

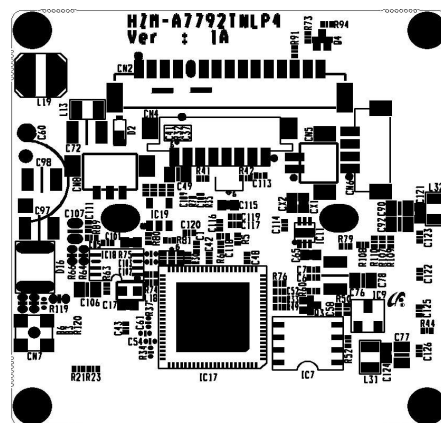
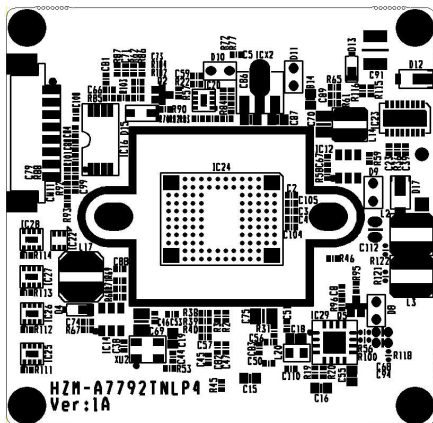


CUSTOMER	
ATTENTION 1	2M STARVIS™ CMOS
ATTENTION 2	42x42mm
MODEL	HCM-A7792TNLP4
CODE NO	

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

SPECIFICATIONS

06. 12. 2017



P&A Corporation



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- Revision History

Date	Version	Description
FEB.21 2017	0A	Establishment
APR.18 2017	0B	Update OSD Menu
JUN.09 2017	1A	Change SDI Amp
JUN.12 2017	1B	Update OSD Menu
AUG.25 2017	1C	Update Hardware



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.



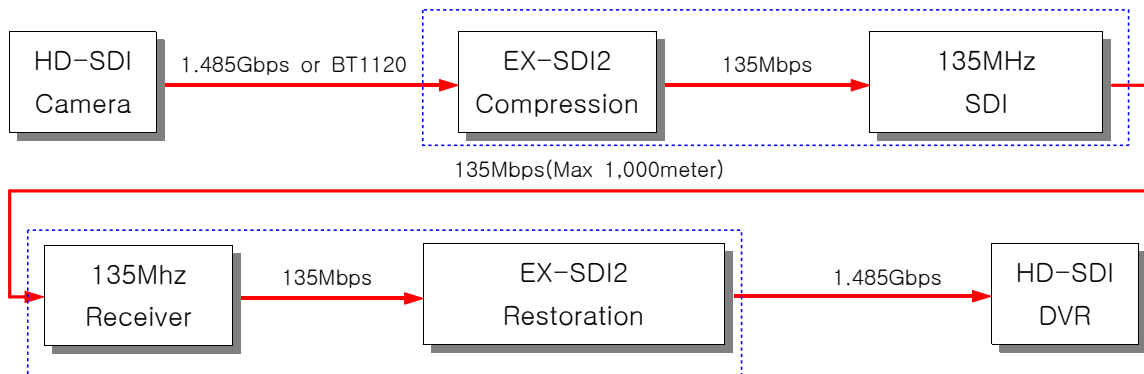
■ EX-SDI (HD-VLC : Long Reach Solution) & UTC, PoC

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.

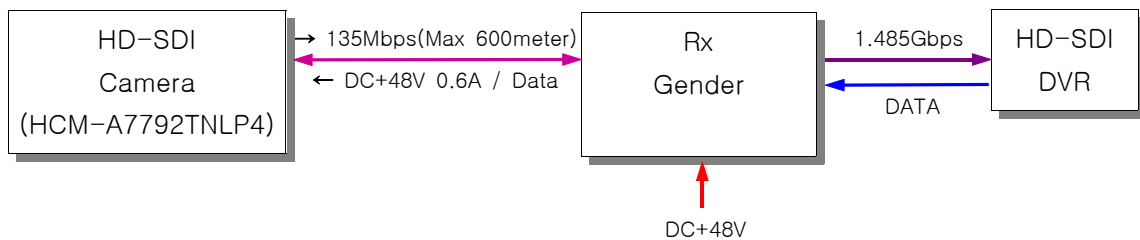
The technical background EX-SDI2 : HD-SDI video signal is compressed and then lowered the frequency of 135Mhz to transfer technology to increase the distance almost no loss of image.

This camera sends video signals to the coaxial cable and sends power and data at the same time. It uses + 48V DC power and can transmit up to 600 meters with 0.6A capacity.

<BLOCK DIAGRAM>



<PoC System Diagram>





<Cable Reach>

Cable Reach In Makers			
Cable Type	HD-VLC :	HD : 1.485Gb/s	Full HD :
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.



