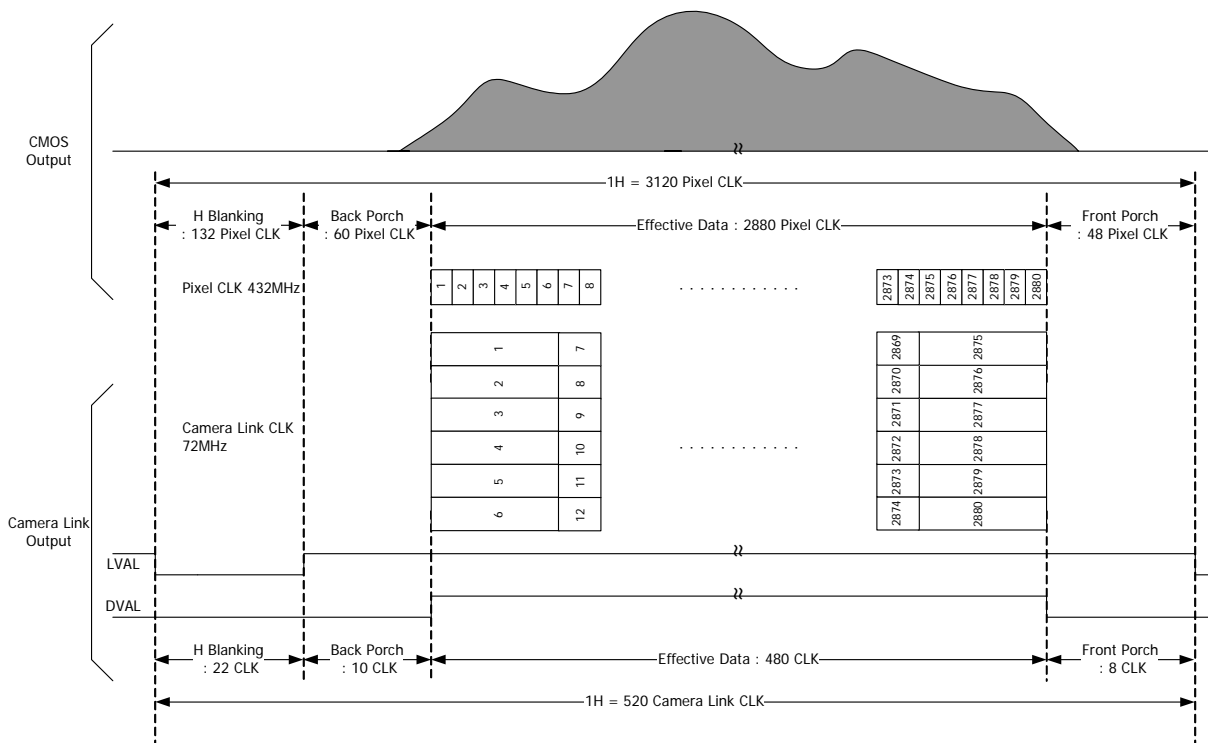
Pin No.		Pin No.	
1	GND	14	GND
2	X0-	15	X0+
3	X1-	16	X1+
4	X2-	17	X2+
5	Xclk-	18	Xclk+
6	X3-	19	X3+
7	SerTC+	20	SerTC-
8	SerTFG-	21	SerTFG+
9	CC1- (Trigger IN -)	22	CC1+ (Trigger IN +)
10	NC (CC2+)	23	NC (CC2-)
11	NC (CC3-)	24	NC (CC3+)
12	NC (CC4+)	25	NC (CC4-)
13	GND	26	GND

## 7. Timing Chart

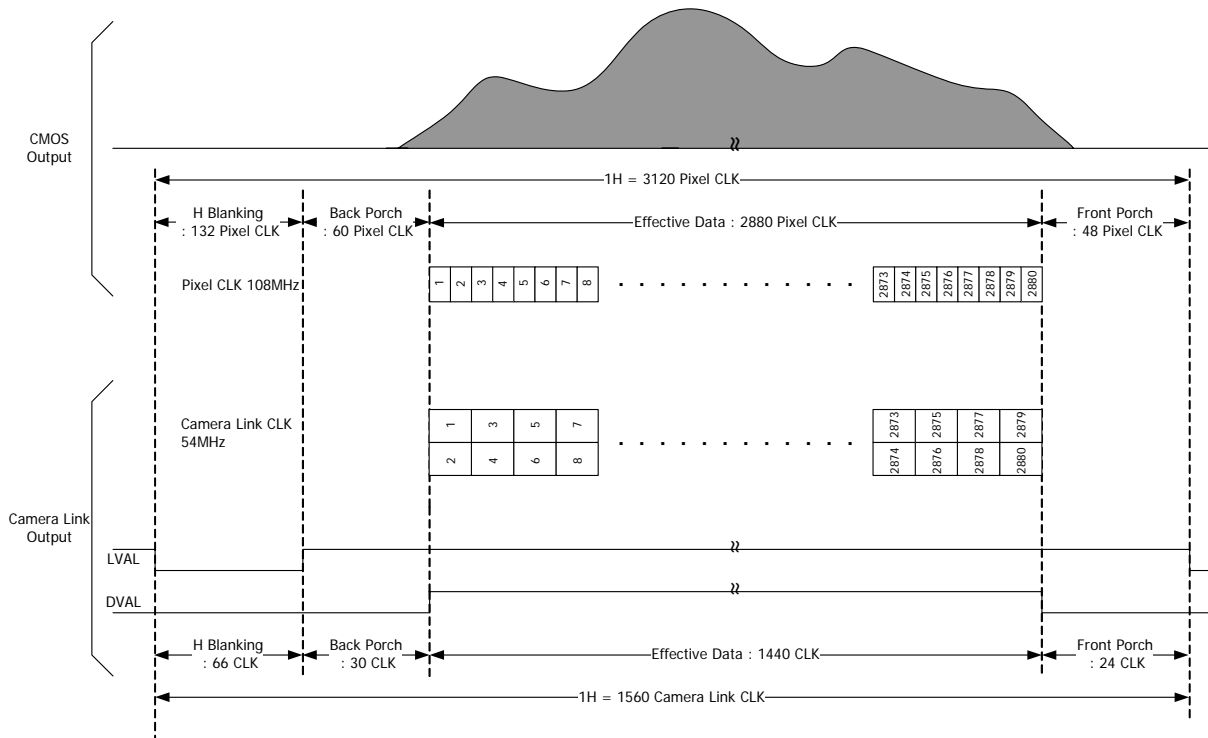
### 7.1. Horizontal Synchronous Timing (60fps mode: 6Taps Separated Output Format)



