

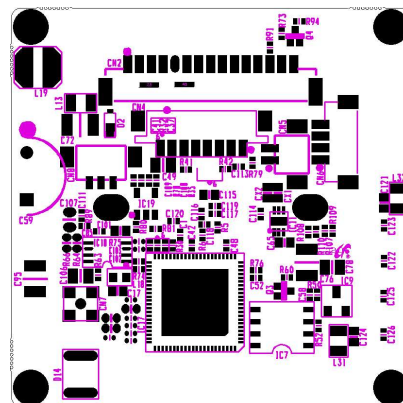
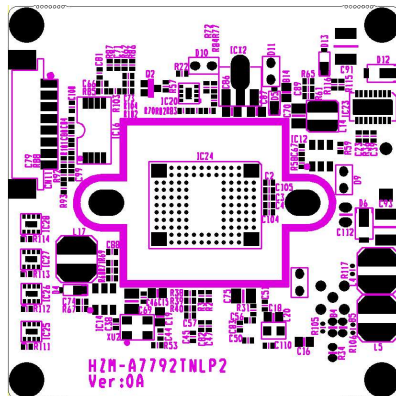


CUSTOMER	
ATTENTION 1	2M STARVIS™ CMOS
ATTENTION 2	42x42mm
MODEL	HCM-A7792TNL
CODE NO	

HD-SDI/EX-SDI1,2/TVI/AHD/VBS Color Camera Module

SPECIFICATIONS

04. 18. 2017



P&A Corporation



Table of Contents

- Revision History

1. Features	4
2. Applications & Information	
2-1. General Specifications & Functions	6
2-2. Block Diagram	7
2-3. I/O Interface Specifications	
2-3-1. I/O Circuit	8
2-3-2. I/O Specifications	9
2-3-3. ADC Key	12
2-3-4. How to Choose the HD-SDI & EX-SDI	13
2-3-5. PCB Layout	14
2-4. PCB Outline Dimensions	15
2-5. OSD Menu tree	16
2-6. OSD Menu Functions	18
3. UART Protocol	
3-1. Connection	32
3-2. Communication Protocol	32
3-3. Communication Command	33
4. Packing Information	34
5. Reference Data Sheet	
5-1. OLPF(Optical Low Pass Filter) Specifications	
5-1-1. OLPF for general lens	35
5-1-2. OLPF for general lens-2	36
5-1-3. OLPF for TDN lens	36
5-1-4. OLPF for Night Vision	37
5-2. I/O Connector Specifications	38





- Revision History

Date	Version	Description
FEB.21 2017	0A	Establishment
APR.18 2017	0B	Osd Menu update



1. Features

■ 1/2.8" STARVIS™ 2MEGA SONY CMOS

High definition 12-bit digital image signals offering 2 mega pixels are obtained with high speed of 120 fps (LVDS output I/F) and with low power consumption. High sensitivity, low dark current and no smear are achieved through the adoption of R, G and B primary color mosaic filters. This chip features an electronics shutter with variable charge-integration time.

■ High Resolution 1100(Color)/(BW) TV Lines

This camera has realized high resolution of **1100(Color)/(BW)** TV lines using the top-notch full digital image processing, 12 Bit A/D serial signal processing and special algorithm technologies.

■ 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 caused by movement.

■ DAY&NIGHT (Output the Filter changing signal)

This camera has the Day&Night function which outputs the filter changing signal with detecting the illumination condition. Day&Night operation feature an 'auto' mode which switches between day and night mode automatically based upon the level of illumination on the scene.

EXTERN mode changes between day and night operation upon triggering from an external source(Optional).

And also, the COLOR mode operates in daytime conditions to provide optimum colors, and B/W mode operates in night-time conditions to enhance the definition of the image.

■ SMART IR & WDR

Brightness of IR and saturation phenomenon are automatically adjusted. Multiple exposure WDR(Wide Dynamic Frange)

■ OSD (On Screen Display)

This camera supports the OSD function which is used with multi language. And so, the camera can be controlled by selecting text displayed on the monitor screen.

■ Privacy Mask Function (16 area)

Privacy masking allows for the 'blinking' of specific areas of a scene, where the viewing or recording of images is prohibited or undesired.

The technology of this camera allows for the user defined setting of a 16 point rectangle mask, which is overlaid onto the video signal output.

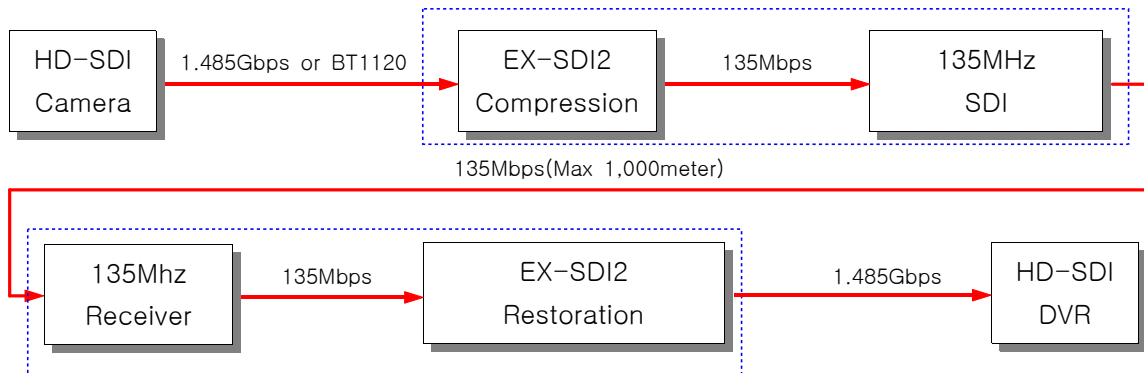


■ EX-SDI (HD-VLC : Long Reach Solution) & UTC

This camera supports the EX-SDI2™(Long Reach Solution). The EX-SDI is no loss of up to 1,000m (warranty 600m) to HD-SDI (1.5GHz) is a revolutionary technology that can be transferred.

The technical background EX-SDI2 : HD-SDI video signal is compressed and then lowered the frequency of 135Mhz to transfer technology to increase the distance almost no loss of image.

<BLOCK DIAGRAM>



Cable Reach>

Cable Reach In Makers			
Cable Type	HD-VLC : 270Mb/s	HD : 1.485Gb/s	Full HD : 2.97Gb/s
belden 9292(RG11) 14AWG	675	335	220
Belden 7731a(rg11) 14AWG	670	330	220
Amphenol 5C-HFBT 16AWG	490	245	160
Belden 1694A 18AWG	460	230	150
West Penn 815 20AWG	535	215	140
Betden RG6(82248) 18AWG	375	185	120
West Penn 252815 20AWG	345	170	110
Belden RG59(543945) 20AWG	330	160	100
Belden 1426A(RG59)20AWG	330	160	100
Belden 1855A 23AWG	235	115	75
JYEBAO RG59B/U 23AWG	220	110	70
Canare 3C2V 25AWG	190	95	60



Always, the core wire of the cable must be 100% copper. If the core of the cable when using a cable that is coated on copper aluminum, it has reached a distance shorter.