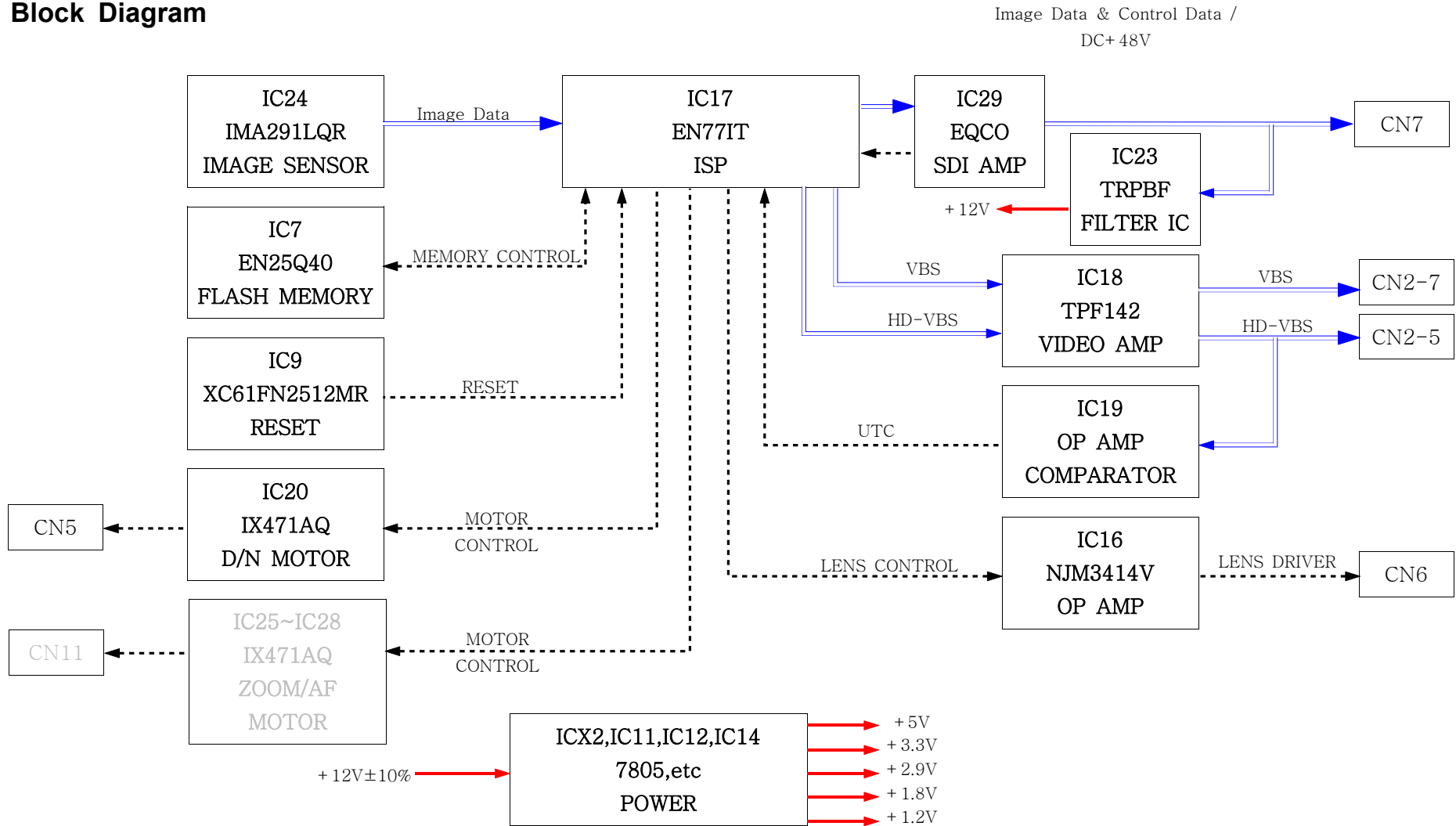
2. Applications & Information

2-1. General Specifications & Functions

Items	Sub-items	HCM-A7792TNLP4
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)
	ACE	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 / PRESET
	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	OFF,LOW,MIDDLE,HIGH
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)
	Digital Serial Video Output	Selectable HD-SDI or EX-SDI1/2(Long Reach)
Lens	Iris	DC iris(Galvanometer)
	TDN	Day & Night(Galvanometer)
	2MOTOR	2.7mm ~ 12mm
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