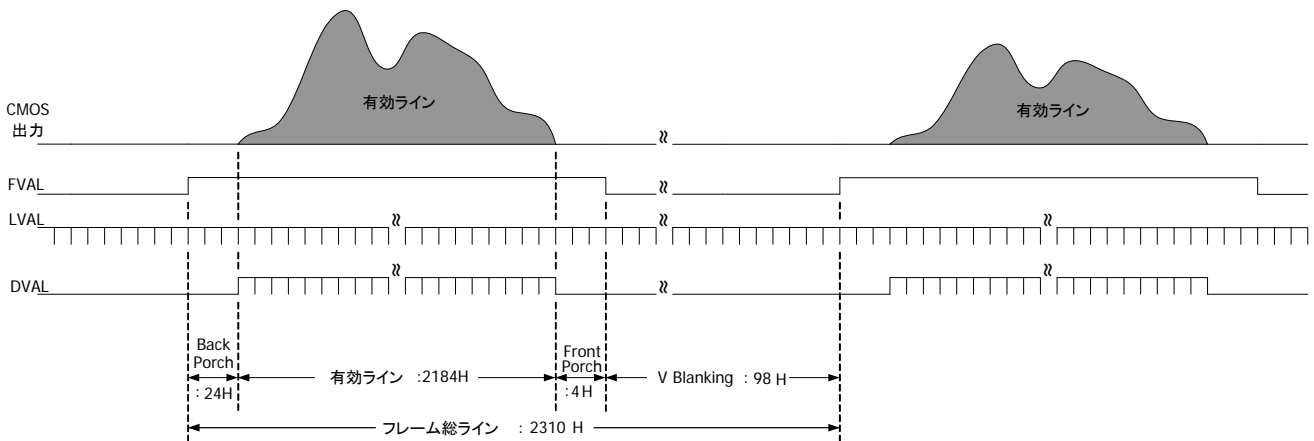
### 7.2. Horizontal Synchronous Timing (60fps mode: 6Taps Interleaved Output Format)



7.3. Horizontal Synchronous Timing (15fps mode)



7.4. Vertical Synchronous Timing, Normal Shutter Mode (Trigger Shutter Mode OFF)



## 7.5. 60fps Trigger Shutter Mode Timing

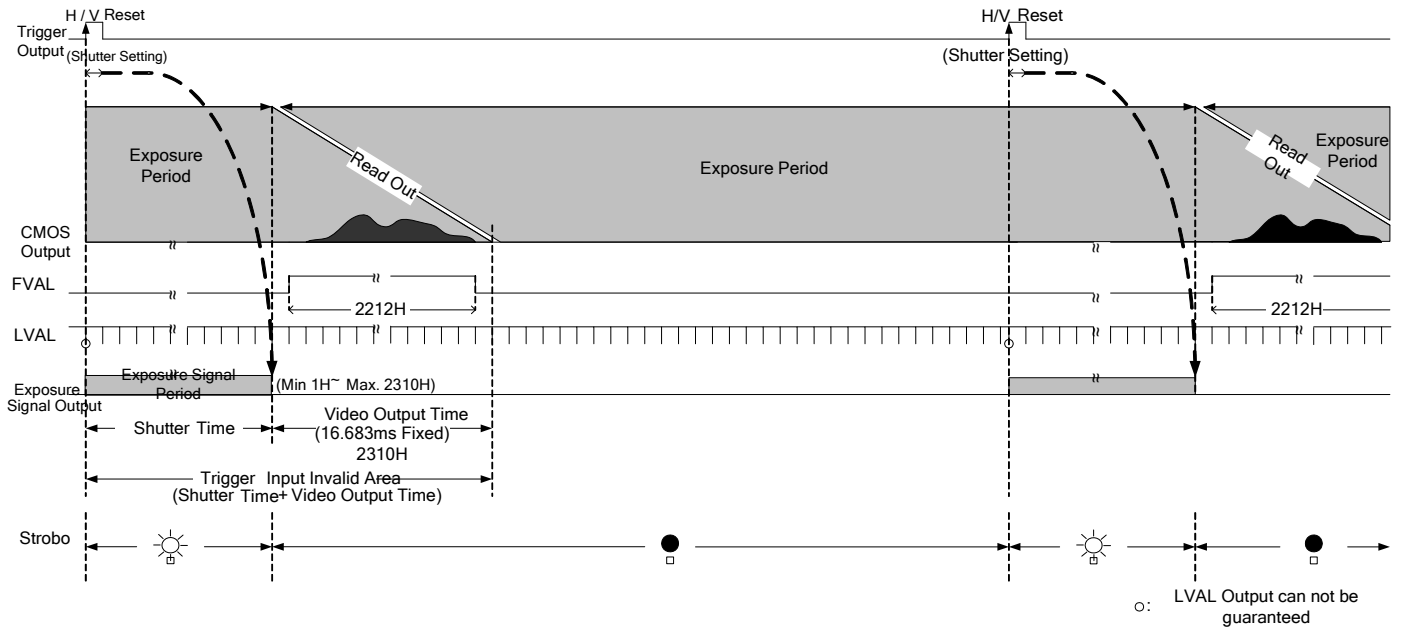
- Rolling Shutter system is adopted to VCC-FC41SX29CL so that electrical charge cannot be swept out at one time to reset. Due to this rolling shutter system, images out-of-exposure signal period will be superimposed. To avoid the superimposed images, please keep shooting conditions dark or give sufficient stroboscopic lighting source when shooting.
- Trigger operation is CLK sync, V-Sync Reset.  
Delay time, from detecting the trigger edge to starting exposure, is as follows.
 