2. Applications & Information

2-1. General Specifications & Functions

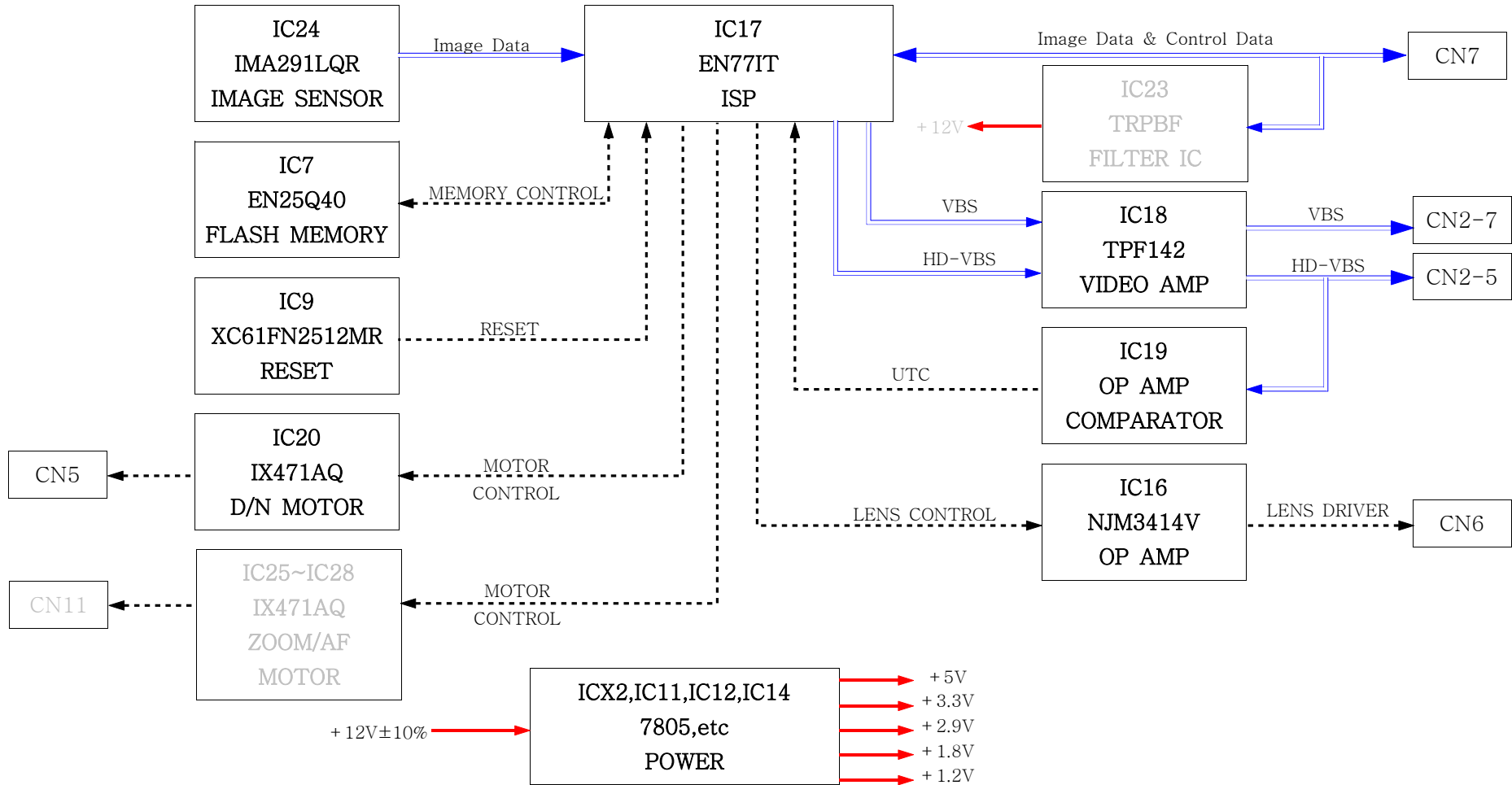
Items	Sub-items	HCM-A7792TNL
CMOS	Device	1/2.8" 2MEGA CMOS
	Total	1945 (H) × 1109 (V)
	Effective	1945 (H) × 1097 (V)
Performance	Horizontal/Vertical Resolution	1100 TV Lines
	Minimum illumination (F1.2, AGC Max)	Color : 0.03 Lux(50IRE) / 0.015 Lux(15IRE) B/W : 0.015 Lux(50IRE) / 0.007 Lux(15IRE)
	S/N Ratio	More than 50dB (AGC off)
	Frame	30fps Full HD
Functions	OSD	English/Chinese/Chinese(S)/Japanese/Korea
	Day&Night	Auto/Color/B&W/EXTERN
	ATW	1800 ~ 10500K
	High Speed Shutter	1/30(1/25) ~ 1/30Ksec
	WDR	Off/ON(30fps)
	D-WDR	Off/ON
	BLC	Off/ON (Size, Position)
	HLC	Level Setting(0~20), Color
	AGC	Level Setting(0~10) : Max 72dB
	Camera ID	Off/On (Letters A~Z, Numerals 0~9, Symbols)
	White Balance	AUTO / AUTOext / PUSH / MANUAL
	DNR	2D+3DNR, OFF/LOW/MIDDLE/HIGH
	Motion Detection	Off/ON
	Privacy Mask	16 Areas (On/Off, Color, Position)
Sens-Up	x2,x4,x8,x16,x32	



	De-Fog	AUTO/Manual
Etc. Function	Sharpness, Reverse(H,V)	0~10, Mirror, Flip
	Color Bar	Off/ON
	In/Output	Alarm Output, Ext IR Mode, IR LED Off/On
	UTC	Pelco-D
Video Output	Analog Video Output(NTSC/PAL)	Analog VBS 1.0Vp-p (75ohm Terminated)
	HD Analog Video Output(Selectable)	TVI VBS 1.0Vp-p (75ohm Terminated)
		AHD VBS 1.0Vp-p (75ohm Terminated)
Digital Serial Video Output	Selectable HD-SDI or EX-SDI1/2(Long Reach)	
Lens	Iris	DC iris(Galvanometer)
	TDN	Day & Night(Galvanometer)
Power Consumption		DC 12V±10%, Less than 2.2 Watts DC 48V±10%, Less than TBD Watts(PoC)
Operating Temperature		Absolute : -10°C ~ +50°C
Operating Humidity		Less than 90%
Dimension		42mm x 42 mm x 1.0t



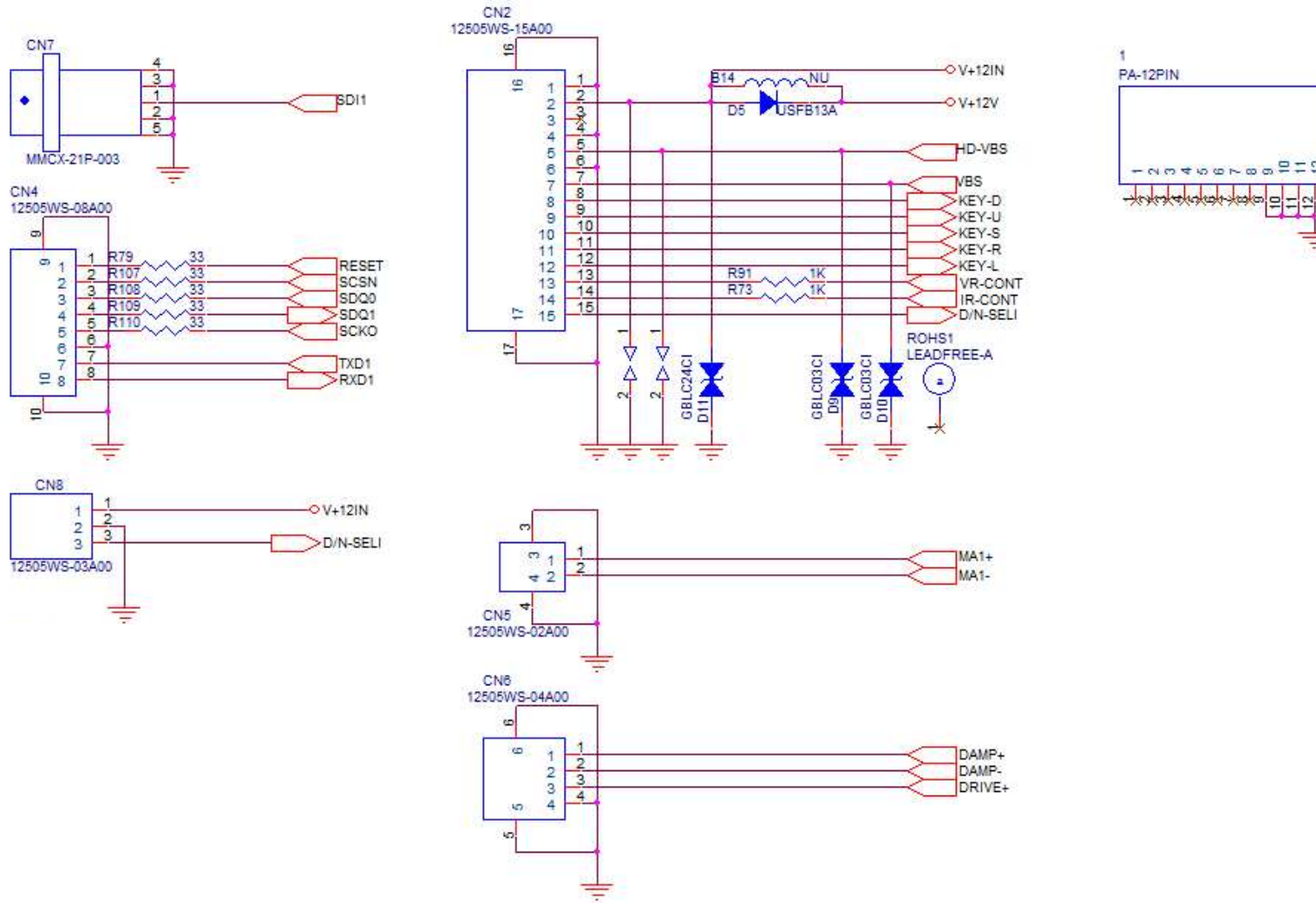
2-2. Block Diagram





2-3. I/O Interface Specifications

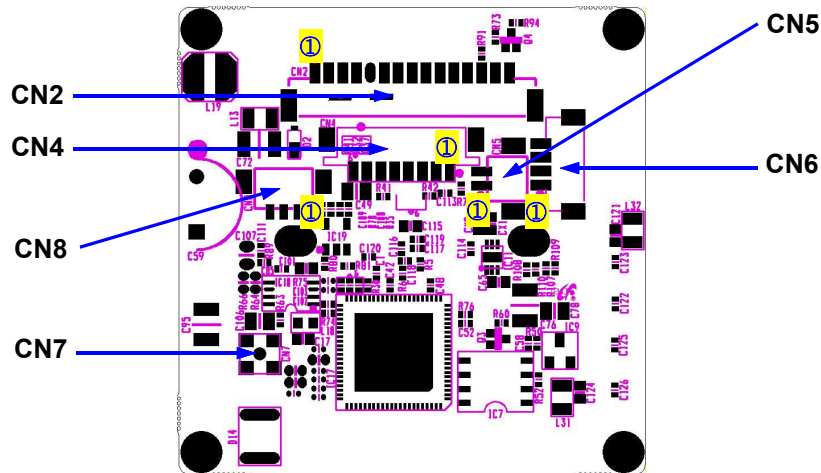
2-3-1. I/O Circuit





2-3-2. I/O Specifications

Bottom View



① CN2 : I/O Connector -1

Pin NO	Pin Name	Description	Normal	Active	I/O
1	GND	Board Ground	-	-	-
2	V+12V	DC+12V Input	DC+12V	DC+12V	I
3	NC	No Connection	-	-	-
4	GND	Board Ground	-	-	-
5	HD-VBS	HD Composite Video Output(TVI or AHD)	1Vp-p	1Vp-p	O
6	GND	Board Ground	-	-	-
7	VBS	Composite Video Output(NTSC or PAL)	1Vp-p	1Vp-p	O
8	KEY-D	OSD Control DOWN	3.3V	0V	I
9	KEY-U	OSD Control Up	3.3V	0V	I
10	KEY-S	ADC KEY INPUT/OSD Control Enter	3.3V	ADC/0V	I
11	KEY-R	OSD Control RIGHT	3.3V	0V	I
12	KEY-L	OSD Control LEFT	3.3V	0V	I
13	VR-CONT	Visible Light LED Control Output	0V/3.3V	3.3V/0V	O
14	IR-CONT	Day & Night Control Output	0V/3.3V	3.3V/0V	O
15	D/N-SELI	External Day & Night Select Input	Open(3.3V)	0V	I
Yeanho Electronics, 12505WS-15A00					