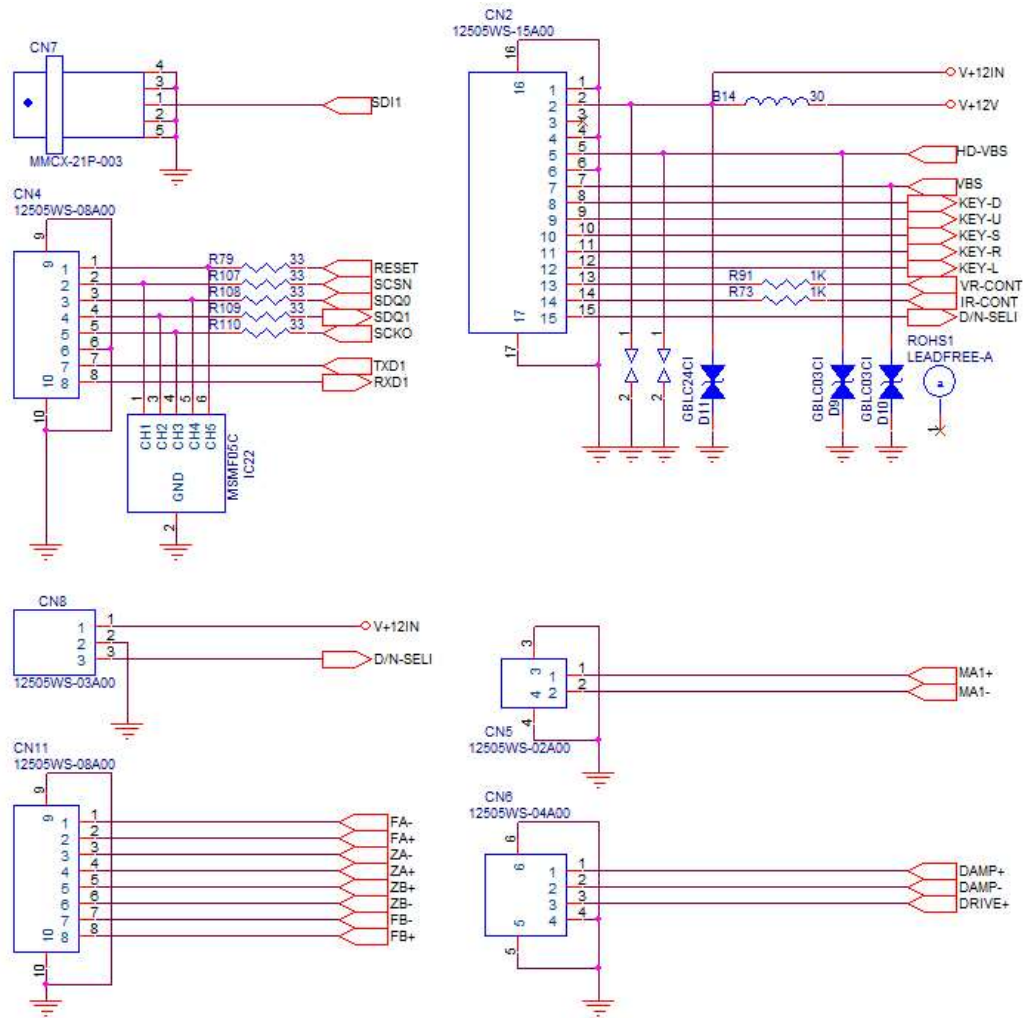
2-2. Block Diagram





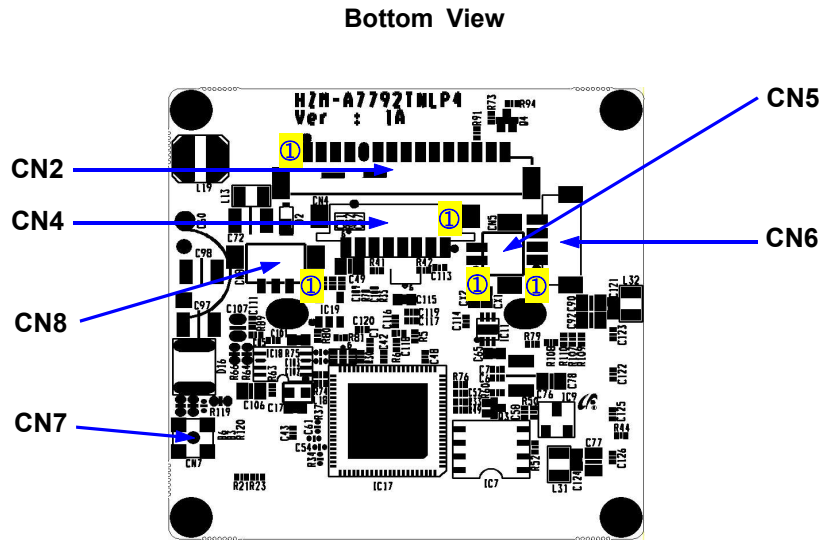
2-3. I/O Interface Specifications

2-3-1. I/O Circuit





2-3-2. I/O Specifications



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	LED Enable Output	0V/3.3V	3.3V/0V	O
14	IR-CONT	IR/VL LED Control Output	0V/3.3V	3.3V/0V	O
15	D/N-SEL1	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					

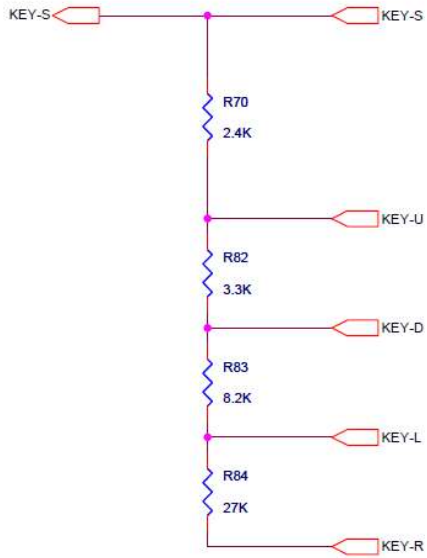


2-3-3. ADC KEY

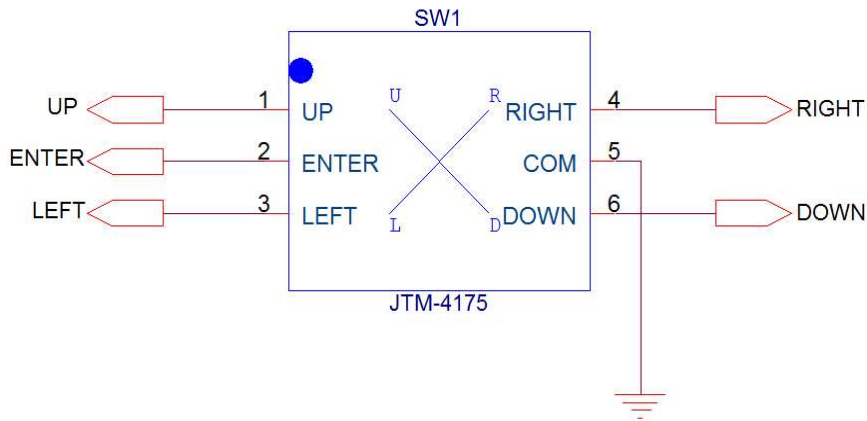
① KEY-VOLTAGE

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)

