2M CMOS NIR Camera

ID2MB-CLIR (B/W)

Technical Manual

iDule Corporation

1. **Product Outline**

ID2MB-CLIR is a Camera Link (PoCL) interfaced and 2M resolution 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.

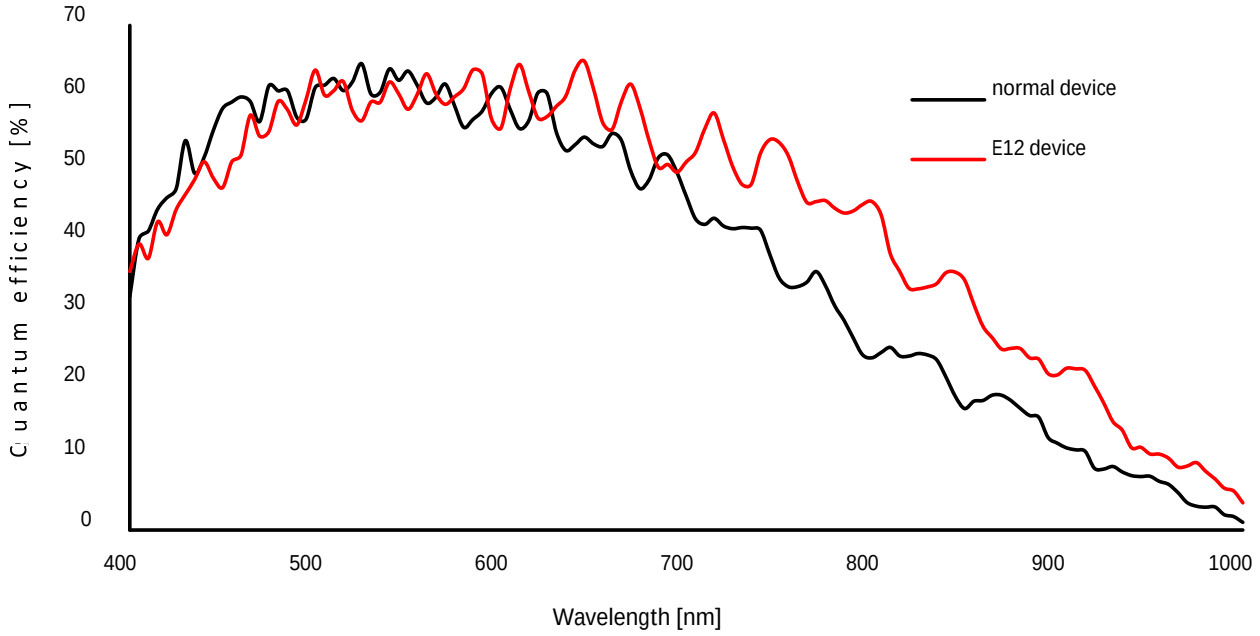
3. **Specification**

3.1. General Specification

(1)	Image Sensor	Type	Diagonal length 12.775mm, Global Shutter (CMOSIS CMV2000)
		Effective Pixel Number	2048(H) x 1088(V)

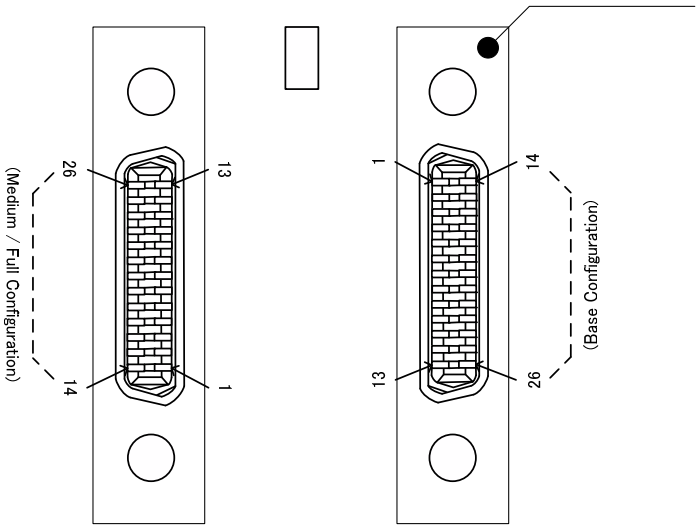
3.3. Spectral Response (Representative Value)

ID2MB-CLIR E12 device



4. **Connector**

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



Connector (CN2)

Pin No		Pin No	
1	**NC**	14	**GND**
2	Y0-	15	Y0+
3	Y1-	16	Y1+
4	Y2-	17	Y2+
5	Yclk-	18	Yclk+
6	Y3-	19	Y3+
7	100ὴ	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	**NC**

Connector (CN1)

Pin No		Pin No	
1	**+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	**+12V(PoCL)**

4.2. Power LED

Camera turns on LED light, when it is supplied electricity from the frame Grabber board.