60fps Trigger Shutter Mode	}	: 0.15 $\mu$ s
60fps Pulse Width Trigger Shutter Mode		
- Shutter Time (at Progressive Scan)
 

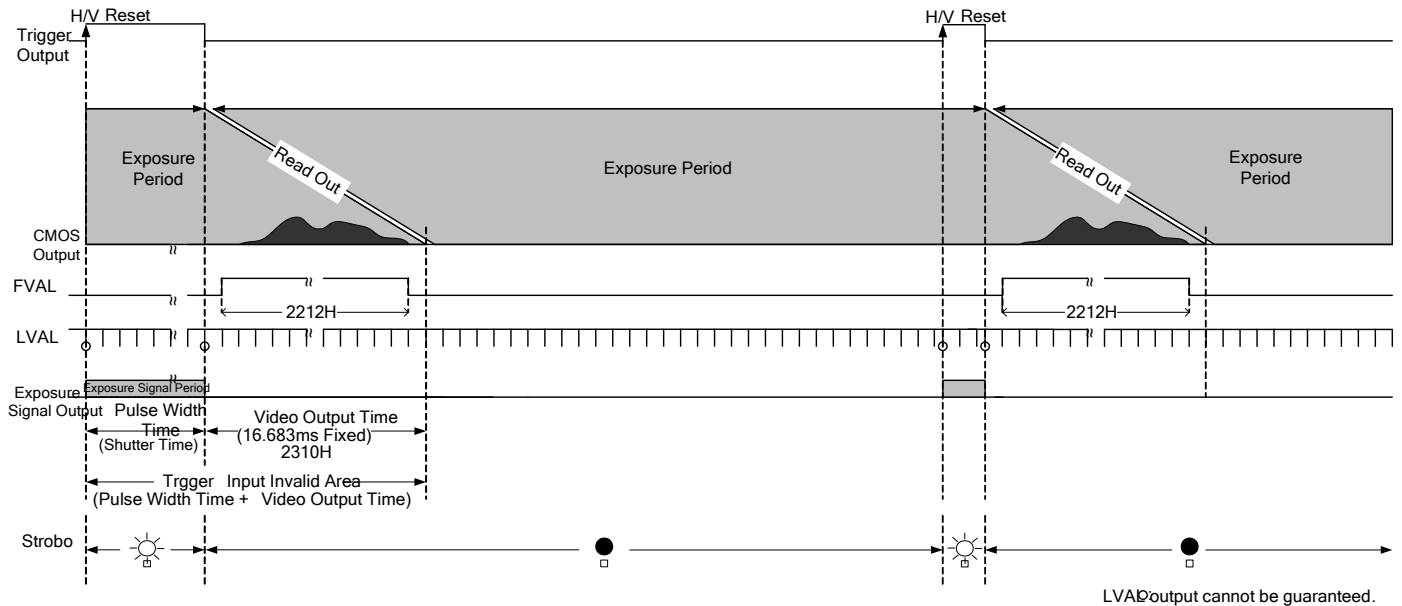
60fps Fixed Trigger Shutter Mode	: 1/120,000s (1H) ~ 1/60s (2310H)
	: 1H Step Resister Assigned (Address 009 & 010)
60fps Pulse Width Trigger Shutter Mode	: 1/120,000s (8.222 $\mu$ s) ~ 1/60s (16.677ms)
	: Pulse Width 7.222 $\mu$ s x n + 1 $\mu$ s (0 $\leq$ n $\leq$ 2309)
- The shortest input interval (Tact Time) is as follows.
 

60fps Trigger Shutter Mode	}	: Shutter Time + Video Output Time
60fps Pulse Width Trigger Shutter Mode		
- Trigger signals input prior to the completion of video output signals for the prior trigger shall be ignored.

### 7.5.1. 60fps Fixed Trigger Shutter Mode



### 7.5.2. 60fps Pulse Width Trigger Shutter Mode



7.6. 60fps Trigger Shutter Mode (Pseudo-Reset Shutter)

□ Rolling Shutter system is adopted to VCC-FC41SX29CL so that electrical charge cannot be swept out at one time to reset. Due to this rolling shutter system, images out-of-exposure signal period will be superimposed. To avoid the superimposed images, please keep shooting conditions dark or give sufficient stroboscopic lighting source when shooting. With this shutter mode, the electrical charge, stored before the trigger input, can be reset, reading out the video once from CMOS sensor when detecting the trigger.

□ Trigger operation is CLK sync, V-Sync Reset.

Delay time, from detecting the trigger edge to starting exposure, is as follows.

60fps Trigger Shutter Mode (Pseudo-Reset Shutter)	}	: 16.033ms
60fps Pulse Width Trigger Shutter Mode (Pseudo-Reset Shutter)		

□ With 60fps Pulse Width Trigger Shutter Mode (Pseudo-Reset Shutter), the camera samples trigger shutter signals with H (7.222  $\mu$ s).

Therefore, trigger signals with margin, over H (7.222  $\mu$ s) x n + 1  $\mu$ s, shall be input.

Without the above margin, 1H jitter may occur with Shutter Time.

□ Shutter Time (at Progressive Scan)

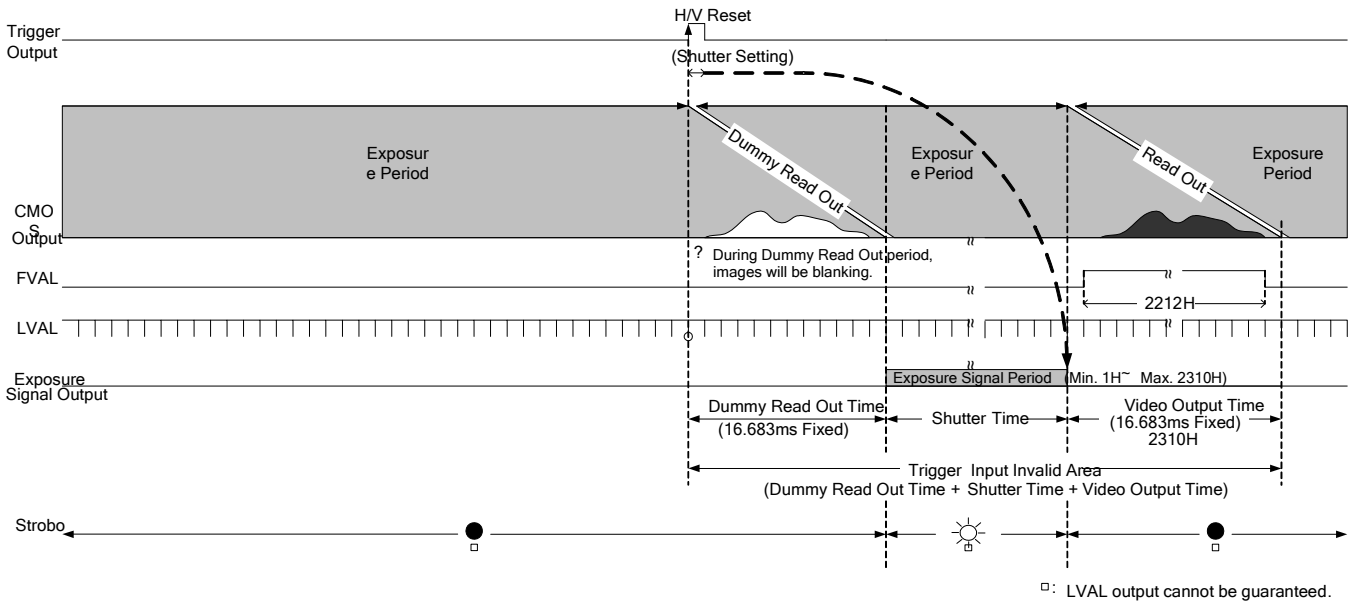
60fps Fixed Trigger Shutter Mode	: 1/120,000s (1H) ~ 1/60s (2310H)
	: 1H Step Resister Assigned (Address 009 & 010)
60fps Pulse Width Trigger Shutter Mode	: 1/120,000s (8.222 $\mu$ s) ~ 1/60s (16.677ms)
	: Pulse Width 7.222 $\mu$ s x n + 1 $\mu$ s (0 $\leq$ n $\leq$ 2309)
	: 1/60s shutter will be set when trigger over 16.677ms is input.