② CN4 : Connector for upgrading Camera Program

Pin NO	Pin Name	Description	Normal	Active	I/O
1	RESET	System Reset	Open	3.3V/0V	I
2	SCSN	Flash Memory Chip Select	Open	3.3V/0V	I
3	SDQ0	Flash Memory Data0	Open	3.3V/0V	I
4	SDQ1	Flash Memory Data1	Open	3.3V/0V	I
5	SCKO	Flash Memory Clock	Open	3.3V/0V	I
6	GND	Board Ground	-	-	-
7	TXD1	UART Transmit OUTPUT1(RS232)	3.3V/0V	3.3V/0V	O
8	RXD1	UART Receive INPUT1(RS232)	0V	3.3V/0V	I
Yeanho Electronics, 12505WS-08A00					



③ CN5 : Day & Night Motor Control Connector

Pin NO	Pin Name	Description	Normal	Active	I/O
1	MA+	Day & Night Motor Drive - Output	Open	0V/5V	O
2	MA-	Day & Night Motor Drive + Output	Open	5V/0V	O
Yeonho Electronics, 12505WS-02A00					

④ CN6 : Auto Iris Lens Control Connector

Pin NO	Pin Name	Description	Active	I/O
1	DAMP+	DC Iris Damping Motor +	DAMP+	O
2	DAMP-	DC Iris Damping Motor -	DAMP-	O
3	DRIVE+	DC Iris Motor Drive	DRIVE+	O
4	GND	Board GROUND	-	-
Yeonho Electronics, 12505WS-04A00				

⑤ CN7 : HD-SDI / EX-SDI1,2 Digital Serial Video Output Connector

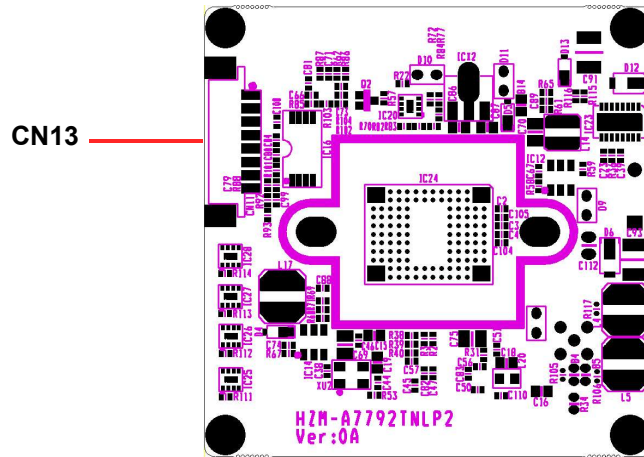
Pin NO	Pin Name	Description	Normal	Active	I/O
1	SDI1	HD-SDI / EX-SDI Serial data output	-	0.8Vp_p	O
2	GND	Board GROUND	-	-	-
3	GND	Board GROUND	-	-	-
4	GND	Board GROUND	-	-	-
5	GND	Board GROUND	-	-	-
MMCX-210-003					

⑥ CN8 : Extra DC+12V & Analog VBS Output

Pin NO	Pin Name	Description	Normal	Active	I/O
1	V+12V	Extra DC+12V Output(Use IR LED Board)	DC+12V	DC+12V	O
2	GND	Board GROUND	-	-	-
3	VBS	Composite Video Output(SUB1)	1Vp-p	1Vp-p	O
Yeonho Electronics, 12503WS-03A00					



Top View



⑨ CN11 : Focus/Zoom Motor Connector(Optional)

Pin NO	Pin Name	Description	Normal	Active	I/O
1	FA-	Focus A- Motor Drive Signal	Hi-Z	3.3V/0V	O
2	FA+	Focus A+ Motor Drive Signal	Hi-Z	3.3V/0V	O
3	ZA-	Zoom A- Motor Drive Signal	Hi-Z	3.3V/0V	O
4	ZA+	Zoom A+ Motor Drive Signal	Hi-Z	3.3V/0V	O
5	ZB+	Zoom B+ Motor Drive Signal	Hi-Z	3.3V/0V	O
6	ZB-	Zoom B- Motor Drive Signal	Hi-Z	3.3V/0V	O
7	FB-	Focus B- Motor Drive Signal	Hi-Z	3.3V/0V	O
8	FB+	Focus B+ Motor Drive Signal	Hi-Z	3.3V/0V	O
Yeonho Electronics, 12505WS-08A00					

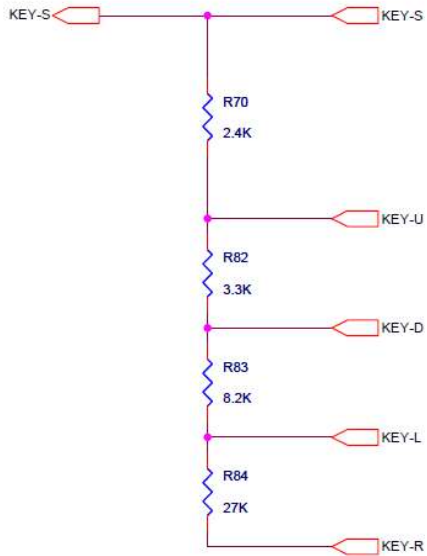


2-3-3. ADC KEY

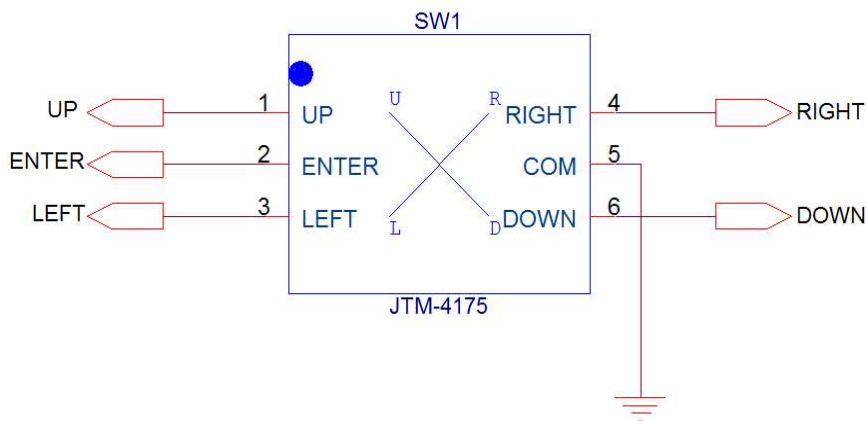
① KEY-VOLTAGE

net Name	Direction	Key Name	Voltage
KEY-S	⊙	SELECT(ENTER)	0.00V
KEY-U	▲	UP	0.66V
KEY-D	▼	DOWN	1.21V
KEY-L	◀	LEFT	1.92V
KEY-R	▶	RIGHT	2.65V

② Internal/External Circuit



③ External Switch(Sample)





2-3-4. How to Choose the Video Output(OSD Key)

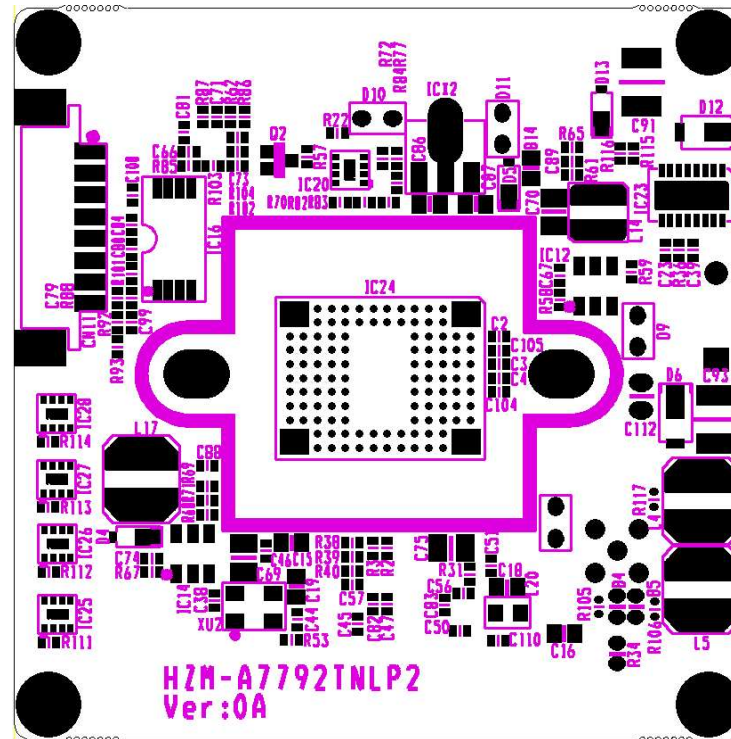
NO	Output Port	Output Format	OSD KEY				Remarks
			1'st	2'nd	3'rd	적용	
1	CN2-7	CVBS	DOWN	LEFT	ENTER	O	NTSC mega
2	CN2-5	AHD	DOWN	RIGHT	ENTER	O	AHD 2.0
3		TVI	DOWN	DOWN	ENTER	O	TVI 1080p
5	CN7 MMCX	HD-SDI	UP	DOWN	ENTER	O	HD-SDI 1080p
6		EX-SDI 1.0	UP	LEFT	ENTER	O	EX-SDI 1.0 1080p
7		EX-SDI 2.0	UP	UP	ENTER	O	EX-SDI 2.0 1080p
8		EX-SDI 2.1	UP	RIGHT	ENTER	X	EX-SDI 2.1 1080p
9	2-MOTOR(AF)	TELE	UP(continuous)			O	2-MOTOR ZOOM MODULE only.
10		WIDE	DOWN(continuous)			O	
11		FAR	RIGHT(continuous)			O	
12		NEAR	LEFT(continuous)			O	