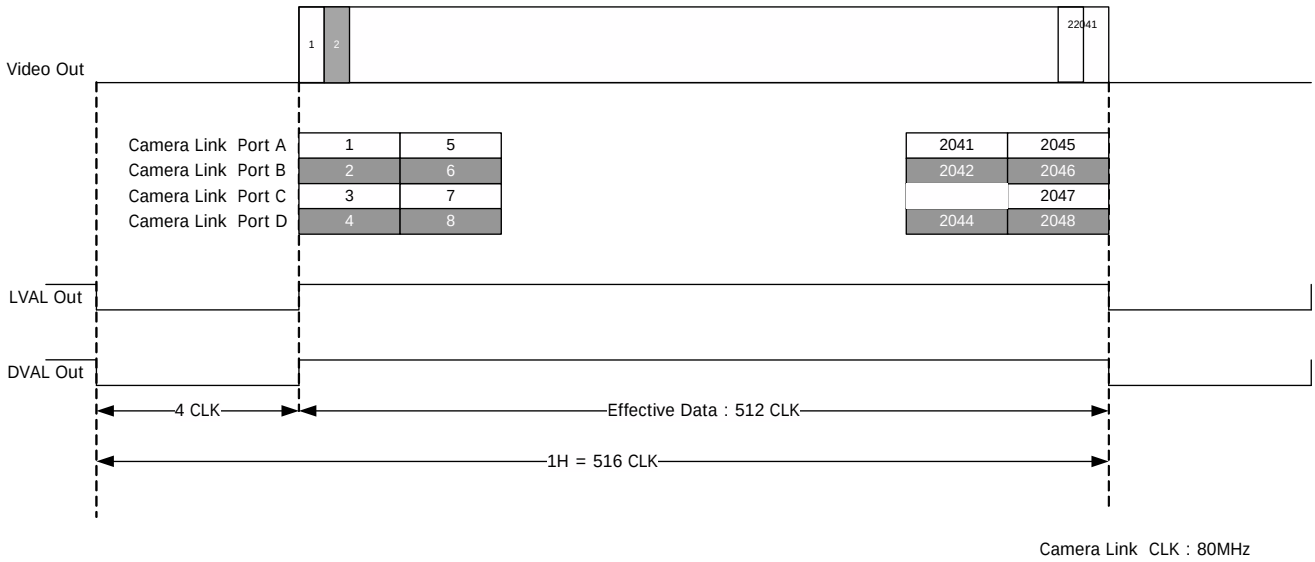
*Power feeding line of CN1 (on Base Configuration connector side) will be connected to the camera internal power input. At this time, power feeding line of CN2 (on Medium/Full Configuration connector side) shall be OPEN. When using at Medium /Full Configuration mode, please contact the frame grabber board manufacturer to make sure that there would be no problem with the above connection.

5. **Timing Chart**

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

5.2. Vertical Synchronous Signal

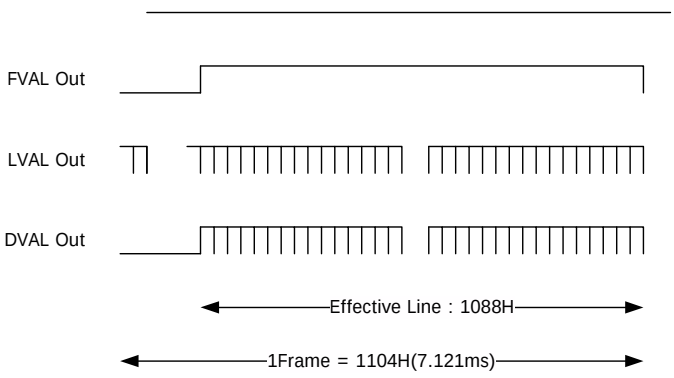
5.3. Horizontal Synchronous Signals Timing (4Tap Medium Configuration : 140fps)