□ The shortest input interval (Tact Time) is as follows.

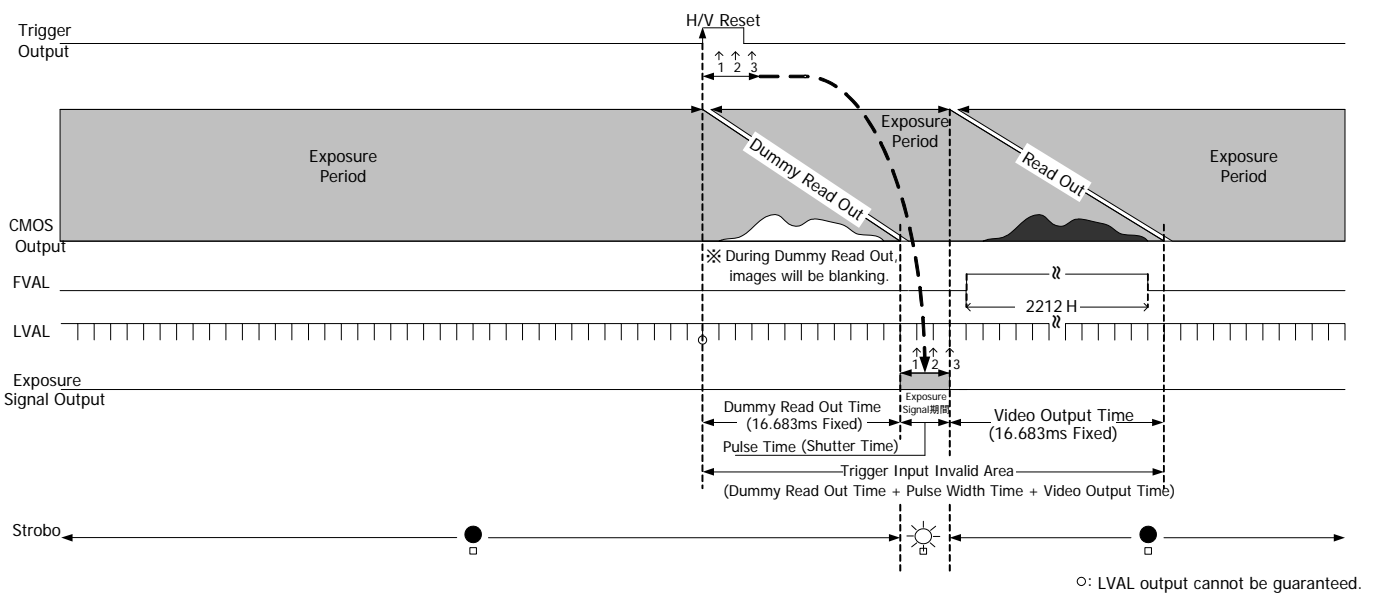
60fps Trigger Shutter Mode (Pseudo-Reset Shutter)	}	: Dummy Read Out Time (16.033ms) + Shutter Time + Video Output Time (Progressive: 16.683ms)
60fps Pulse Width Trigger Shutter Mode (Pseudo-Reset Shutter)		

□ Trigger signals input prior to the completion of video output signals for the prior trigger shall be ignored.

### 7.6.1. 60fps Fixed Trigger Shutter Mode (Pseudo-Reset Shutter)



### 7.6.2. 60fps Pulse Width Trigger Shutter Mode (Pseudo-Reset Shutter)



### 7.7. 15fps Trigger Shutter Mode Timing

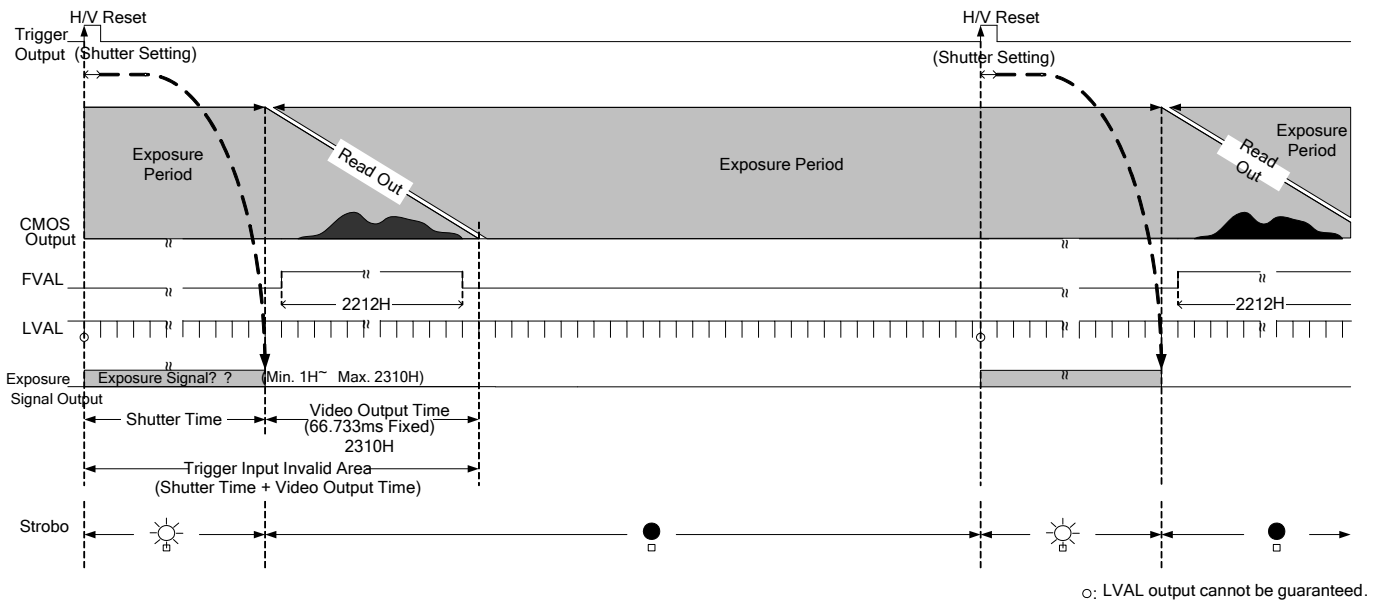
- Rolling Shutter system is adopted to VCC-FC41SX29CL so that electrical charge cannot be swept out at one time to reset. Due to this rolling shutter system, images out-of-exposure signal period will be superimposed. To avoid the superimposed images, please keep shooting conditions dark or give sufficient stroboscopic lighting source when shooting.
- Trigger operation is CLK sync, V-Sync Reset.  
Delay time, from detecting the trigger edge to starting exposure, is as follows.
 