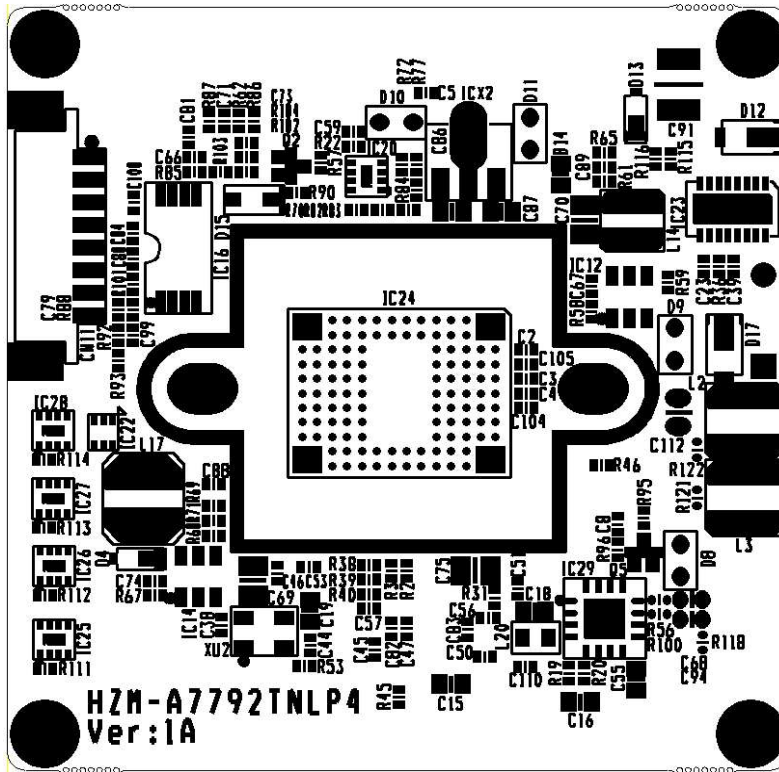
NO	Output Port	Output Format	OSD KEY				Remarks
			1'st	2'nd	3'rd	적용	
1	CN2-7	CVBS	DOWN	LEFT	ENTER	X	NTSC mega
2	CN2-5	AHD	DOWN	RIGHT	ENTER	X	AHD 2.0
3		TVI	DOWN	DOWN	ENTER	X	TVI 1080p
5	CN7 MMCX	HD-SDI	UP	DOWN	ENTER	O	HD-SDI 1080p
6		EX-SDI 1.0	UP	LEFT	ENTER	O	EX-SDI 1.0 1080p
7		EX-SDI 2.0	UP	UP	ENTER	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	X	X	X	
3	CN2-7	Monitor Output(NTSC)	△	△	△	X	X	X	
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)								

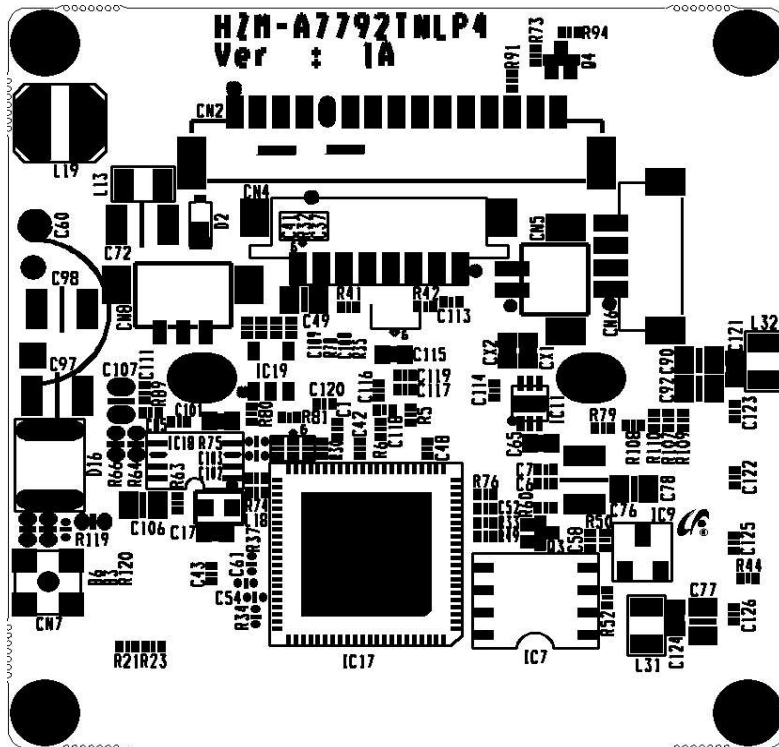


2-3-5. PCB Layout

<TOP VIEW>

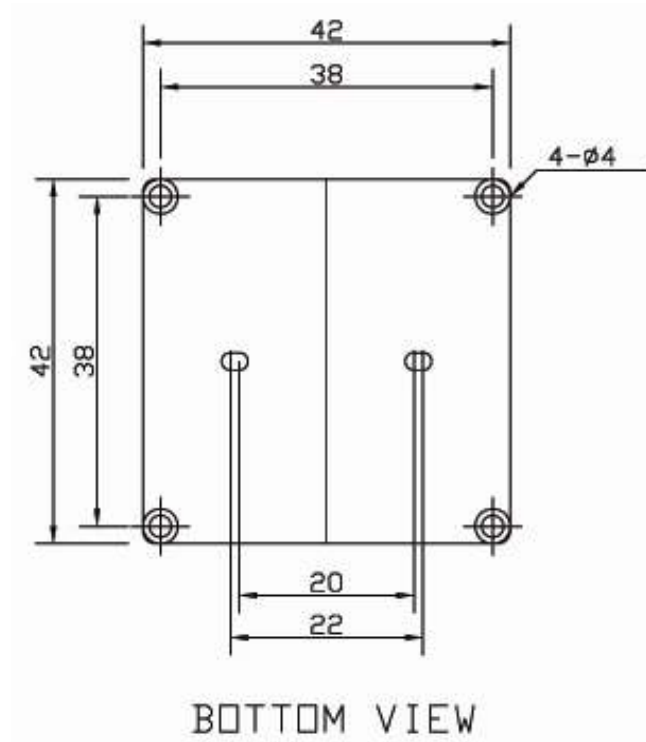
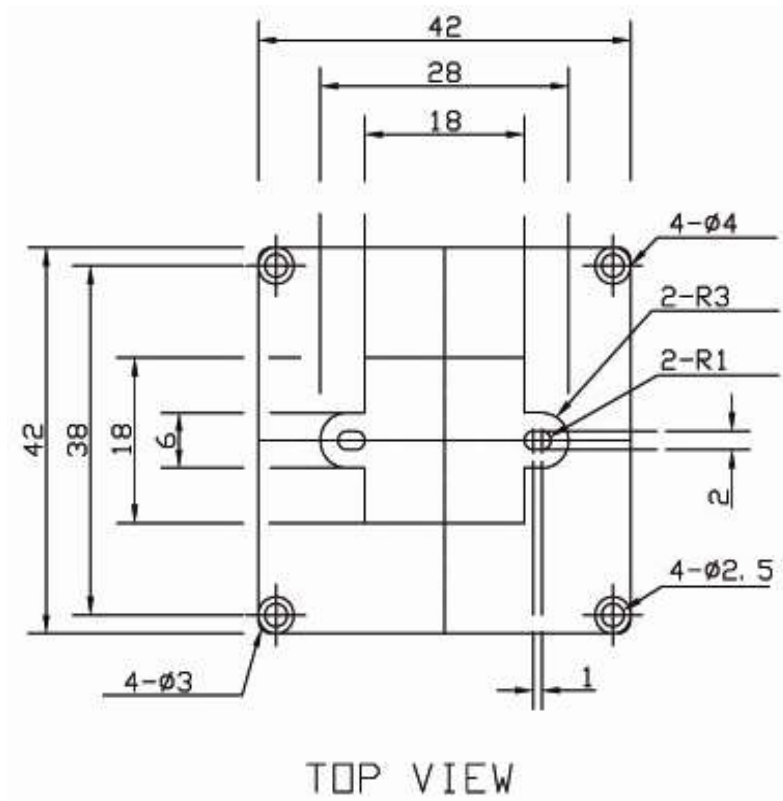