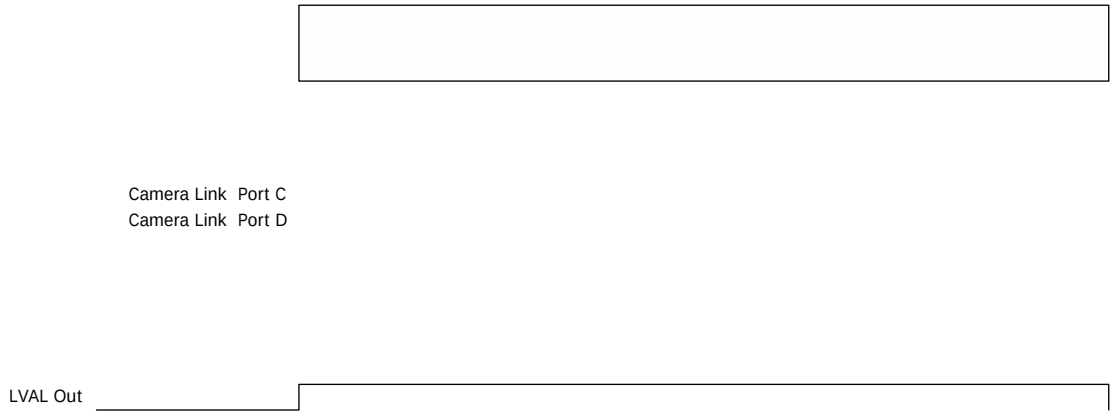
Camera Link CLK : 80MHz

5.4. Horizontal Synchronous Signals Timing (2Tap Base Configuration Center Trimming 1024(H))

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

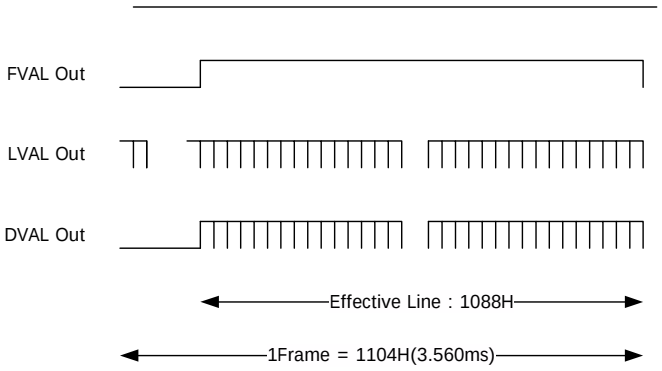


5.6. Horizontal Synchronous Signals Timing (8Tap Full Configuration : 280fps)



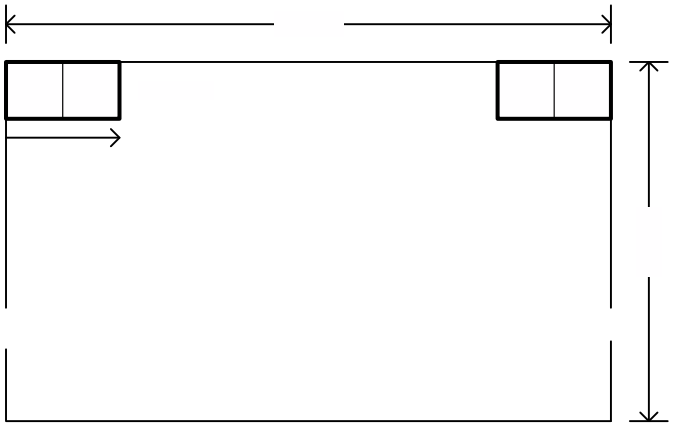
5.7. Horizontal Synchronous Signals Timing (2Tap Base Configuration Center Trimming 512(H))