MARK	CONNECTOR	VIDEO Output	HD-SDI	EX-SDI 1.0	EX-SDI 2.0	TVI	AHD	VBS	Remarks
1	CN7 MMCX	SDI Output	O	O	O	X	X	X	
2	CN2-5	HD ANALOG Output	X	X	X	O	O	X	
3	CN2-7	Monitor Output(NTSC)	△	△	△	△	△	O	
O	Output performance function OK								
X	Output Disable								
△	Output OK, performance, function, image quality is not guaranteed. Simple MONITOR function (for adjusting angle of view and focus for installation)								

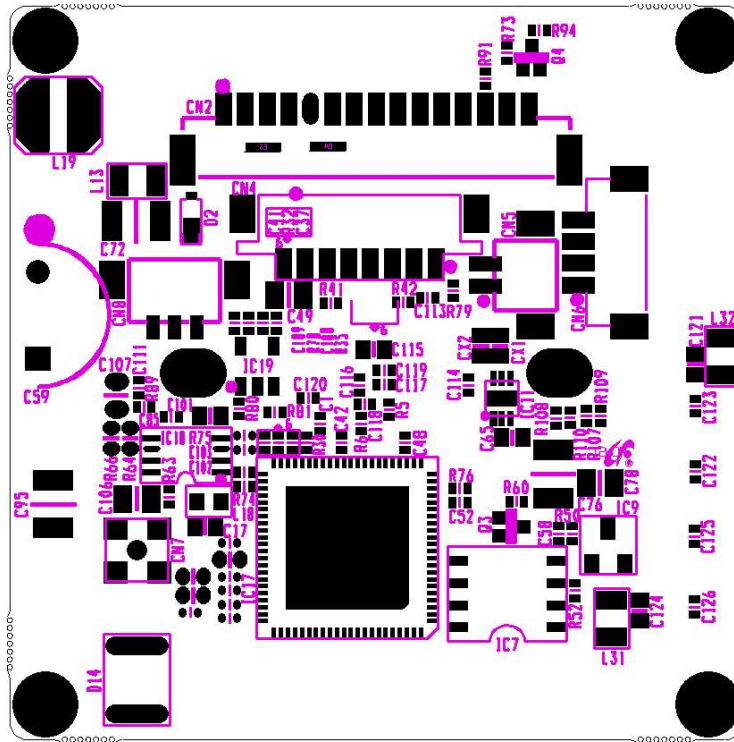


2-3-5. PCB Layout

<TOP VIEW>

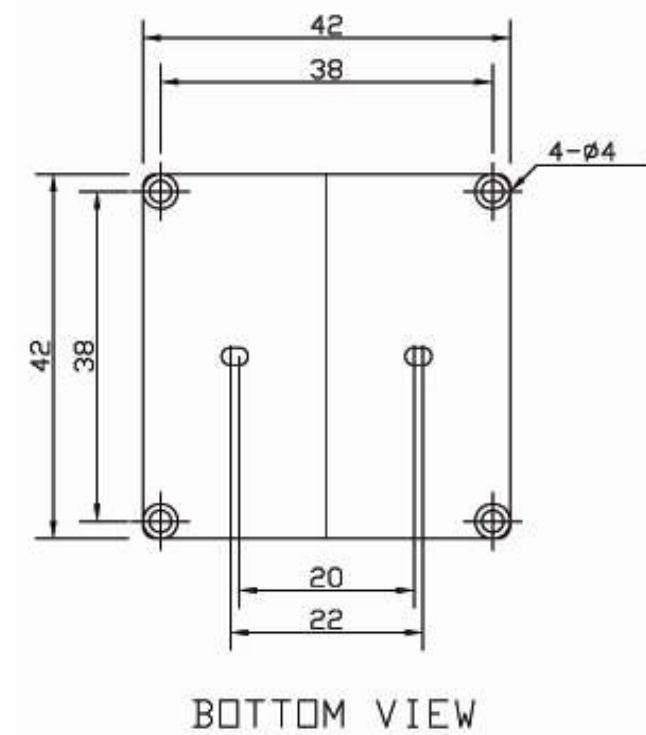
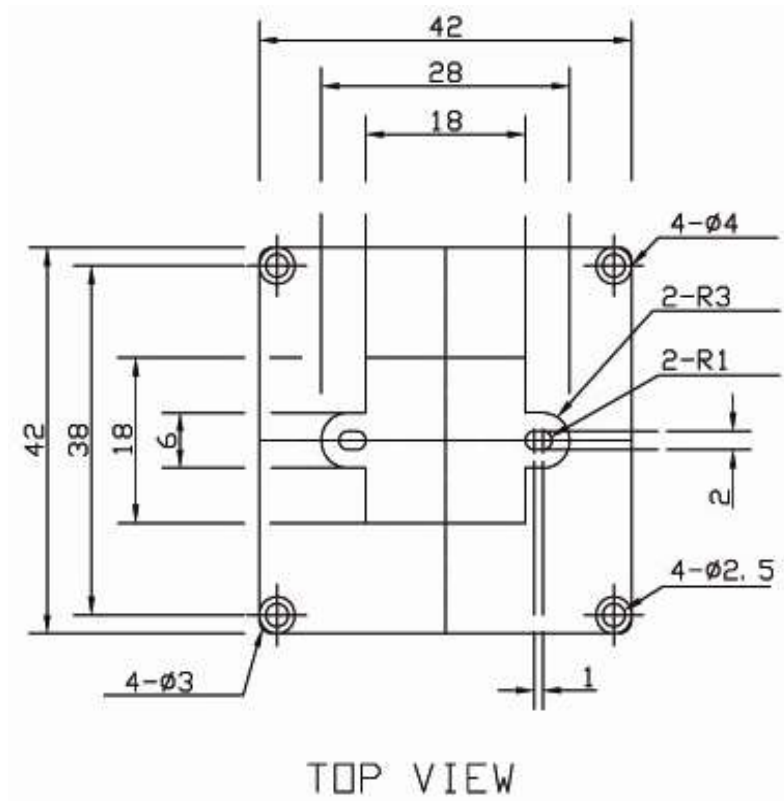


<BOTTOM VIEW>





2-4. PCB Outline Dimensions





2-5. OSD Menu tree

Main Menu	Sub Menu	Descriptions
LENS	MODE	DC,MANUAL
FOCUS ADJ	FOCUS AREA	WIDE,NARROW,MIDDLE
	DISP TONE	0~2
	DISP H_POS	0~60
	DISP V_POS	0~34
	DISP H_SIZE	0~60
	DISP V_SIZE	0~34
	RETURN	
EXPOSURE	BRIGHTNESS	0~20
	SHUTTER	AUTO,MANUAL,FLICKER
	TCS	OFF/MODE1~20
	SENS-UP	OFF,X2~X32
	AGC	0~10
	RETURN	
BACKLIGHT	MODE	OFF,HLC,BLC,WDR
	HLC	LEVEL:0~20, COLOR: BLK,WHT,YEL,GYN,GRN,MAG,RED,BLU
	BLC	H-POS,V-POS,H-SIZE,V-SIZE
	WDR	MODE: NORMAL, ROI WEIGHT: LOW,MIDDLE,HIGH
	RETURN	
DAY/NIGHT	MODE	AUTO,COLOR,B&W,EXTERN
	AUTO	THRESHOLD, MARGIN, DELAY,SMART IR
	COLOR	-
	B&W	SMART IR
	EXTERN	EXTERN SW, DELAY, SMART IR
	RETURN	
WHITE BAL	MODE	AUTO,AUTOext,PRESET,MANUAL
	COLOR GAIN	0~20
	AUTO	-
	AUTOext	-
	PRESET	PRESET, PUSHING
	MANUAL	C-TEMP,R-GAIN,B-GAIN
	RETURN	
DNR	MODE	OFF,LOW,MIDDLE,HIGH
IMAGE	SHARPNESS	0~10
	GAMMA	0.45,0.55,0.65,0.75



Main Menu	Sub Menu	Descriptions
IMAGE	MIRROR	OFF,ON
	FLIP	OFF,ON
	ACE	OFF,LOW,MIDDLE,HIGH
	DEFOG	OFF,ON
	PRIVACY	OFF,ON
	RETURN	
MOTION	MOTION LED	OFF,ON (Motion LED model only)
	WINDOW USE	0~3
	WINDOW_ZONE	OFF,ON
	DET H-POS	0~60
	DET V-POS	0~34
	DET H-SIZE	0~60
	DET V-SIZE	0~34
	MDRECT_FILL	OFF,ON
	SENSITIVITY	0~10
	MOTION OSD	OFF,ON
	TEXT_ALARM	OFF,ON
	RETURN	
OPTION	COM.	CAM ID, BAUDRATE, SAVE
	IMAGE_RANGE	Full,Comp,User
	COLOR_SPACE	HD-CbCr, YUV, SD-CbCr
	FRAME_RATE	1080_30P,720_30P,720_60P
	FREQ	50HZ,60HZ
	COLOR_BAR	OFF,ON
	LANGUAGE	English,Chinese,Chinese(S) Japanese,Korea
	CAM_TITLE	OFF,RIGHT UP, LEFT DOWN
	VERSION	4779X71 1A
	RETURN	
EXIT	EXIT	SAVE, Reset



2-6 OSD Menu Functions

◆ Main Menu



■ LENS

Select the Lens operation type.