<BOTTOM VIEW>





2-4. PCB Outline Dimensions





2-5. OSD Menu tree

Main Menu	Sub Menu	Descriptions
LENS	IRIS	DC,MANUAL
	AF MODE	AUTO,MANUAL,HOLD
	SCANNING	HALF,FULL
	ONE PUSH AF	ON
	SYNC TDN	OFF,ON
	INITIAL	ON
EXPOSURE	BRIGHTNESS	0~20
	SHUTTER	AUTO,MANUAL,FLICKERLESS
	SENS-UP	OFF,X2~X32
	AGC	0~10
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	LOW,MIDDLE,HIGH
DAY&NIGHT	AUTO	THRESHOLD, MARGIN, DELAY,SMART IR
	COLOR	-
	B&W	SMART IR
	EXTERN	D>N THR, N>D THR, DELAY, SMART IR
WHITE BAL	MODE	AUTO, PRESET(PUSHING, OK)
	COLOR GAIN	0~20
IMAGE	SHARPNESS	0~10
	DNR	OFF,LOW,MIDDLE,HIGH
	GAMMA	0.45,0.55,0.65,0.75
	MIRROR	OFF,ON
	FLIP	OFF,ON
	ACE	OFF,LOW,MIDDLE,HIGH
	DEFOG	OFF,LOW,MIDDLE,HIGH
	PRIVACY	OFF,ON
MOTION	MOTION LED	OFF,ON
	WINDOW ZONE	0~3
	WINDOW USE	OFF,ON
	DET H-POS	0~58
	DET V-POS	0~32
	DET H-SIZE	1~60
	DET V-SIZE	1~34
	MDRECT FILL	OFF,ON



Main Menu	Sub Menu	Descriptions
	SENSITIVITY	0~10
	MOTION OSD	OFF,ON
	TEXT ALARM	OFF,ON
OPTION	CAM ID	0 ~ 255
	FRAME RATE	1080_30P,1080_25P, 720_60P,720_50P
	COLOR BAR	OFF,ON
	LANGUAGE	English,Chinese,Chinese(S) Japanese,Korea
	CAM TITLE	OFF,RIGHT UP, LEFT DOWN
EXIT	EXIT	SAVE, RESET, CANCEL



2-6 OSD Menu Functions

◆ Main Menu



■ LENS

Select the Lens operation type and set Auto Focus system

■ 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.

■ 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 the video output format, 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.

CANCEL: The function is used to cancel the various settings of the internal OSD menu.

KEY FUNCTIONS

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



◆ LENS



FUNCTION	OPTION	DESCRIPTION
IRIS	DC MANUAL	DC (Automatic IRIS Control) MANUAL (Electronic Shutter Control)
AF MODE	AUTO MANUAL HOLD	Executes the Auto Focus after Zoom in/out Focus the subjects manually Keep the current focus state without moving the lens
SCANNING	HALF FULL	Scan the half focus boundary Scan the full focus area
ONE PUSH AF	ON	Executes the Auto Focus just one time
SYNC TDN	OFF, ON	Execute the Auto Focus when changing the TDN
INITIAL	ON	Check the Zoom and Focus position

◆ 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 "Ⓢ" FLICKERLESS	Execute the Shutter speed automatically Execute the user setting Shutter speed Execute the Flickerless Shutter speed.
SENS-UP	OFF, X2, X4, X8, X16, X32	Adjusts the SENS-UP
AGC	0~10	Adjusts the AGC



■ SHUTTER(MANUAL)



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

◆ BACKLIGHT

*WDR does not operate while CVBS is being output.

FUNCTION	OPTION	DESCRIPTION
BACKLIGHT	OFF HLC"Ⓢ" BLC"Ⓢ" WDR"Ⓢ"	- HLC(High Light Compensation) ON BLC(Back light Compensation) ON. 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
WEIGHT	LOW,MIDDLE,HIGH	Selects the WDR weight

◆ 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

```

* DAY&NIGHT
THRESHOLD 20 |-----|
MARGIN    5  |-----|
DELAY     3  |-----|
SMART IR  3  |-----|
RETURN    ↓
  
```

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.

■ B&W

```

* DAY&NIGHT
SMART IR  3  |-----|
RETURN    ↓
  
```

FUNCTION	OPTION	DESCRIPTION
Smart IR	0~20	Brightness of IR and saturation phenomenon are automatically adjusted.