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

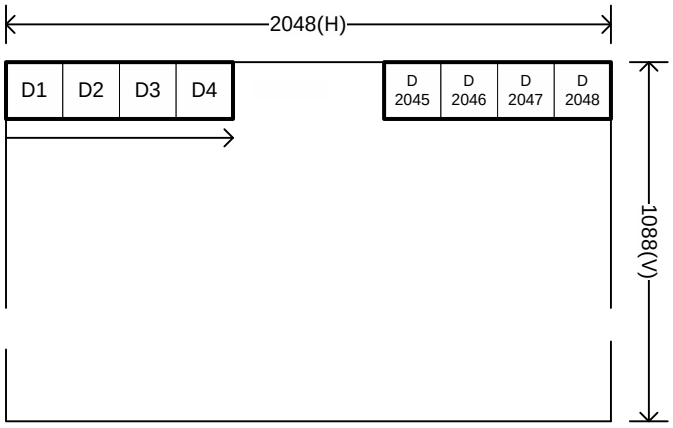


5.9. Video Output Format

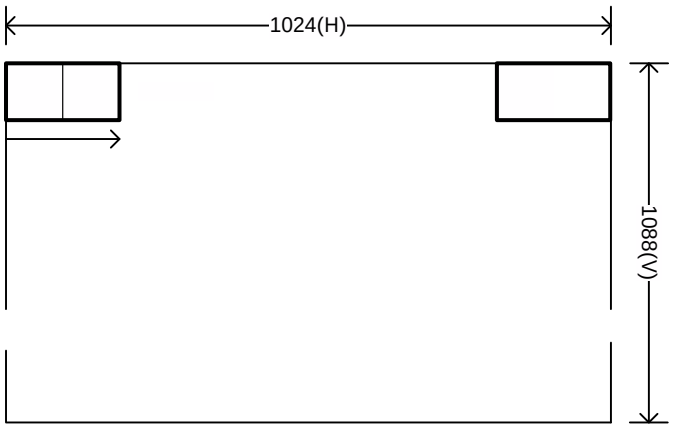
(1) 2Tap Base Configuration : 70fps



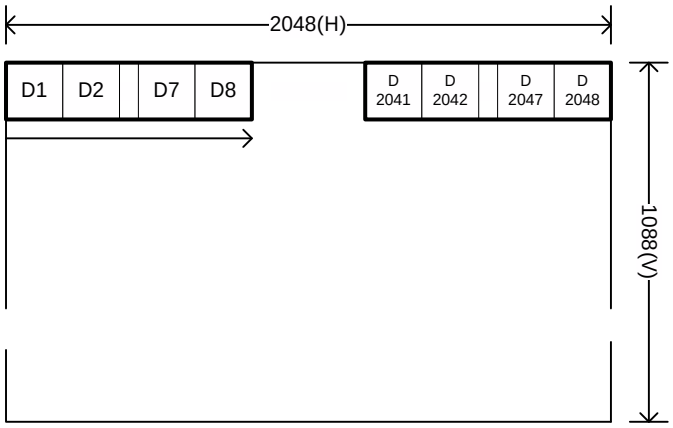
(2) 4Tap Base Configuration : 140fps



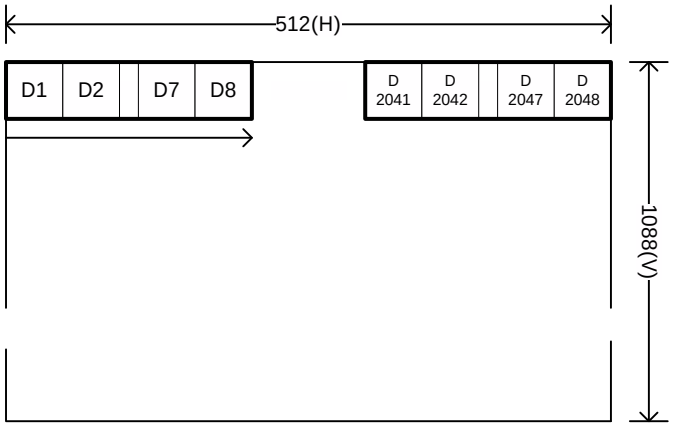
(3) 2Tap Base Configuration Center Trimming 1024(H)



(4) 8Tap Full Configuration : 280fps



(5) 2Tap Base Configuration Center Trimming 512(H)



5.10. 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 Rest.

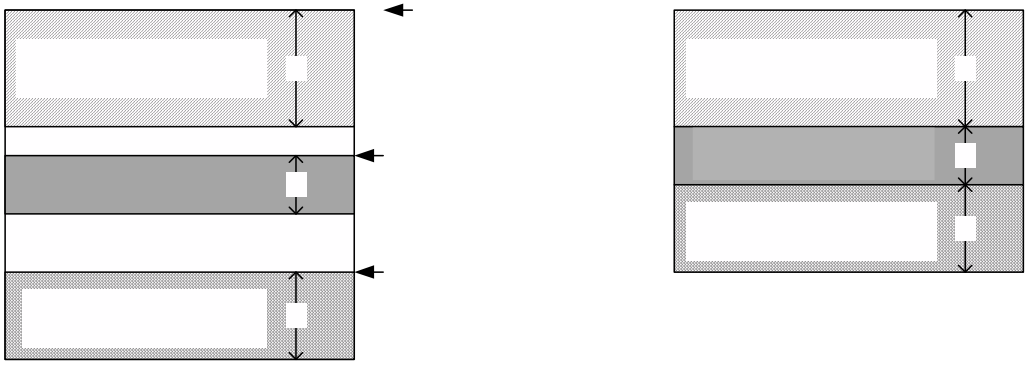
Delay time (Exposure Time Delay) from detecting trigger edge in the camera to starting exposure is max 1HD.

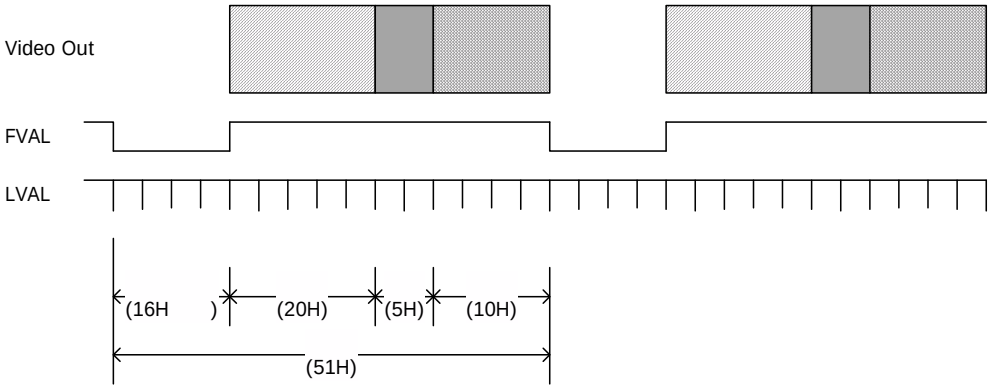
6. **Center Trimming Mode**

(1) Center Trimming 512(H) Output
(2) Center Trimming 1024(H) Output

<Example 1.> 512(H) x 512(V) 587fps

Address : 0A Data : 04 Horizontal 512(H) 2Tap Base Configuration Center Trimming
Address : 50-51 Data : 512 Vertica4_ 512(ess 4 54-51 Data 2




Video Out
FVAL
LVAL
(16H)
(20H)
(5H)
(10H)
(51H)

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 numerial order of start 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 ñSum total of partial effective line numbers (expect V blanking lines) < **1088**ò should be met.