■ FOCUS ADJ

Displays the Focus status for the Lens focus adjustment.

■ EXPOSURE

Adjust camera exposure.

■ BACKLIGHT

The function is used to set the Back Light Compensation(BLC) and High Light Compensation(HLC) and Wide Dynamic Range(WDR).

■ DAY&NIGHT

The function is used to set the Day/Night function which switches day/Night mode automatically based on the level of illumination.

■ WHITE BAL

This function is used to set the White Balance operation which adjusts the color scheme.

■ DNR

The function is used to reduce the noise using the Digital Noise Reduction (DNR).

■ IMAGE

The function is used to adjust the camera picture(Sharpness, Gamma,Color Gain, etc).

■ MOTION

The function is used to configure the Motion Detection operation and Alarm function which sense the movement of the scene.

■ OPTION

Set up CVBS on/off, Language, etc.

■ EXIT

SAVE: The function is used to save the various settings of the internal OSD menu.

RESET: The function initializes all the internal OSD menu settings.

KEY FUNCTIONS

- ▲: Up
- ▼: Down
- ◀: Left
- ▶: Right
- ⊕: Enter(Setup)



◆ LENS

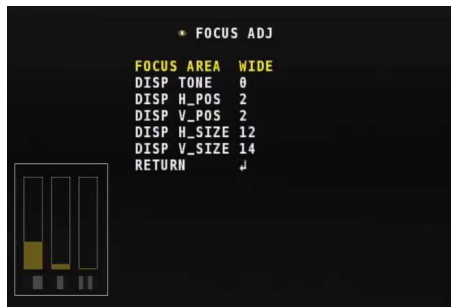
DC: IRIS Control, MANUAL: SHUTTER Control

"◀" "▶"

FUNCTION	OPTION	DESCRIPTION
LENS	DC	DC (Automatic IRIS Control)
	MANUAL	MANUAL (Electronic Shutter Control)

◆ FOCUS ADJ

■ FOCUS ADJ "▲" "▼" "◀" "▶" "ⓔ"



"◀" "▶"

FUNCTION	OPTION	DESCRIPTION
FOCUS AREA	WIDE	Selects the Focus detection area
	NARROW	
	MIDDLE	
DISP TONE	0~2	Sets the osd tone
DISP H_POS	0~60	Sets the osd horizontal start position
DISP V_POS	0~34	Sets the osd vertical start position
DISP H_SIZE	0~60	Sets the osd horizontal size
DISP V_SIZE	0~34	Sets the osd vertical size

◆ EXPOSURE

This function can adjust the intensity of radiation incoming to the camera.

Use the "▲" "▼" "◀" "▶" "ⓔ" switch to select a menu item.

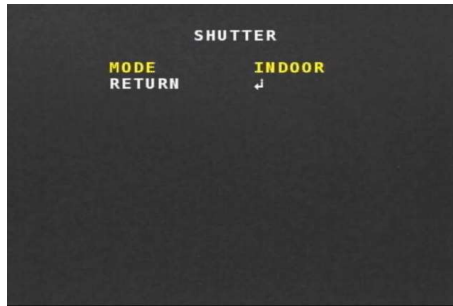




◀ ▶

FUNCTION	OPTION	DESCRIPTION
BRIGHTNESS	0~20	Sets the screen brightness
SHUTTER	AUTO "Ⓜ" MANUAL "Ⓜ" FLICKER	Execute the Shutter speed automatically Execute the user setting Shutter speed Execute the Flickerless Shutter speed.
TCS	OFF, MODE1~MODE20 "Ⓜ"	Selects the TCS MODE
SENS-UP	OFF,X2,X4,X8,X16,X32	Adjusts the SENS-UP
AGC	0~10	Adjusts the AGC

■ SHUTTER (AUTO) ▲ ▼ ◀ ▶ "Ⓜ"



◀ ▶

FUNCTION	OPTION	DESCRIPTION
MODE (DC)	INDOOR OUTDOOR DEBLUR	IRIS IRIS+SHUTTER SHUTTER:1/250+AGC
(MANUAL)	NORMAL DEBLUR	SHUTTER SHUTTER:1/250+AGC

■ SHUTTER(MANUAL) ▲ ▼ ◀ ▶ "Ⓜ"



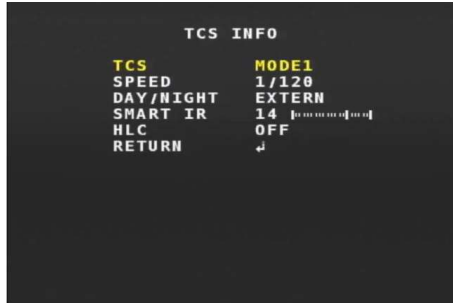
◀ ▶

FUNCTION	OPTION	DESCRIPTION
SPEED	<60HZ(50HZ)>	Sets the screen shutter



	1/30(25),1/60(50), 1/120(100),1/250, 1/700,1/1000, 1/1600,1/2500, 1/5000,1/7000, 1/10000,1/30000	
--	---	--

■ TCS INFO "▲" "▼" "◀" "▶" "Ⓢ"



"◀" "▶"

FUNCTION	OPTION	DESCRIPTION
TCS	OFF	NOT USED
	MODE1	Shutter 1/120 + DN EXT + Smart IR 14
	MODE2	Shutter 1/250 + DN EXT + Smart IR 14
	MODE3	Shutter 1/700 + DN EXT + Smart IR 14
	MODE4	Shutter 1/1000 + DN EXT + Smart IR 14
	MODE5	Shutter 1/1600 + DN EXT + Smart IR 14
	MODE6	Shutter 1/120 + User DN + User Smart IR
	MODE7	Shutter 1/250 + User DN + User Smart IR
	MODE8	Shutter 1/700 + User DN + User Smart IR
	MODE9	Shutter 1/1000 + User DN + User Smart IR
	MODE10	Shutter 1/1600 + User DN + User Smart IR
	MODE11	Shutter 1/120 + DN EXT + Smart IR 14 + HLC
	MODE12	Shutter 1/250 + DN EXT + Smart IR 14 + HLC
	MODE13	Shutter 1/700 + DN EXT + Smart IR 14 + HLC
	MODE14	Shutter 1/1000 + DN EXT + Smart IR 14 + HLC
	MODE15	Shutter 1/1600 + DN EXT + Smart IR 14 + HLC
	MODE16	Shutter 1/120 + User DN + User Smart IR+ HLC
	MODE17	Shutter 1/250 + User DN + User Smart IR+ HLC
	MODE18	Shutter 1/700 + User DN + User Smart IR+ HLC
	MODE19	Shutter 1/1000 + User DN + User Smart IR+ HLC
	MODE20	Shutter 1/1600 + User DN + User Smart IR+ HLC
SPEED	1/120 ~ 1/1600	Show the Shutter speed value
DAY/NIGHT	AUTO~EXTERN	Show the DAY/NIGHT mode
SMART IR	0~20	Show the SMART IR level value
HLC	OFF,ON	Show the HLC on,off state



◆ BACKLIGHT

*WDR does not operate while CVBS is being output.

"◀" "▶"

FUNCTION	OPTION	DESCRIPTION
BACKLIGHT	OFF	-
	HLC"Ⓢ"	HLC(High Light Compensation) ON
	BLC"Ⓢ"	BLC(Back light Compensation) ON.
	WDR"Ⓢ"	WDR(Wide Dynamic Range) ON.

■ HLC "▲" "▼" "◀" "▶" "Ⓢ"



"◀" "▶"

FUNCTION	OPTION	DESCRIPTION
LEVEL	0~20	Adjusts the HLC Mask Level
COLOR	BLK,WHT,YEL,CYN,GRN,MAG,RED,BLU	Select the HLC Mask color

■ BLC "▲" "▼" "◀" "▶" "Ⓢ"



"◀" "▶"

FUNCTION	OPTION	DESCRIPTION
H-POS	0~20	Can be adjusted BLC area
V-POS	0~20	
H-SIZE	0~20	
V-SIZE	0~20	



■ WDR ▲ ▼ ◀ ▶ "Ⓜ"



◀ ▶

FUNCTION	OPTION	DESCRIPTION
MODE	NORMAL,ROI	Selects the WDR operation type
WEIGHT	LOW,MIDDLE,HIGH	Selects the WDR weight

■ ROI ▲ ▼ ◀ ▶ "Ⓜ"



◀ ▶

FUNCTION	OPTION	DESCRIPTION
WINDOW ZONE	0~3	Selects the window zone number
WINDOW USE	OFF,ON	Sets the selected zone ROI on,off
H-POS	0~1920	Sets the selected zone horizontal start position
V-POS	0~1080	Sets the selected zone vertical start position
H-SIZE	0~1920	Sets the selected zone horizontal size
V-SIZE	0~1080	Sets the selected zone vertical size

◆ DAY&NIGHT

◀ ▶

FUNCTION	OPTION	DESCRIPTION
DAY/NIGHT	AUTO"Ⓜ"	switches between day and night mode automatically based upon the level of illumination on the scene
	COLOR	fixed day
	B&W	fixed night
	EXTERN"Ⓜ"	changes between day and night operation upon triggering from an external source



■ **AUTO** "▲" "▼" "◀" "▶" "ⓔ"



"◀" "▶"

FUNCTION	OPTION	DESCRIPTION
THRESHOLD	0~20	Sets the threshold for identifying the Night status from the Day status.
MARGIN	0~20	Sets the margin for identifying the Night status from the Day status.
DELAY	0~20	Sets the Night/Day identification transfer time.
Smart IR	0~20	Brightness of IR and saturation phenomenon are automatically adjusted.