■ EXTERN

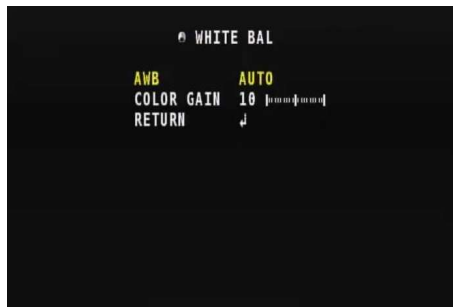
```

* DAY&NIGHT
D>N THRES 1  |-----|
N>D THRES 3  |-----|
DELAY     3  |-----|
SMART IR  3  |-----|
RETURN    ↓
  
```



FUNCTION	OPTION	DESCRIPTION
D>N THRES	0~20	Sets the threshold level from day to night
N>D THRES	0~20	Sets the threshold level from night to day
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	Auto trace white balance.
	PRESET	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.
COLOR GAIN	0~20	Adjusts COLOR GAIN

◆ IMAGE





FUNCTION	OPTION	DESCRIPTION
SHARPNESS	0~10	Select the resolution of the camera.
DNR	OFF,LOW,MIDDLE, HIGH	Set up 3D-DNR(Digital Noise Reduction) LEVEL.
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 contrast Enhance) level
DEFOG	OFF,LOW,MIDDLE, HIGH	Select defog compensation weight
PRIVACY	"Ⓢ"	Sets the Privacy function

■ 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 V-POS H-SIZE V-SIZE	0~58 0~32 1~60 1~34	Can be adjusted Privacy area
Y LEVEL	0~20	Adjusts the Y LEVEL of the Privacy zone area
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	0~2	Adjusts the transparency of the Privacy zone area



◆ MOTION



FUNCTION	OPTION	DESCRIPTION
MOTION LED	OFF,ON	Set the motion led on time
DET WINDOW	"⊕"	Adjust the size of the detection area
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

■ DET WINDOW



FUNCTION	OPTION	DESCRIPTION
WINDOW ZONE	0~3	Select the Motion set number
WINDOW USE	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
CAM ID	0 ~ 255	Sets the communication ID
FRAME RATE	1080_30P,1080_25P, 720_60P,720_50P	Sets the format and frame rate
COLOR BAR	OFF,ON	Display Color bar pattern
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
SDI FORMAT	HD-SDI, EX-SDI 1.0, EX-SDI 2.0	Display the SDI Format informaion

■ 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.
	CANCEL	All the settings of the internal OSD menu are canceled.



◆ Menu default data change

Set the menu data to be used as default data.
and then push the left button for 3 seconds at option item.

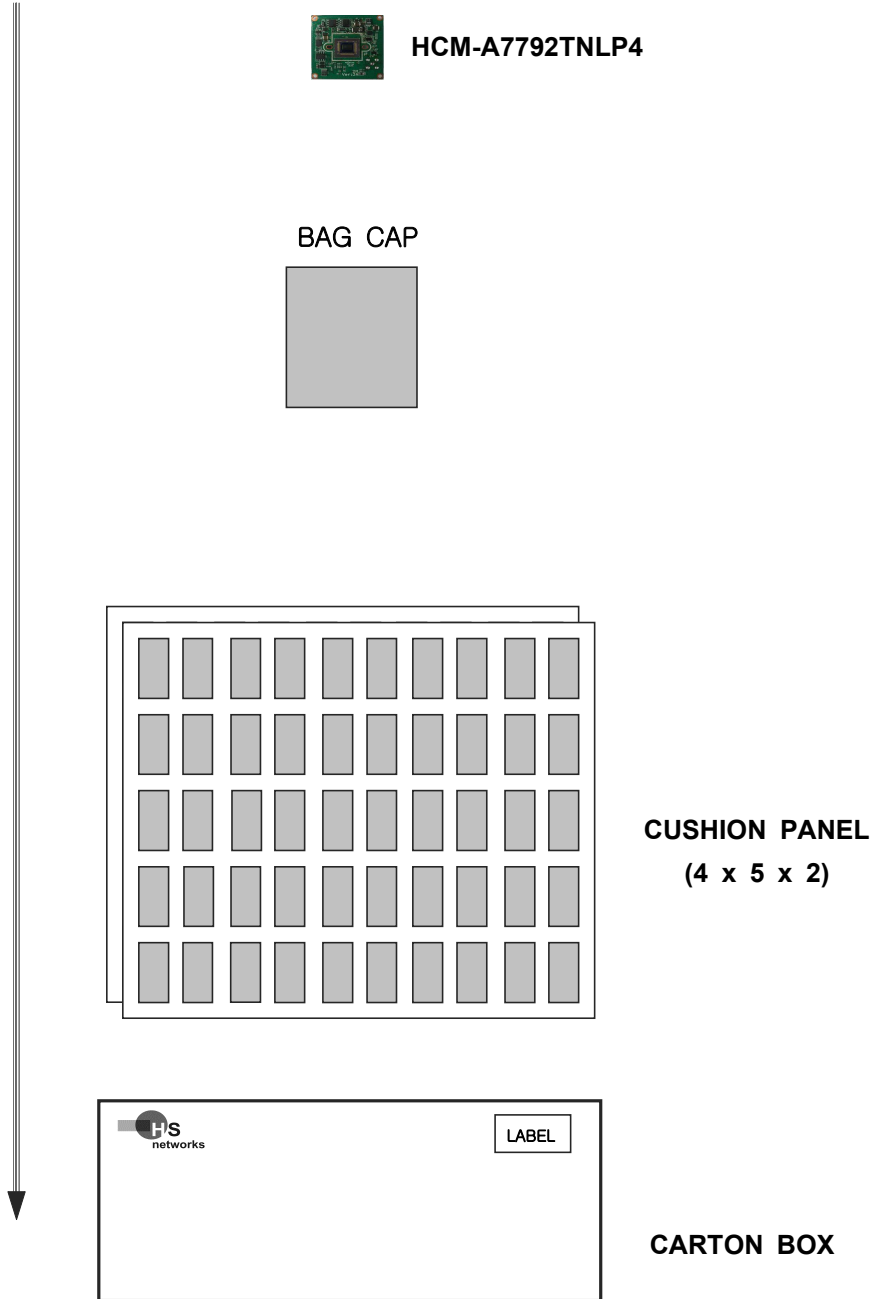


Push the enter button for 3 seconds at save item
(appear the 'pushing' instead of 'on')
and then exit the menu.