Frame rate = 1 / (Entire frame line numbers Ĭ Time for 1 line)

Camera Mode	Time for 1 Line
2Tap Base Configuration	12.9us
4Tap Medium Configuration 2Tap Base Configuration Center Trimming 1024(H)	6.45us
8Tap Full Configuration 2Tap Base Configuration Center Trimming 512(H)	3.225us

Example

	Effective Line Number	Frame Total Line Number	Frame Rate (Total Line)		
			2Tap Base Configuration	4Tap Medium Configuration	8Tap Full Configuration
1(Min)	1 H	17H	4560fps	9120fps	18240fps

@erti Ṫal ' 4ک0 H ' A 56fps

8. **Remote Communication**

8.1. Command Specifications

1) Set some values of resister

Command Set Resister

STX	S	R	(a)	(a)	(d)	(d)		ETX

Address Data Variable-length max 16 address

Return Value

Succeed	ACK
Fail	NAK

2) Get some value of resister

Command Get Resister

STX	G	R	(a)	(a)	(d)	ETX

Address Number of data acquisition optional

Return value

3) Set User's data

Command Set User's data

STX	S	U	(n)			ETX

Table No. (0~3)

User's data (fixed length :16byte)

Return Value

Succeed	ACK
Fail	NAK

Remarks

The commands, sets free data on the specified register, and can use 4 tables (1 table : 16 characters).

4) Get User's data

Command Get User's data

STX	G	U	0	ETX

Table No. (0~3)