■ **EXTERN** "▲" "▼" "◀" "▶" "ⓔ"

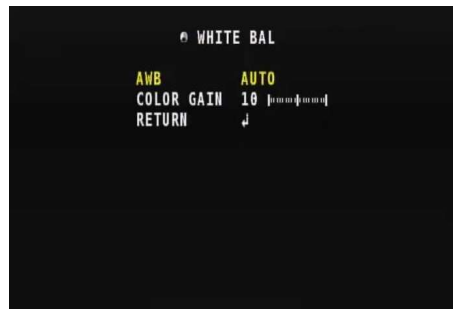


"◀" "▶"

FUNCTION	OPTION	DESCRIPTION
EXTERN SW	LOW,HIGH	Selects the active level.
DELAY	0~20	Sets the Night/Day identification transfer time.
Smart IR	0~20	Brightness of IR and saturation phenomenon are automatically adjusted.



◆ WHITE BALANCE



"◀" "▶"

FUNCTION	OPTION	DESCRIPTION
AWB	AUTO AUTOext PUSH	Auto trace white balance. TDN lens Auto trace white balance. Can be changed in AWC mode only. When the set color temperature doesn't meet with user's environment, press the menu button long to adjust the color temperature to desired setting.
	MANUAL "Ⓢ"	Manual white balance.
COLOR GAIN	0~20	Adjusts COLOR GAIN

■ MANUAL "▲" "▼" "◀" "▶" "Ⓢ"



"◀" "▶"

FUNCTION	OPTION	DESCRIPTION
C-TEMP	3000K, 5000K, 8000K	Selects Color Temperature
R-GAIN	0~20	Adjusts R-GAIN
B-GAIN	0~20	Adjusts B-GAIN



◆ DNR

"◀" "▶"

FUNCTION	OPTION	DESCRIPTION
DNR	OFF, LOW, MIDDLE, HIGH	Set up 3D-DNR(Digital Noise Reduction) LEVEL.

◆ IMAGE

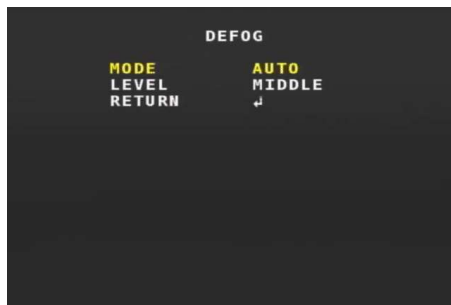
■ IMAGE "▲" "▼" "◀" "▶" "Ⓢ"



"◀" "▶"

FUNCTION	OPTION	DESCRIPTION
SHARPNESS	0~10	Select the resolution of the camera.
GAMMA	0.45,0.55,0.65,0.75	Select the GAMMA
MIRROR	OFF,ON	Set up the screen mirror
FLIP	OFF,ON	Set up the screen flip
ACE	OFF,LOW,MIDDLE. HIGH	Select Digital ACE(Advanced Enhance) level
DEFOG	OFF,ON"Ⓢ"	Defog on,off
PRIVACY	"Ⓢ"	Sets the Privacy function

■ DEFOG "▲" "▼" "◀" "▶" "Ⓢ"





◀ ◀ ◀ ▶ ▶ ▶

FUNCTION	OPTION	DESCRIPTION
MODE	AUTO, MANUAL	Changes the Defog level automatically Executes the Defog function within fixed Defog level
LEVEL	LOW,MIDDLE,HIGH	Selects the Defog function weight

■ PRIVACY ▲ ▼ ◀ ▶ Ⓣ



◀ ◀ ◀ ▶ ▶ ▶

FUNCTION	OPTION	DESCRIPTION
ZONE NUM	0~15	Select the Privacy zone number
ZONE DISP	OFF,ON	Show up PRIVACY AREA function on the screen
H-POS	0~60	Can be adjusted Privacy area
V-POS	0~34	
H-SIZE	0~60	
V-SIZE	0~34	
Y LEVEL	0~20	
CB LEVEL	0~20	Adjusts the B GAIN of the Privacy zone area
CR LEVEL	0~20	Adjusts the R GAIN of the Privacy zone area
TRANS	0~3	Adjusts the transparency of the Privacy zone area

◆ MOTION ▲ ▼ ◀ ▶ Ⓣ





◀ " ▶ "

FUNCTION	OPTION	DESCRIPTION
MOTION LED	OFF,ON	Adjust the motion led(motion led model only)
DET WINDOW	"Ⓜ"	Adjust the size of the detection area
DET TONE	0~4	Sets the nonuse area signal tone
MDRECT FILL	OFF,ON	Fill a color in the motion detection position
SENSITIVITY	0~20	Sets the motion detection sensitivity
MOTION OSD	OFF,ON	Display the motion detection position
TEXT ALARM	OFF,ON	Display the motion detection state

■ MOTION LED(motion LED model only) ▲ " ▼ " ◀ " ▶ " Ⓜ



◀ " ▶ "

FUNCTION	OPTION	DESCRIPTION
LED ON	LOW,HIGH	Select the led active logic
LED ON TIME	5SEC ~ 60SEC	Select the led on time from motion trig
LED RESET	OFF,15SEC~5MIN	Select the forced led off time during continues motion

■ DET WINDOW ▲ " ▼ " ◀ " ▶ " Ⓜ



◀ " ▶ "

FUNCTION	OPTION	DESCRIPTION
WINDOW USE	0~3	Select the Motion set number
WINDOW ZONE	OFF,ON	Active the Motion set number
DET H-POS	0~60	Adjust the size of the detection area
DET V-POS	0~34	
DET H-SIZE	0~60	
DET V-SIZE	0~34	



◆ **OPTION** "▲" "▼" "◀" "▶"



"◀" "▶"

FUNCTION	OPTION	DESCRIPTION
COM.	"Ⓜ"	Sets the communication
IMAGE RANGE	Full,Comp,User"Ⓜ"	Digital output data scale
FRAME RATE	1080_30P,720_30P,720_60P	Sets the format and frame rate
FREQ	50HZ,60HZ	Sets the system frequency
COLOR BAR	OFF,ON	Display Color bar pattern
CVBS	OFF,ON	Cvbs on,off
LANGUAGE	English,Chinese,Chinese(S) Japanese,Korea	Selects the language in which to display the internal OSD menu
CAM TITLE	OFF,ON"Ⓜ"	Sets Camera TITLE
VERSION	470XE V1A	Camera VERSION display

■ **COMMUNICATION** "▲" "▼" "◀" "▶" "Ⓜ"



"◀" "▶"

FUNCTION	OPTION	DESCRIPTION
CAM ID	0~255	Digital output data scale
BAUDRATE	2400,4800,9600,57600,115200	Selects communication baudrate
SAVE	NG->ENT, OK->ENT	Reflects the communication setting value



■ **IMAGE RANGE** "▲" "▼" "◀" "▶" "ⓔ"



"◀" "▶"

FUNCTION	OPTION	DESCRIPTION
IMAGE RANGE	0~32	Digital output data scale

■ **CAM TITLE** "▲" "▼" "◀" "▶" "ⓔ"

This function can set up Title, Version, Communication, etc
Use the "▲" "▼" "◀" "▶" "ⓔ" switch to select a menu item



◆ **Exit** "◀" "▶"

FUNCTION	OPTION	DESCRIPTION
EXIT	SAVE	All the settings of the internal OSD menu are saved.
	RESET	All the internal OSD menu settings are reset.



◆ Menu default data change "▲" "▼" "◀" "▶" "ⓔ"

"▲" "▼" "◀" "▶" "ⓔ"

Sets the menu data to be used as default data.

and then push the left button for 3 seconds at option item.



Push the enter button for 3 seconds at save item

(appear the 'pushing' instead of 'on')

and then exit the menu.





3. UART Protocol

3-1. Connection

- ◆ Data Communication : **RS-485+/RS-485- Level**, Start-Stop Synchronized serial interface
- ◆ Data length : 8bit data
- ◆ Stop bit : 1 bit
- ◆ Parity : None
- ◆ Baudrate : **2400, 4800, 9600, 57600,11520 bps**

3-2. Communication Protocol

- ◆ All communication data consist of nine bytes.
- ◆ Communication Synch Byte with 0xFF/0xA0.
- ◆ Communication Address with 0x00.
- ◆ The format of the communication data is shown below.

◆Pelco-D

7 Byte Fixed

Byte1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Sync Byte	Address	Command1	Command2	Data1	Data2	Check sum

Data Byte	Type	Contents	Remarks
Byte 1	Sync Byte	0xFF	Data Packet Sync Byte
Byte 2	Address	Camera Address	0~255 ID Address
Byte 3	Command1	Target Command1	Menu On/Iris Colse/Iris Open
Byte 4	Command2	Target Command2	Down/Up/Left/Right
Byte 5	DATA 1	Target DATA1	Pan Speed(N/A)
Byte 6	DATA 2	Target DATA2	Tilt Speed(N/A)
Byte 7	Check Sum	Target Check Sum	Sum of Bytes 2 to6

◆Pelco-P

8 Byte Fixed

Byte1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
STX	Address	Data1	Data2	Data3	Data4	ETX	Check sum

Data Byte	Type	Contents	Remarks
Byte 1	STX	0xA0	STX
Byte 2	Address	Camera Address	logical address(addr 1 is 00)
Byte 3	DATA 1	Target DATA1	Menu On/Iris Colse/Iris Open
Byte 4	DATA 2	Target DATA2	Down/Up/Left/Right
Byte 5	DATA 3	Target DATA3	Pan Speed(N/A)
Byte 6	DATA 4	Target DATA4	Tilt Speed(N/A)