3. Packing Information

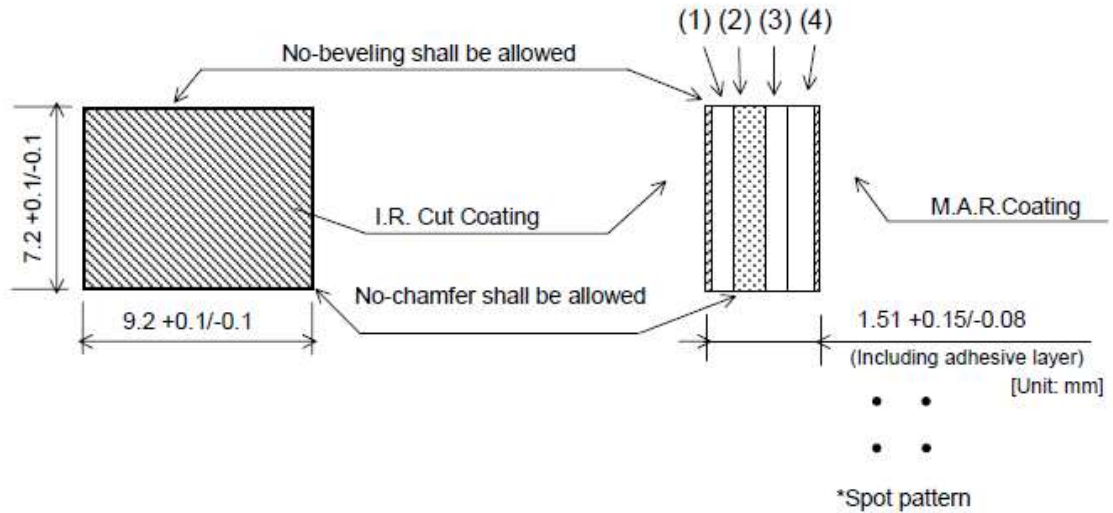




4. Reference Data Sheet

4-1. OLPF(Optical Low Pass Filter) Specifications

4-1-1. 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	

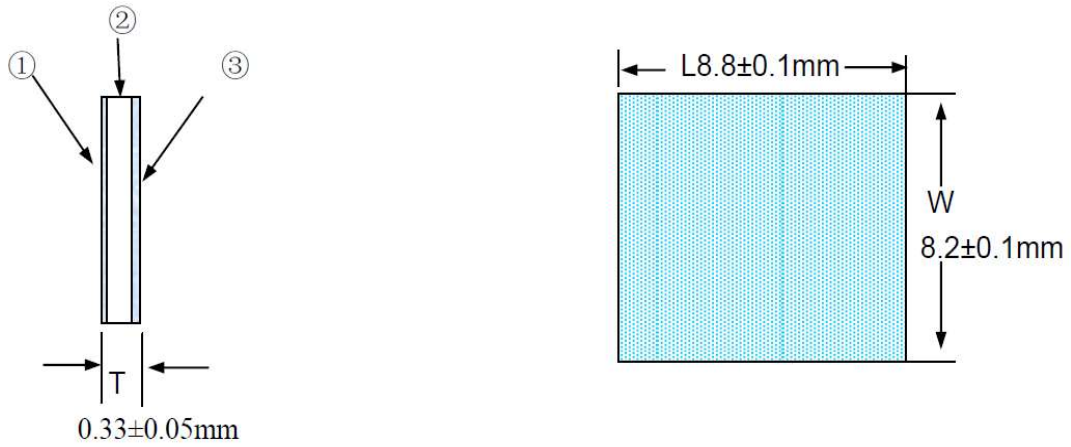
*Rotating angle of parts No. (3) is possible event by -45 +1/-1 degree.

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)



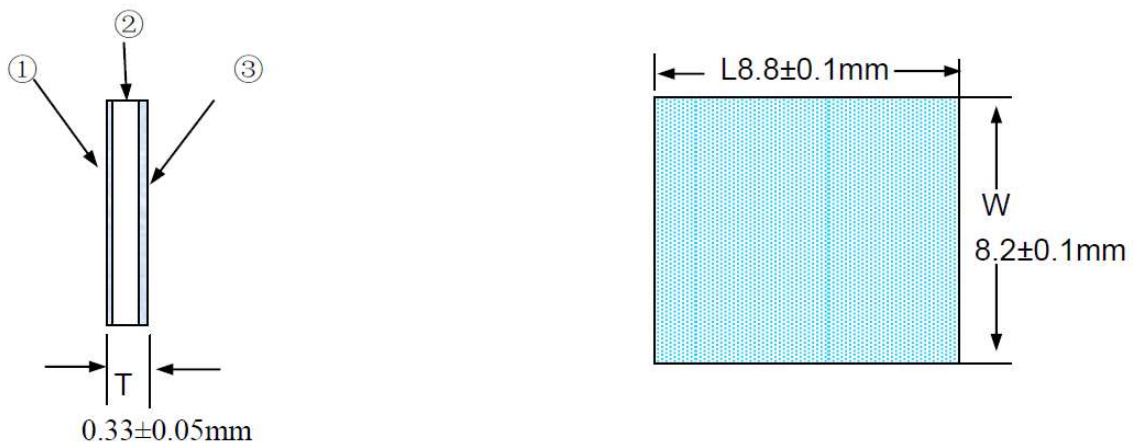
4-1-2. OLPF for general lens-2(OLPF Manufacturer : Max Gain)