Response

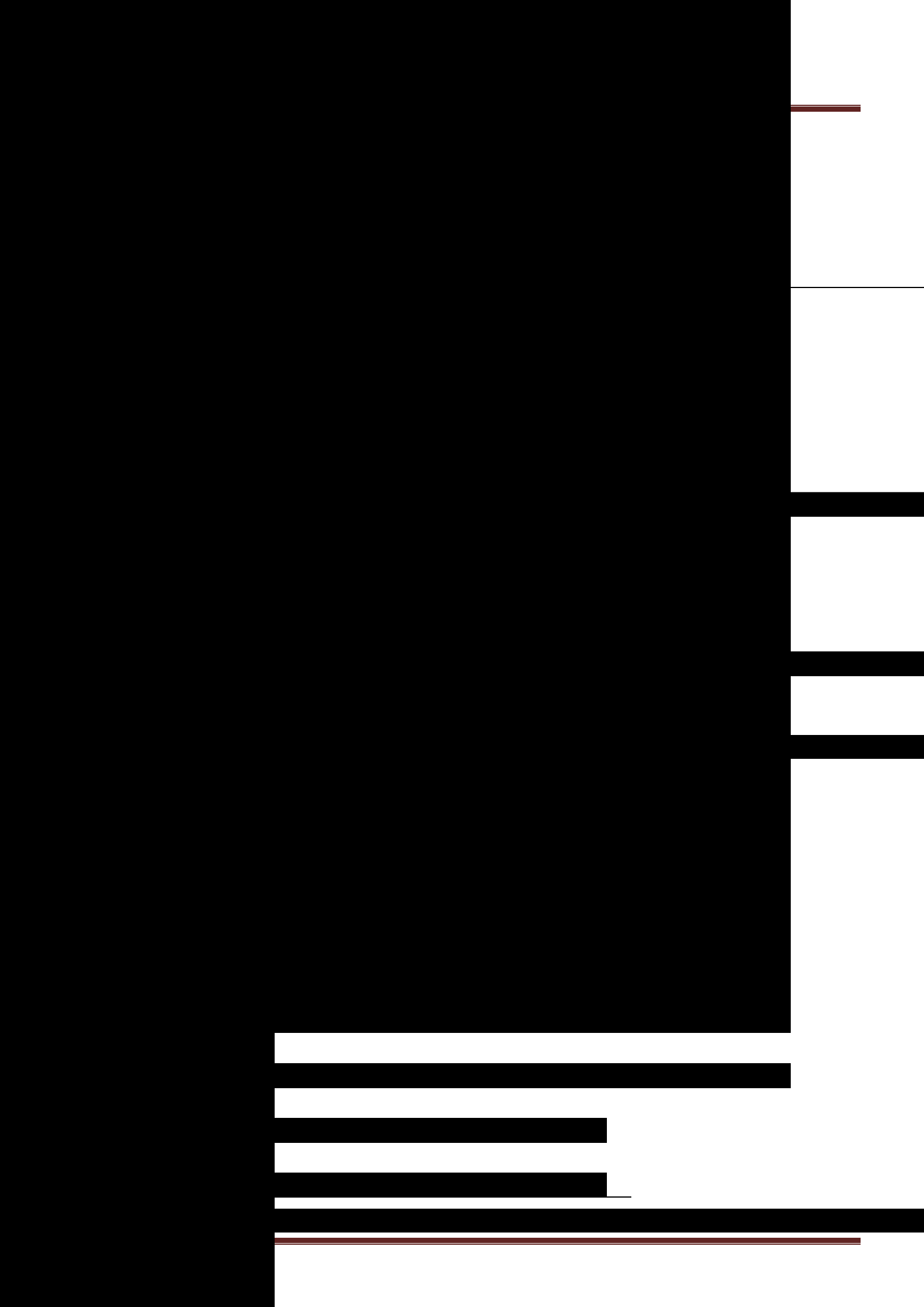
Succeed

STX	A	U	(d)	(d)		ETX

User's data (fixed length : 16byte)

Fail

NAK



9) Get a firmware version

Command Query Version

STX	Q	V	ETX

Return Value

Succeed

STX	R	V	(d)	(d)	ETX

Version information (fixed length 8byte)

Fail

NAK

10) Get a detail of error information

Command Query Error

STX	Q	E	ETX

Return Value

Succeed

STX	R	E	(d)	(d)	(d)	ETX

Kind Detal

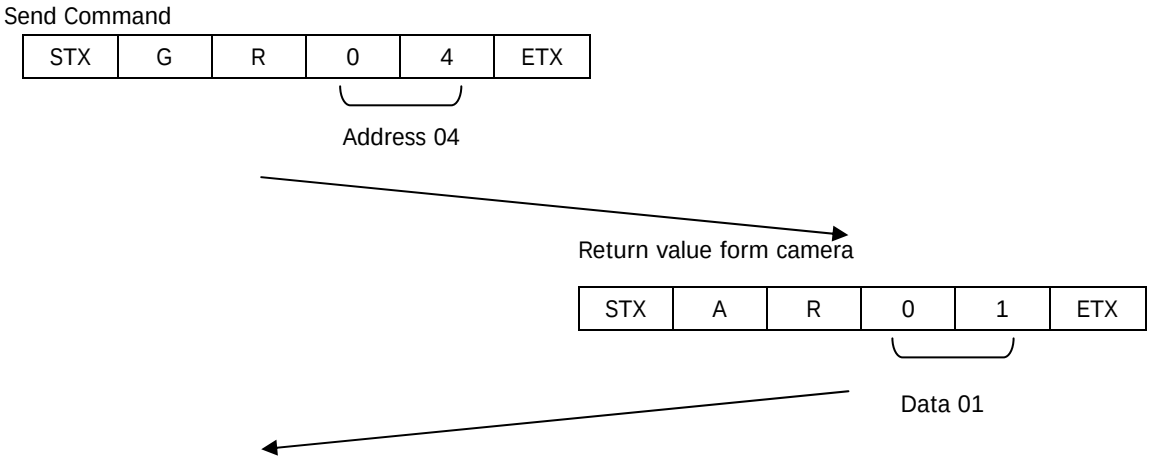
Fail

NAK

Kind		Detail	
0	No Error	00	Normal result
1	Communication Protocol Error	00	

8.2. Control Example

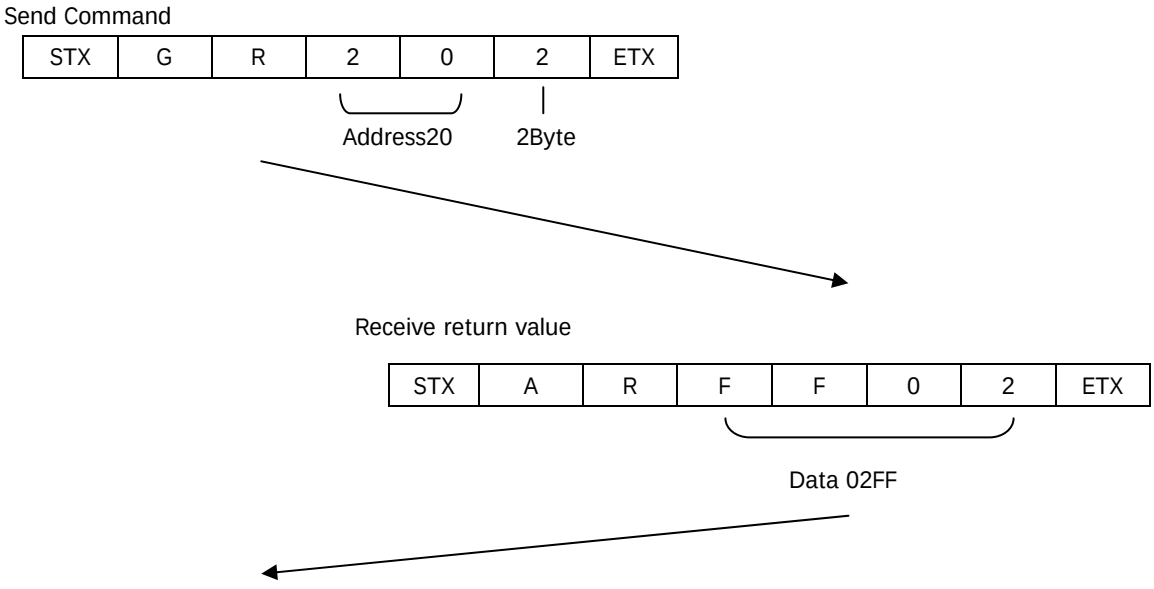
1) How to check trigger shutter mode. (The command gets a value from address 04)