15fps Trigger Shutter Mode	}	: 0.15 $\mu$ s
15fps Pulse Width Trigger Shutter Mode		
- Shutter Time (at Progressive Scan)
 

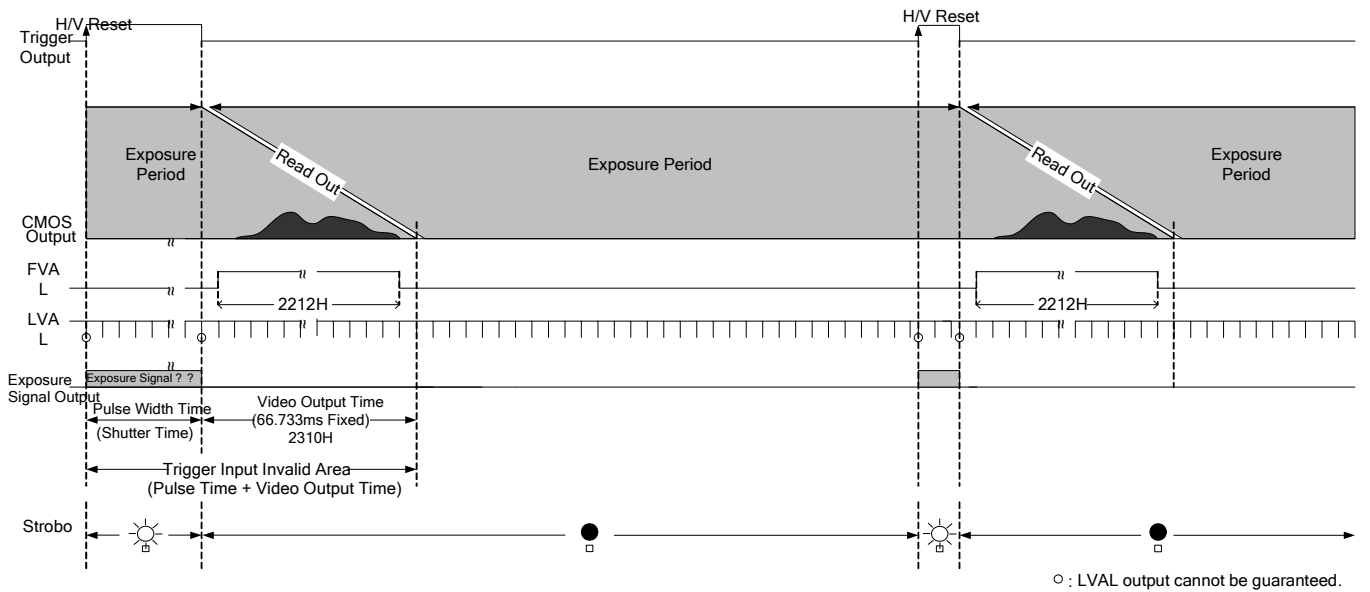
15fps Fixed Trigger Shutter Mode	: 1/34,000s (1H) ~ 1/15s (2310H)
	: 1H Step Resister Assigned (Address 009 & 010)
15fps Pulse Width Trigger Shutter Mode	: 1/34,000s (29.889 $\mu$ s) ~ 1/15s (66.706ms)
	: Pulse Width 28.889 $\mu$ s x n + 1 $\mu$ s ( $0 \leq n \leq 2309$ )
- The shortest input interval (Tact Time) is as follows.
 

15fps Trigger Shutter Mode	}	: Shutter Time + Video Output Time
15fps Pulse Width Trigger Shutter Mode		
- Trigger signals input prior to the completion of video output signals for the prior trigger shall be ignored.

### 7.7.1. 15fps Fixed Trigger Shutter Mode



### 7.7.2. 15fps Pulse Width Trigger Shutter Mode



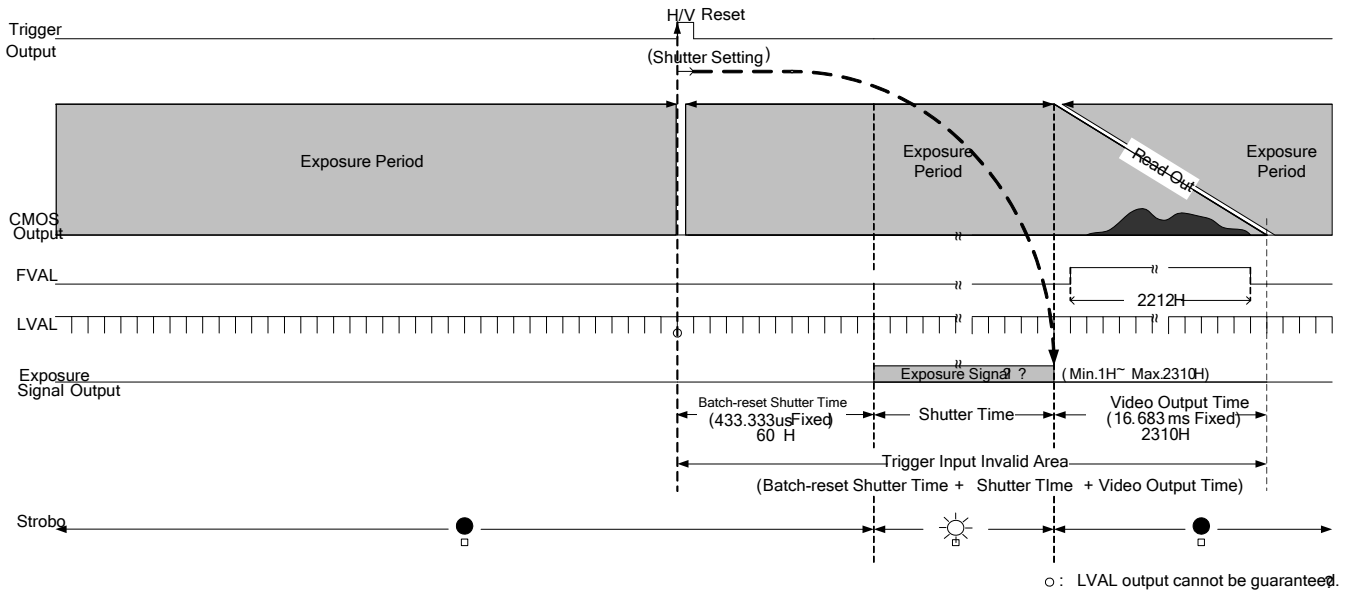
### 7.8. 15fps Trigger Shutter Mode Timing (Batch-Reset Shutter/Pseudo-Reset Shutter)