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%

4-1-3. OLPF for TDN lens(OLPF Manufacturer : Max Gain)



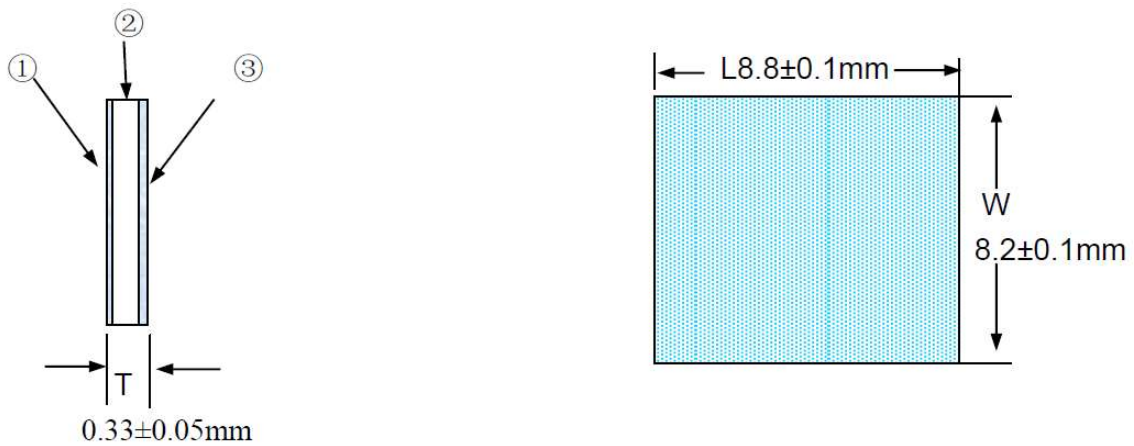




Part No	Part Name	Dimension(mm)			Orientation Angle	Rotation Angle	Flatness	Para
		L	W	T				
①	AR Coating							
②	Double refractive	8.8±0.	8.2±0.	0.33±0.0	45	0	3N	2'
③	AR Coating							

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

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



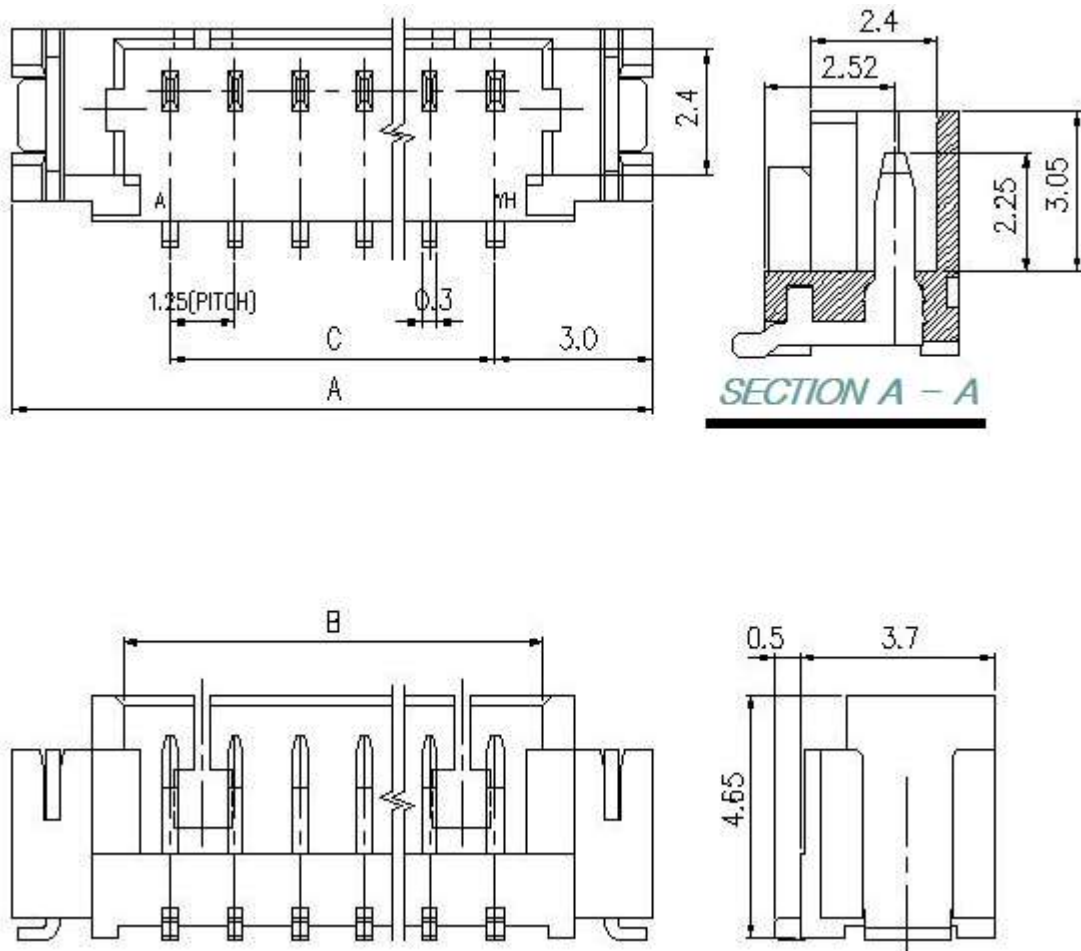
Part No	Part Name	Dimension(mm)			Orientation Angle	Rotation Angle	Flatness	Para
		L	W	T				
①	Night vision Coating							
②	Double refractive	8.8±0.	8.2±0.	0.33±0.0	45	0	3N	2'
③	AR Coating							

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



4-2. I/O Connector Specifications

4-2-1. 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°C ~ +85°C
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



4-2-2. MMCX-005-003 Series