Receive Return Value

The camera is working with a trigger shutter mode, because the command received a 01 from the camera.

2) How to check trigger shutter mode. (The command gets consecutive 2 bytes values from address 20)



Receive return value

The shutter mode of camera is working +12dB, because the command received a 02FF(767) from the camera.

3) How to set partial scan mode. (The command sets 01 for address 08)

Send Command

STX	S	R	0	8	0	1	ETX

Address 08 Data 01

Return value form camera

Receive Return Value

The command finished normally, because the command received ACK from the camera.

4) How to Send Command for manua Ά M ت t ³ How ¥ ” ᴀ ƀ ẇ l ə

STX S R 0 H Addr

5) How to save configurations of a camera. (The command send CS)

9. **Function Setting**

Function	Address(Hex)	Data(Hex)	
Baud Rate	10	00:	9600bps
		01:	19200bps
		02:	38400bps
		03:	57600bps
		04:	115200bps
Output Image Flip Vertical	18	00:	Normal
		01:	Flip Vertical
LED ON/OFF	1B	00:	OFF
		01:	ON
Manual Gain	20-21	LLHH:	min:0(0H) - max:767(2FFH) 0: x1(0dB), 767: x4(+12dB)
Manual Shutter	24-25	LLHH:	min:0(0H) - max:1087(43FH)
			2Tap Base Configuration: Shutter time = 16.641us + (1088 - (setting value)) ǐ 12.9us min:0=14.052ms(1/70s), max:1087=29.541us(1/30000s)
			4Tap Medium Configuration / 2Tap Base Configuration Center Trimming 1024(H): Shutter time = 16.641us + (1088 - (setting value)) ǐ 6.45us min:0=7.034ms(1/140s), max:1087=23.091us(1/40000s)
			8Tap Full Configuration / 2Tap Base Configuration Center Trimming 512(H) Shutter time = 16.641us + (1088- (setting value)) ǐ 3.225us min:0=3.525ms(1/280s), max:1087=19.866us (1/50000s)

LLHH : The data set with 2 Byte shall be set with Low Byte first, then set with High Byte.

< Example> Manual Shutter (Address 24-25) ->6671(1A0FH)