- Rolling Shutter system is adopted to VCC-FC41SX29CL so that electrical charge cannot be swept out at one time to reset. Due to this rolling shutter system, images out-of-exposure signal period will be superimposed. To avoid the superimposed images, please keep shooting conditions dark or give sufficient stroboscopic lighting source when shooting.

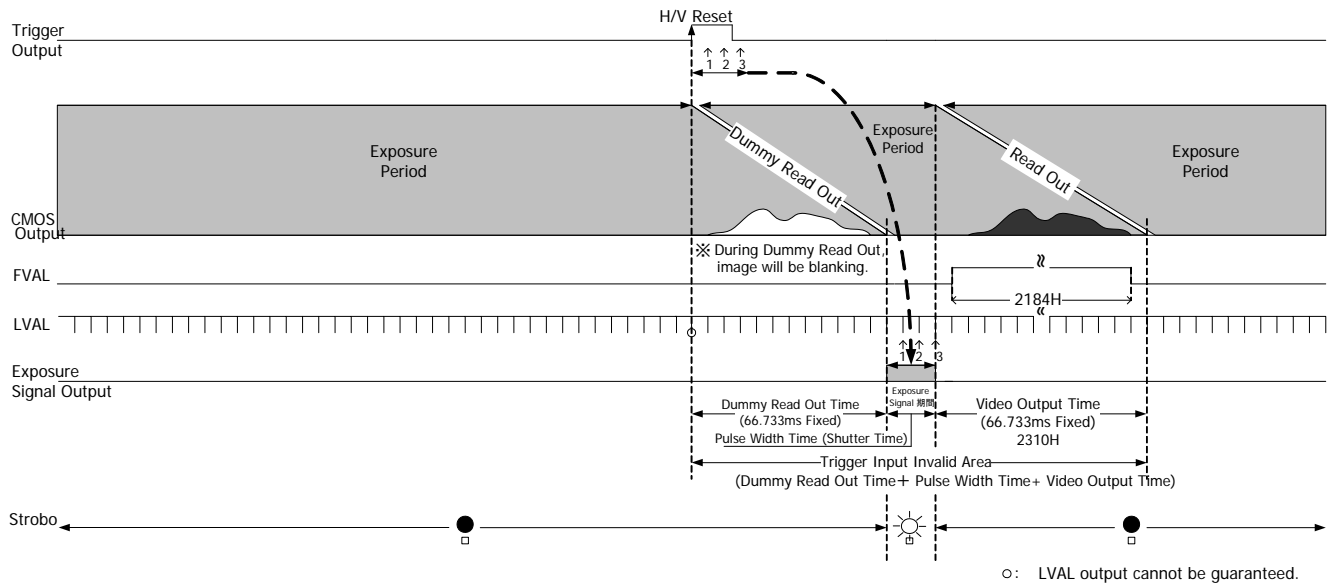
With Batch-Reset Shutter mode, the electrical charge of entire pixels is reset when detecting the trigger. With Pseudo-Reset shutter mode, the electrical charge, stored before the trigger input, can be reset, reading out the video once from CMOS sensor when detecting the trigger.

- Trigger operation is CLK sync, V-Sync Reset.  
Delay time, from detecting the trigger edge to starting exposure, is as follows.  
15fps Trigger Shutter Mode (Batch-Reset Shutter) : 433.333  $\mu$ s  
15fps Pulse Width Trigger Shutter Mode (Pseudo-Reset Shutter) : 66.733ms
- With 15fps Pulse Width Trigger Shutter Mode (Pseudo-Reset Shutter), the camera samples trigger shutter signals with H (28.889  $\mu$ s).  
Therefore, trigger signals with margin, over H (28.889  $\mu$ s) x n + 1  $\mu$ s, shall be input.  
Without the above margin, 1H jitter may occur with Shutter Time.
- Shutter Time (at Progressive Scan)  
15fps Fixed Trigger Shutter Mode : 1/34,000s (1H) ~ 1/15s (2310H)  
: 1H Step Resister Assigned (Address 009 & 010)  
15fps Pulse Width Trigger Shutter Mode : 1/34,000s (29.889  $\mu$ s) ~ 1/15s (66.706ms)  
: Pulse Width 28.889  $\mu$ s x n + 1  $\mu$ s (0  $\leq$  n  $\leq$  2309)  
: 1/15s shutter will be set when trigger over  
66.706ms is input.
- The shortest input interval (Tact Time) is as follows.  
15fps Trigger Shutter Mode (Batch-Reset Shutter)  
: Batch Reset Shutter Time t (433.333  $\mu$ s) + Shutter Time + Video Output Time (Progressive: 66.733ms)  
15fps Pulse Width Trigger Shutter Mode (Pseudo-Reset Shutter)  
: Dummy Read Out Time (66.733ms) + Shutter Time + Video Output Time (Progressive: 66.733ms)
- Trigger signals input prior to the completion of video output signals for the prior trigger shall be ignored.