Byte 7	ETX	0xAF	ETX
Byte 8	Check Sum	Target Check Sum	xOR sum of Bytes 1 to 7

3-3. Communication Command

◆ Byte2 Address ID Menu(0~255)Set

◆ Pelco-D OSD Control Command

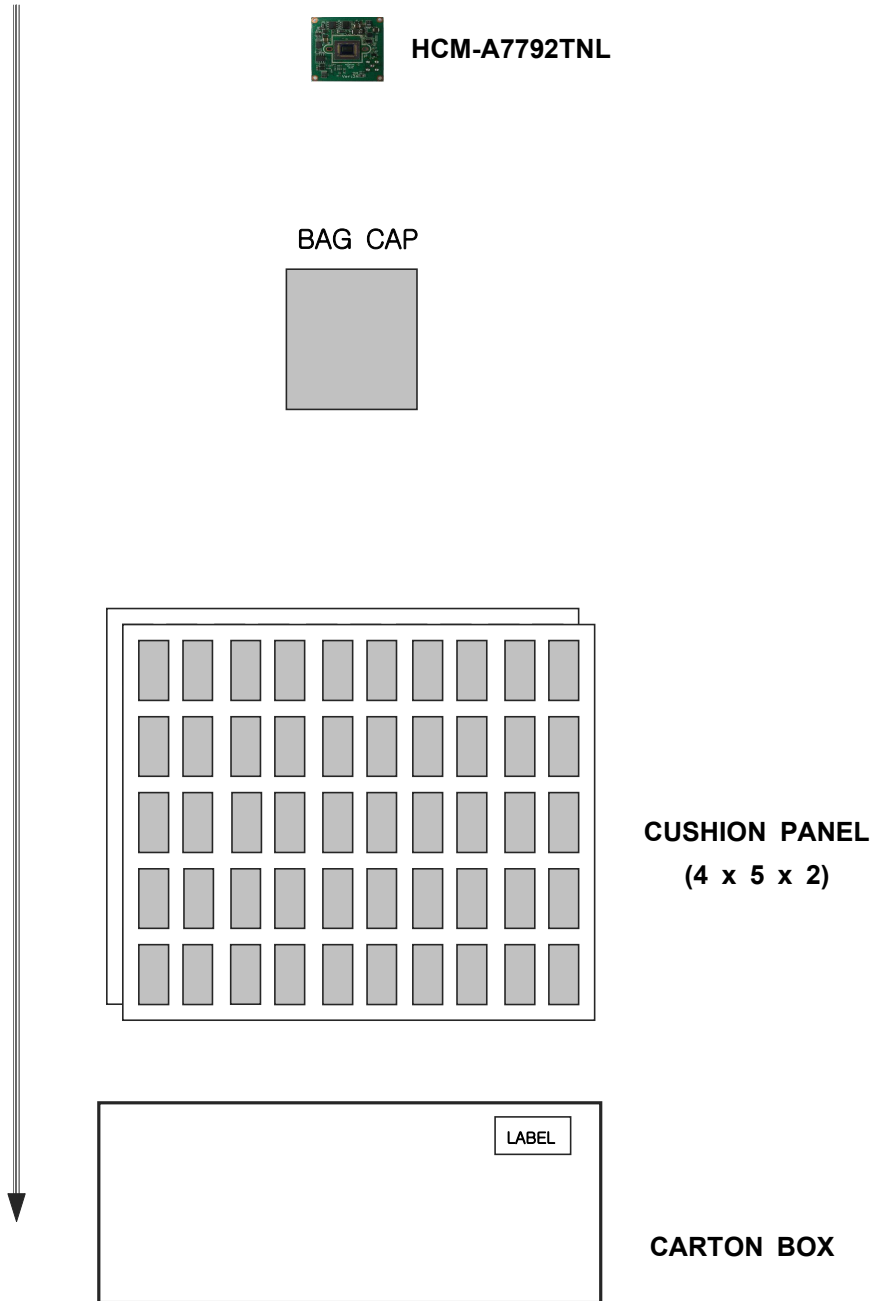
NO	Category	Items	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
1	Numeric Key	Menu On	01	20	00	00	00	CS
			01	03	00	00	00	CS
			01	00	03	00	5F	CS
			01	00	07	00	5F	CS
			MENU ON/OFF 시					
2		Up Key	01	00	08	00	00	CS
3		Down Key	01	00	10	00	00	CS
4		Left Key	01	00	04	00	00	CS
5		Right Key	01	00	02	00	00	CS
6		Enter Key	01	60	00	00	00	CS
			01	02	00	00	00	CS
7	Zoom Tele	01	00	20	00	00	CS	
8	Zoom Wide	01	00	40	00	00	CS	
9	Focus Near	01	01	00	00	00	CS	
10	Focus Far	01	00	80	00	00	CS	
11	Zoom/Focus stop	01	00	00	00	00	CS	

◆ Pelco-P OSD Control Command

NO	Category	Items	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
1	Numeric Key	Menu On	00	10	00	00	00	AF	CS
			00	03	00	00	00	AF	CS
			00	00	03	00	00	AF	CS
			00	00	07	00	00	AF	CS
			MENU ON/OFF 시						
2		Up Key	00	00	08	00	00	AF	CS
3		Down Key	00	00	10	00	00	AF	CS
4		Left Key	00	00	04	00	00	AF	CS
5		Right Key	00	00	02	00	00	AF	CS
6		Enter Key	00	40	00	00	00	AF	CS
			00	04	00	00	00	AF	CS
7	Zoom Tele	00	00	20	00	00	AF	CS	
8	Zoom Wide	00	00	40	00	00	AF	CS	
9	Focus Near	00	02	00	00	00	AF	CS	
10	Focus Far	00	01	00	00	00	AF	CS	
11	Zoom/Focus stop	00	00	00	00	00	AF	CS	



4. Packing Information

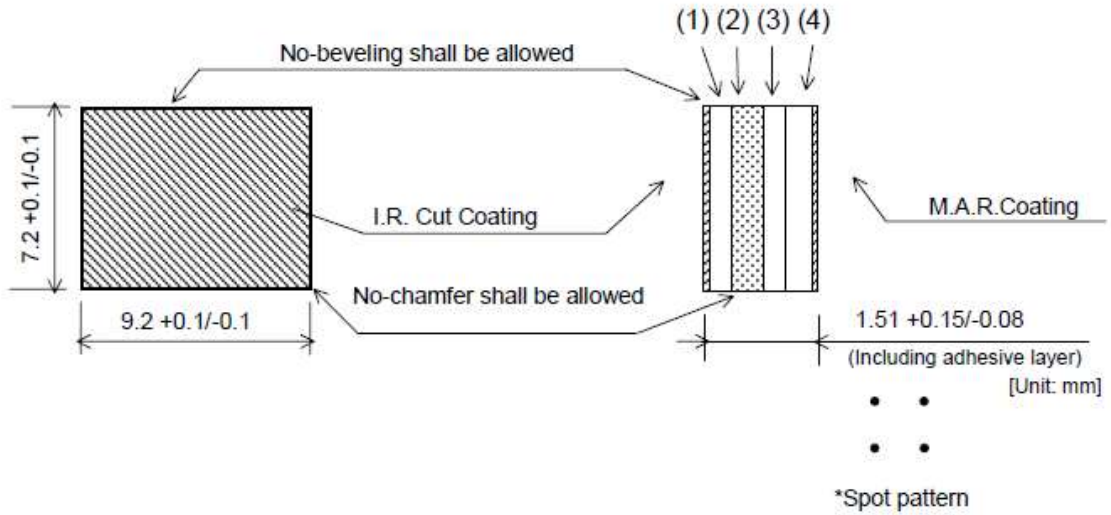




5. Reference Data Sheet

5-1. OLPF(Optical Low Pass Filter) Specifications

5-1-1. OLPF for general lens-1(OLPF Manufacturer : KDS)



No.	Item	Thickness (mm)	Orientation (degree)	Rotating Angle (degree)	Note
(1)	Double Refraction Plate	0.31 +0.02/-0.01	45 +1/-1	0 +1/-1	
(2)	Infrared Absorbing Glass	0.54 +0.03/-0.03	-	-	C5000(HOYA) or NF50(AGC)
(3)	Wave Plate	0.35 +0.03/-0.03	0 +1/-1	45 +1/-1	
(4)	Double Refraction Plate	0.31 +0.02/-0.01	45 +1/-1	90 +1/-1	

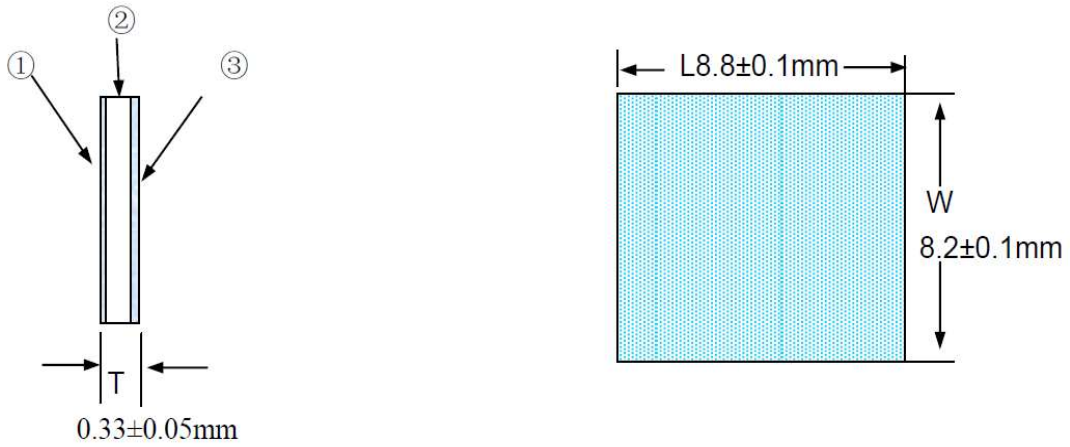
*Rotating angle of parts No. (3) is possible event by -45 +1/-1 degree.