STX SR 24 0F 1A ETX

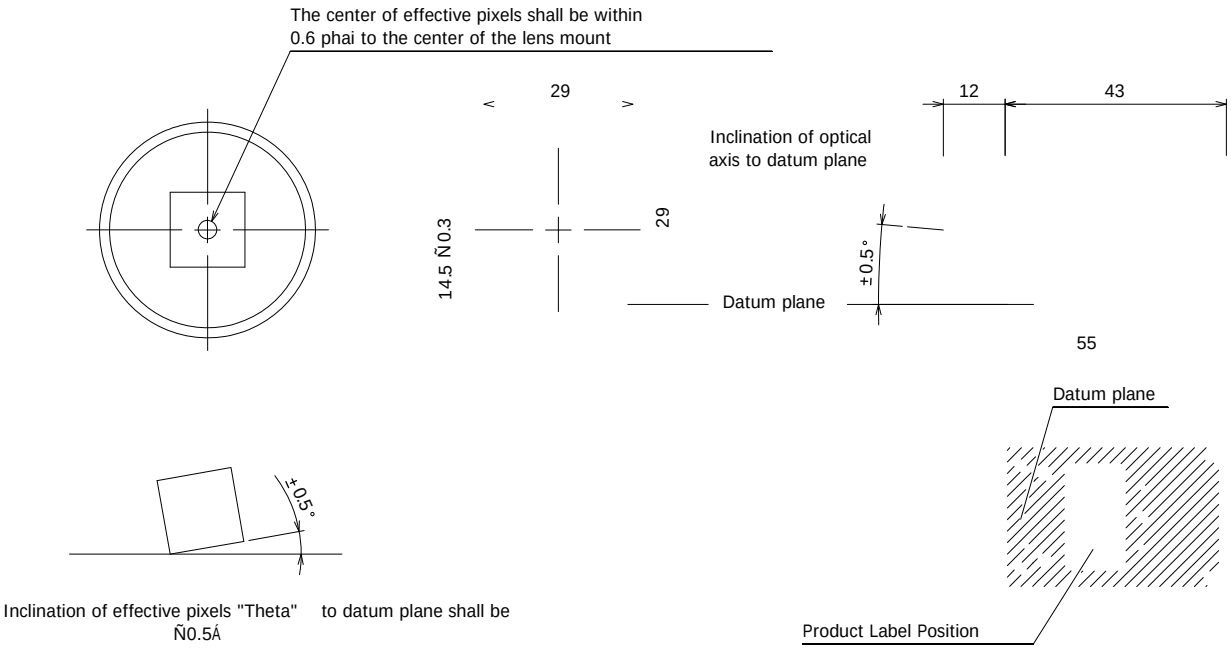
Function	Address(Hex)	Data(Hex)	
Cursor Position X Coordinate	3C-3D	LLHH:	min:0(0H) - max:1087(43FH)
Cursor Position Y Coordinate	3E-3F	LLHH:	min:0(0H) - max:1087(43FH)
Partial Scan Start Position 1	40-41	LLHH:	min:0(0H) - max:1087(43FH) *ID2MC-CL : Color Camera Start Position Setting -> Only even number *If you not use partial scan function, you need to set ñstart position 1~8=0ò.
Start Position 2	42-43		
Start Position 3	44-45		
Start Position 4	46-47		
Start Position 5	48-49		
Start Position 6	4A-4B		
Start Position 7	4C-4D		
Start Position 8	4E-4F		
Partial Scan Effective Line 1	50-51	LLHH:	min:1(1H) - max:1088(440H) *ID2MC-CL : Color Camera Effective Line Setting -> Only even number *If you not use partial scan function, you need to set ñeffective line 1=1088(440H),2~8=0(0H)ò.
Effective Line 2	52-53		
Effective Line 3	54-55		
Effective Line 4	56-57		
Effective Line 5	58-59		
Effective Line 6	5A-5B		
Effective Line 7	5C-5D		
Effective Line 8	5E-5F		

LLHH : The data set with 2 Byte shall be set with Low Byte first, then set with High Byte.

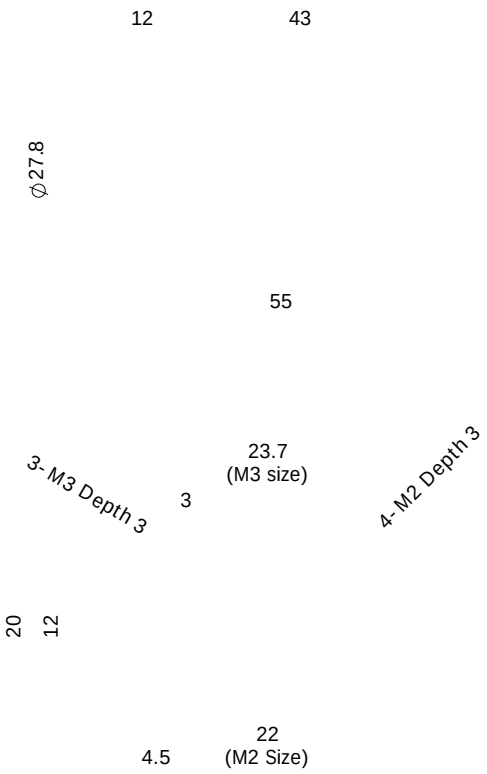
< Example > Manual Shutter(Address 24-25) ->6671(1A0FH)

STX SR 24 0F 1A ETX

10. **CMOS Optical Axis Accuracy**



11. **Dimensions**



12. **Initial Setting**

Function	Address	Data	
Shutter	01	00:	1/140s(OFF)
Trigger Mode	04	00:	Normal (Trigger OFF)
Trigger Polarity	05	00:	Positive
Partial Scan Mode	08	00:	Full Frame
Camera Mode	0A	01:	4Tap Medium Configuration
Output Data Selection	0B	00:	8bit
Baud Rate	10	00:	9600bps
Output Image Flip Vertical	18	00:	Normal
LED ON/OFF	1B	01:	ON
Manual Gain	20-21	0000:	0dB
Manual Shutter	24-23	0000:	Shutter (OFF)
Partial Scan Start Position	40-41,42-43, 44-45,46-47, 48-49,4A-4B, 4C-4D,4E-4F	0000:	Start Position 0
Partial Scan Effective Lines	50-51	4004:	Effective Lines 1088
	52-53,54-55, 56-57,58-59, 5A-5B,5C-5D, 5E-5F	0000:	Effective Lines 0

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).

14. **CMOS Pixel Defect**

IDULE 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 IDULE 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.