7.8.1. 15fps Fixed Trigger Shutter Mode (Batch-Reset Shutter)



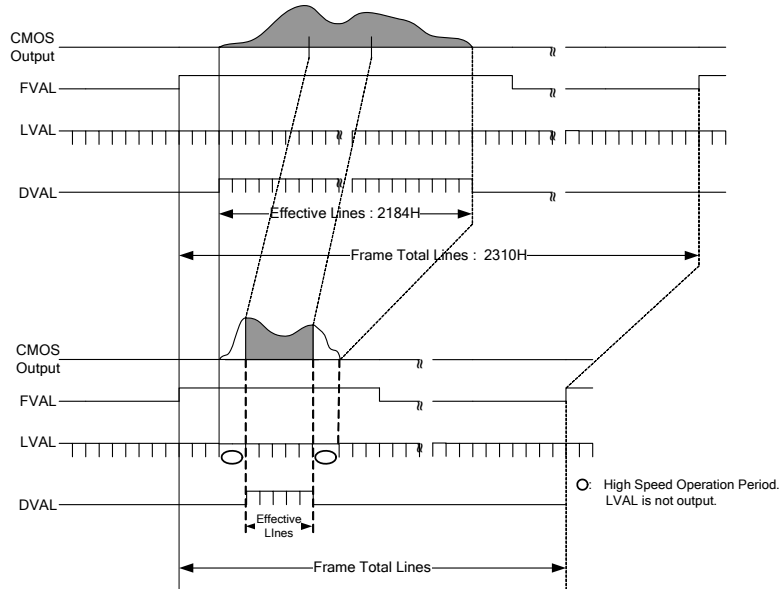
7.8.2. 15fps Pulse Width Trigger Shutter Mode (Pseudo-Reset Shutter)



8. Partial Scan Mode Details

Note:

- (1) Partial scan mode is effective only when trigger mode is set.
- (2) Reading start position and effective lines shall meet the following conditions.
  - Start position register (Address 016 & 017) + effective line register (Address 019 & 020) = < 27
  - Total line register (Address 029 & 030) value + 1 become frame total lines.
  - LVAL signals shall not be output when the camera is operating at high speed with partial scan.



- When the start position is set other than 0, the top 1 line out of total lines will not be output.

Capturing start position and capturing width can be set per 78H via camera link connector serial port.

Start Position Register (Address 016 & 017) : 0 (0H) ~ 27 (2106H) ... 78H x n  
 Effective Line Register (Address 019 & 020) : 0 (78H) ~ 27 (2184H) ... 78H x (n + 1)  
 Total Line Register (Address 029 & 030) : ... (Read Only)

<Example 1> Conditions: Reading out position register (Address 016 & 017) = 000

Effective line register (Address 019&020)	Effective lines	Frame total lines (Address 029&030) + 1	Frame Rate	
			15fps mode	60fps mode
0 (mini)	78 H	258 H	134 fps	537 fps
.	.	.	.	.
6 (vertical: VGA equiv.)	546 H	714 H	48 fps	194 fps
.	.	.	.	.
7 (vertical: XGA equiv.)	624 H	790 H	44 fps	175 fps
.	.	.	.	.
13 (vertical: SXGA equiv.)	1092 H	1246 H	28 fps	111 fps
.	.	.	.	.
15 (vertical: UXGA equiv.)	1248 H	1398 H	25 fps	99 fps
.	.	.	.	.
27 (Max: total lines)	2184 H	2310 H	15 fps	60 fps

## 9. Remote Interface Function

Through serial port of camera link connector, the camera can be controlled.

### (1) The settings for RS-232C

Baud rate : 9600bps  
 Data : 8bit  
 Stop bit : 1bit  
 Parity : None  
 XOn/XOff : Not controlled

### (2) Control code

- The total control code is 14 bits, 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 "W" Write mode "C" Camera mode	Please refer to the address table of Section 5.Function Settings.			000~255			0 Dh
00EEEE: 4digits error code						"X" error response	0	0	0	0	0	0	

Camera No. is fixed with 6 bite 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 11<sup>th</sup> ~13<sup>th</sup>, 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 the camera side detects an error.

Error details can be checked with 4 digits, 3<sup>rd</sup> to 6<sup>th</sup> bytes.

- 0101 Address value error
- 0102 Command error
- 0103 Data value error
- 0104 Data length error (over 14 byte)

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

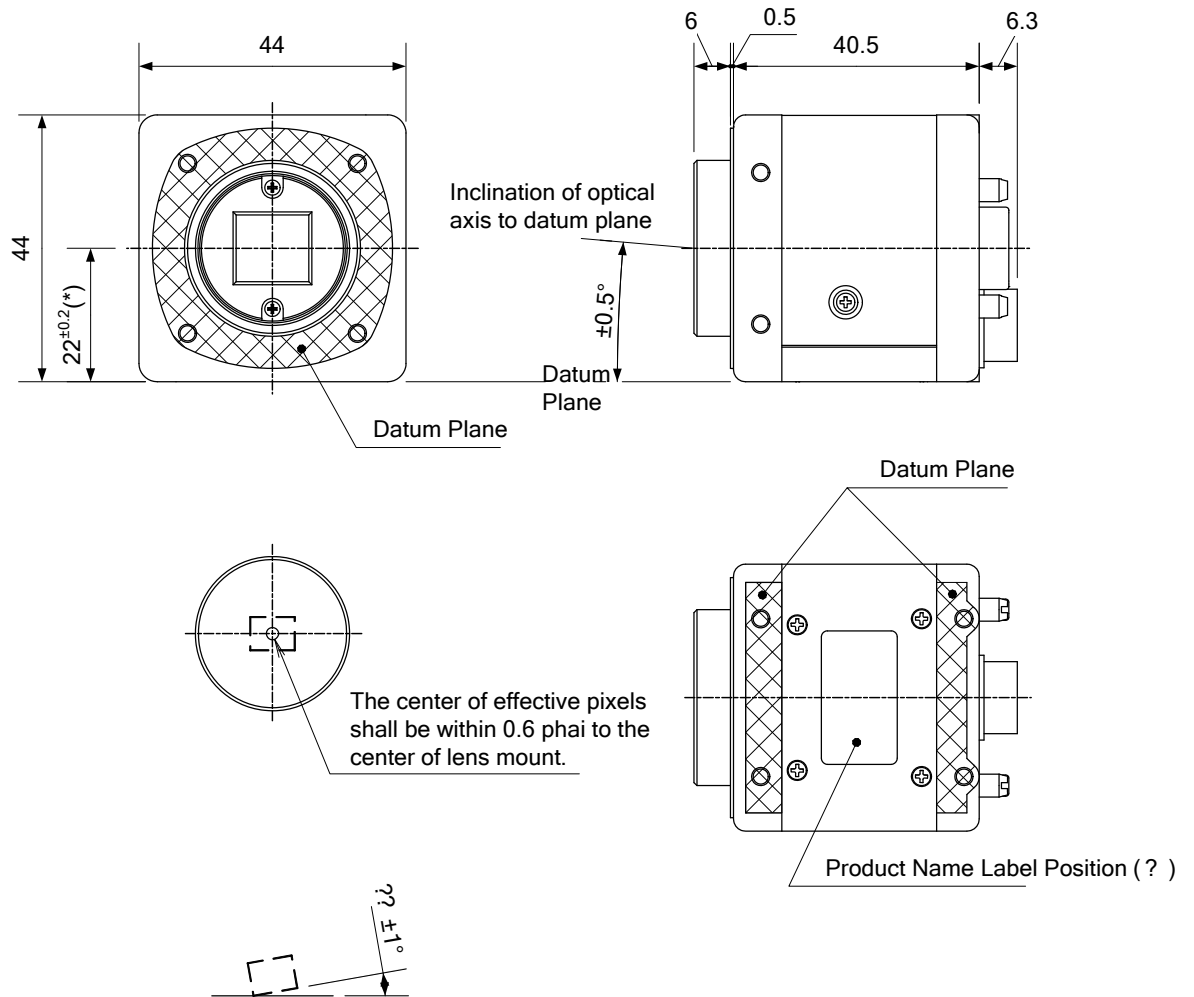
Be sure to input "CR" to confirm the end of the command.