Wavelength (nm)	400-450	450-500	500-550	655+15/-15	720-750	750-1050	1050-1100
Transmission Rate (%)	83min.(Avg.)	87min.(Avg.)	84min.(Avg.)	50	3max.	1max.(Avg.)	5max.
Ripple (%)	73min.	82min.	79min.	-	-	2max.	-

(Spectral characteristics of Optical Low Pass Filter)



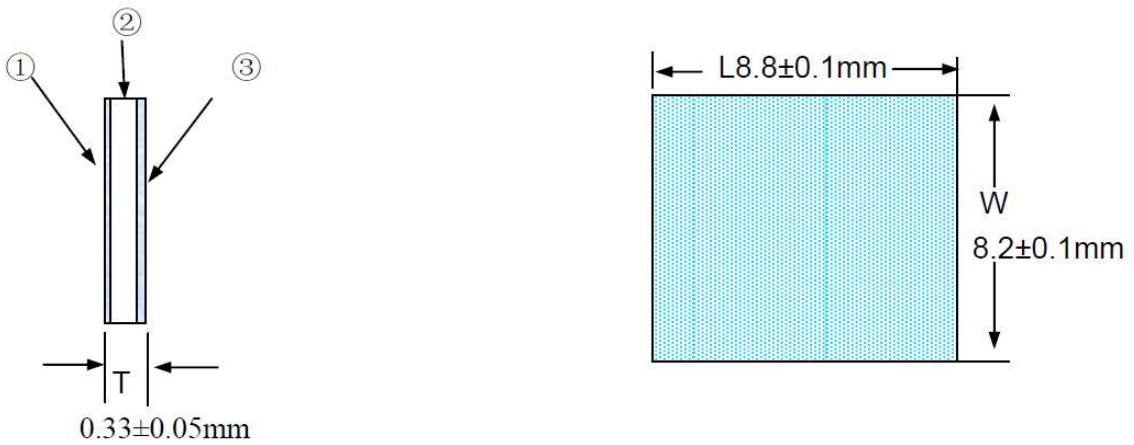
5-1-2. OLPF for general lens-2(OLPF Manufacturer : Max Gain)



Part No	Part Name	Dimension(mm)			Orientation Angle	Rotation Angle	Flatness	Para.
		L	W	T				
①	IR Coating							
②	Double refractive plate	8.8±0.1	8.2±0.1	0.33±0.05	45	0	3N	2'
③	AR Coating							

Wave Length(nm)	Transmission (%)
400nm	>75%
450~600nm	>80%
645 ± 10nm	=50%
700nm	<5%
1100nm	<15%

5-1-3. OLPF for TDN lens(OLPF Manufacturer : Max Gain)



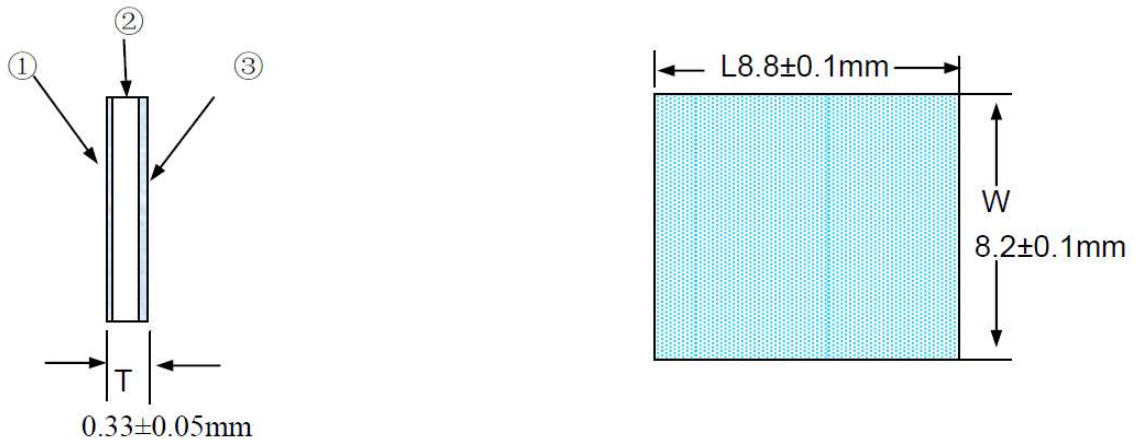




Part No	Part Name	Dimension(mm)			Orientation Angle	Rotation Angle	Flatness	Para
		L	W	T				
①	AR Coating							
②	Double refractive plate	8.8±0.1	8.2±0.1	0.33±0.05	45	0	3N	2'
③	AR Coating							

Wave Length(nm)	Transmission (%)
420~1100nm	>96%

5-1-4. OLPF for Night Vision(OLPF Manufacturer : Max Gain)



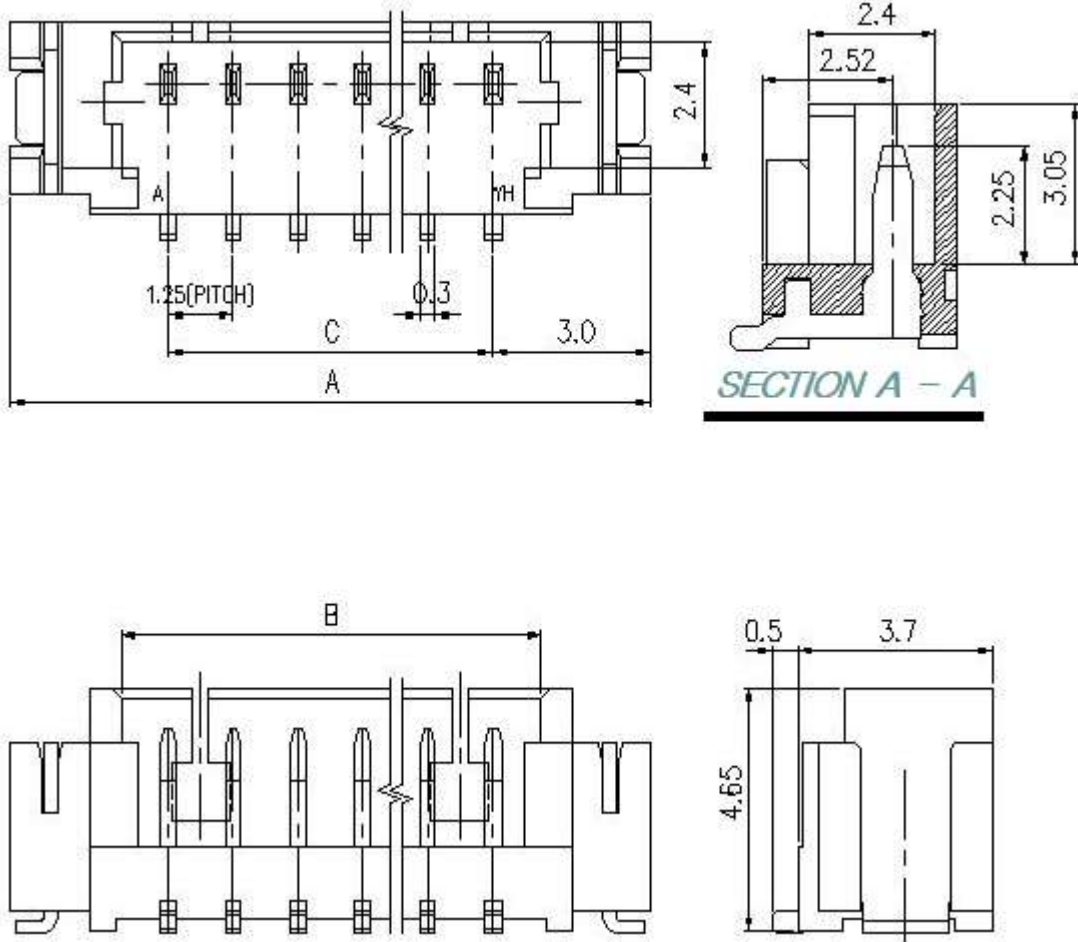
Part No	Part Name	Dimension(mm)			Orientation Angle	Rotation Angle	Flatness	Para
		L	W	T				
①	Night vision Coating							
②	Double refractive plate	8.8±0.1	8.2±0.1	0.33±0.05	45	0	3N	2'
③	AR Coating							



Wave Length(nm)	Transmission (%)
400-420	>75%
421-620	>85%
645±10	50%
700-750	<3%
815±15	50%
850	>80%
900-1100	<20%

5-2. I/O Connector Specifications

5-2-1. 12505WS-XXA00 Series





Available Pin

PARTS NO.	A	B	C
12505WS-02	7.25	3.05	-
12505WS-03	8.50	4.30	2.50
12505WS-04	9.75	5.55	3.75
12505WS-05	11.00	6.80	5.00
12505WS-06	12.25	8.05	6.25
12505WS-07	13.50	9.30	7.50
12505WS-08	14.75	10.55	8.75
12505WS-09	16.00	11.80	10.00
12505WS-10	17.25	13.05	11.25
12505WS-11	18.50	14.30	12.50
12505WS-12	19.75	15.55	13.75
12505WS-13	21.00	16.80	15.00
12505WS-14	22.25	18.05	16.25
12505WS-15	23.50	19.30	17.50

Specification

ITEM	SPEC
Voltage Rating	AC/DC 125V
Current Rating	AC/DC 1A
Operating Temperature	-25℃~+85℃
Contact Resistance	30mΩ MAX
Withstanding Voltage	AC250V/1min
Insulation Resistance	100MΩ MIN
Applicable Wire	-
Applicable P.C.B	0.8 ~ 1.6mm
Applicable FPC/FFC	-
Solder Height	0.15mm
Crimp Tensile Strength	-
UL FILE NO	E108706



5-2-2. MMCX-005-003 Series