※ Note: When setting the data with 2 Byte, High Byte shall be set first, then Low Byte to the next. The camera rewrites the internal resistor when receiving Low Byte.

## 10. Initial Settings

Function	Address	Data
Gain	001	0: 0 dB
E-Shutter	002	0: 1/60s (Off)
White Balance	003	1: 3200K
Trigger Shutter Mode	004	0: Normal Shutter Mode (Trigger Shutter Mode Off)
Trigger Polarity	011	0: Positive Input
Trigger Input Port Selection	012	0: Camera Link (CC1) Input
Output Data Selection	013	0: 8bit Output
Partial Scan Mode	015	0: Full Frame Scan Mode
Partial Scan Start Position	016&017	0: 0 Position
Camera Mode	018	1: 60fps Mode
Partial Scan Effective Lines	019&020	27: 2184 lines
Partial Scan Total Lines	029&030	2309: (Read Only)
12pins Connector Output	034	0: LVAL Output
Exposure Signal Polarity	035	0: Positive Output
60fps Mode Output Format	036	1: 6 Taps Separated Output Format

11. CCD Optical Axis Accuracy

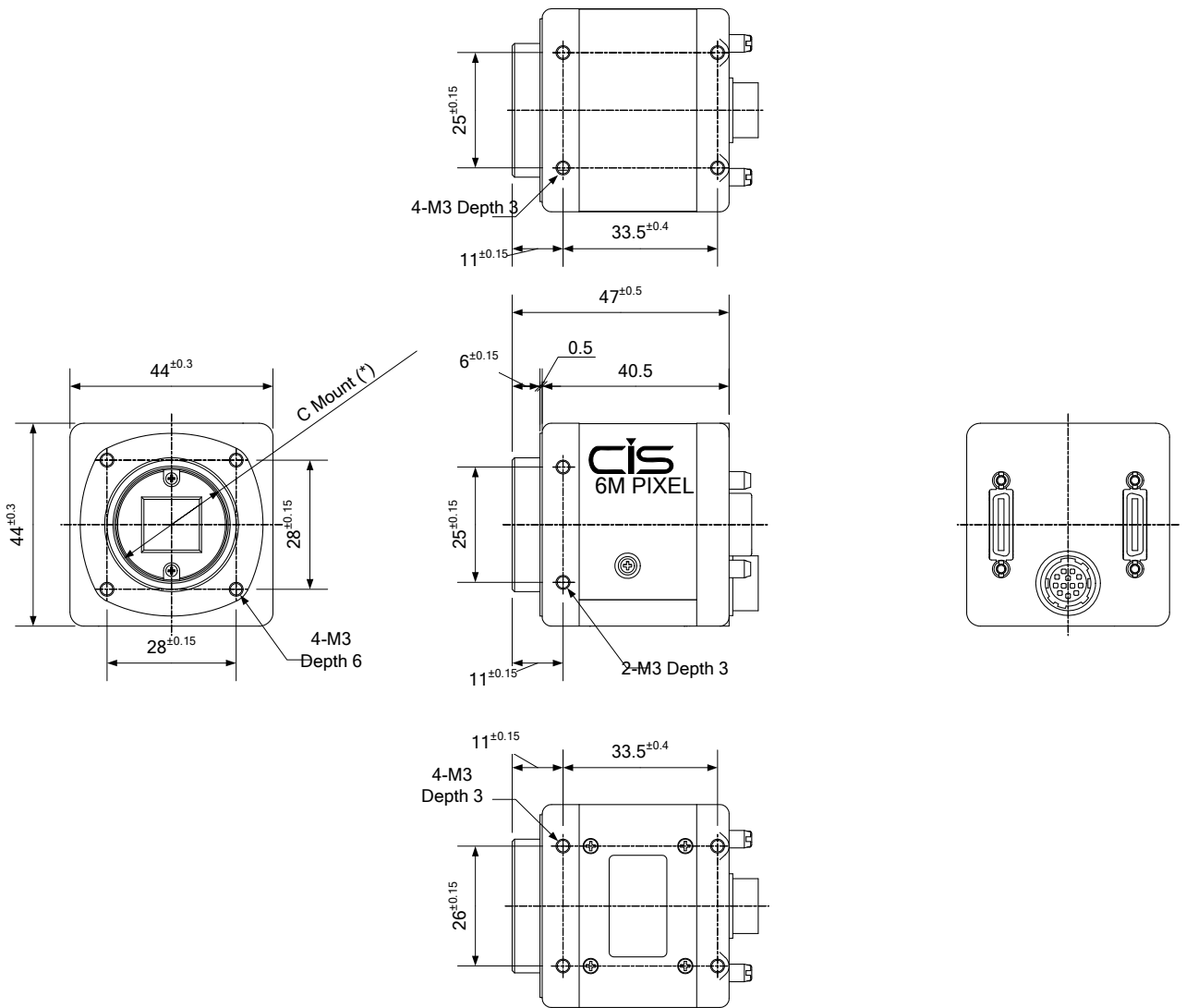


Inclination of effective pixels "Theta" to datum plane is  $?? \pm 1^\circ$

910-012-00-00  
(Unit: mm)

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

12. Dimensions



999-521-00-00  
(Unit: mm)

\*) C mount screws comply with ANSI/ASME B1.1, 1-32UN(2B).  
 \*) Screw length from C mount lens surface shall be under 6mm.  
 And protruding portion shall be less than 10mm.

### 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.