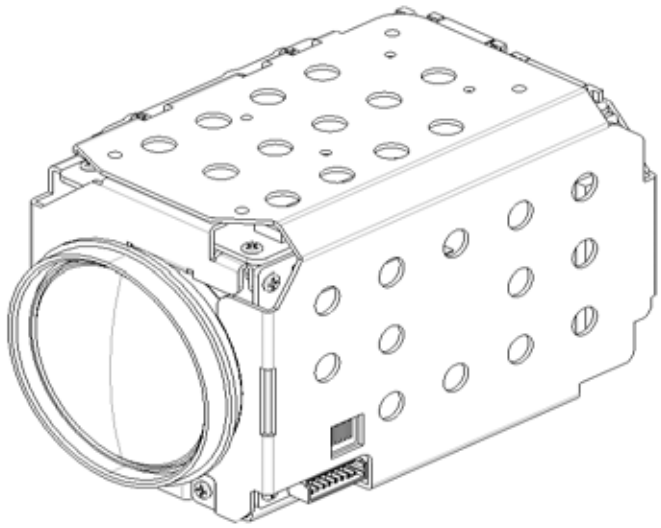
Messrs. :

DATE	2006.09.22
F/W Ver.	6.2

Technical Manual

Model Name	**SDM-330 N/P**

30X OPTICAL ZOOM MODULE



Part No.	
Receipt Stamp	
Remark:	

SAMSUNG TECHWIN CO., LTD
Optics & Digital Imaging Div.

<Modified History>

Revision	Date of Send	Modified Contents
Ver 1.0	May. 24. 2005	Official Version 1.0 Release
Ver 1.1	Jun. 03. 2005	Protocol data is fixed.
Ver 1.2	Jun. 16. 2005	Protocol data is changed.
Ver 1.3	Jun. 17. 2005	Protocol data is changed.
Ver 1.4	Jun. 20. 2005	Protocol data is changed.
Ver 1.5	July. 06. 2005	Protocol data is changed.
Ver 1.6	July. 07. 2005	Protocol data is changed.
Ver 1.7	Aug. 05. 2005	Protocol data is changed.
Ver 1.8	Aug. 17. 2005	Protocol data is added.
Ver 1.9	Sep. 05. 2005	Protocol data is changed.
Ver 2.0	Sep. 14. 2005	Protocol data is added.
Ver 2.1	Sep. 27. 2005	Protocol data is changed.
Ver 2.2	Oct. 17. 2005	Protocol data is changed.
Ver 2.3	Oct. 20. 2005	Function overview is added.
Ver 2.4	Dec. 12. 2005	Protocol data is added.
Ver 2.5	Dec. 16. 2005	Protocol data is added.
Ver 2.6	Jan. 02. 2006	Protocol data is added.
Ver 2.7	Jan. 09. 2006	Protocol data is added.
Ver 2.8	Jan. 21. 2006	Protocol data is added.
Ver 2.9	Sep. 22. 2006	Protocol data is updated.

Contents

1. Product Model

SDM-330 N/P (N:NTSC, P:PAL)

2. Features

■ Fine Picture in Ultra Low illumination

SV-III DSP and 1/3 high density CCD allows bright and high quality images to be captured in ultra low light condition.

■ Wide Dynamic Range(WDR)

SV-III DSP has strong compensation performance in WDR.
So it always shows obvious, clear and perfect light contrast picture in any environment.

■ SV-III DSP Chip

The SDM-330 has powerful DSP that can remove image noise efficiency and it shows clean and obvious image under low illuminance.

■ 30x Optical Zoom

The SDM-330 built-in x30 optical zoom lens is highly reliable. It features auto focus, auto iris and zoom function.

■ High Resolution

The horizontal resolution of 520TV Lines at Color mode and 570TV Lines at BW mode can be achieved by using a high density CCD having Double Speed 410,000 pixels SONY CCD, which provides clean, noiseless and reliable pictures.

■ Day & Night (ICR)

An infrared(IR) Cut-Filter can be disengaged from the image path for increased sensitivity in low light environments. The ICR will automatically engage depending on the ambient light, allowing the camera to be effective in day&night environmrnt.

■ Privacy zone masking(max. 32 zones/8 programmable zone per screen)

The privacy zone function makes it possible to mask specific areas of the scene from view.

■ Electrical Flip function

The SDM-330 has function of H/V reverse mode.

■ Motion Detection

3. Camera Specifications

Specifications		SDM-330N	SDM-330P
POWER	Input Voltage	DC 8V ~ 15v (Recommended : 9V or 12V)	
	Input Current	400 mA : Steady-state, (at 9V) 550 mA : Max. (Zoom,Focus, Day&night motor operating) (at 9V)	
	Power Consumption	3.6 W : Steady-state (at 9V) 4.95 W : Max. (Zoom,Focus, Day&night motor operating, at 9V)	
CCD	Size	1/4 inch, Vertical double density interline CCD	
	Total Pixels	811(H) x 508(V)	795(H) x 596(V)
	Effective Pixels	768(H) x 494(V)	752(H) x 582(V)
OPTICS	Optics	30X, f=3.3 to 99.0mm(F 1.6 to 3.2)	
	Min. Focus Distance	1000mm	
	D. ZOOM	X2, X4, X8	
	Angle Field of view	**H** : Appr. 58.0° (Wide) to 2.22° (Tele) **V** : Appr. 44.8° (Wide) to 1.68° (Tele)	
Sync.	Scanning System	2:1 Interlace	
	Synchronization	Internal/Line Lock	
	Frequency	Horizontal:15.734 KHz/Vertical :59.94 Hz	Horizontal: 15.625 KHz/Vertical : 50.00 Hz
ELECTRICAL	Camera Title	ON/OFF (Displayed 20 characters)	
	Resolution	520 TV Lines(Min.) : Color 570 TV Lines(Min.) : B/W	
	Video Output	CVBS : 1.0Vp-p/75Ω	
	S/N (Y signal)	50 dB (AGC Off,Weight ON)	
	Min. Illumination	0.4 Lux/F1.6 (50 IRE) ; Color 0.08 Lux/F1.6 (50 IRE) ; B/W	
	WDR	52dB	
	Day & Night	AUTO/MANUAL (ICR)	
	Gain Control	Low,Middle,High,OFF Selectable	
	White Balance	ATW/AWC/Manual (1800 °K ~ 10,500 °K)	
	Electronic shutter speed	AUTO/MANUAL (X128 ~ 1/60sec ~ 1/120,000sec) Sens-up and Sens-up Limit is selectable	AUTO/MANUAL (X128 ~1/50sec ~ 1/120,000sec) Sens-up and Sens-up Limit is selectable
	O.S.D	Built-In	
	Motion Detection	ON/OFF (output via communication)	
	Communication	RS-232C 9600bps, 19200bps, 38400bps Selectable	
	SSNR	Low,Middle,High,Off	
	Focus	Auto/Manual	
	Zoom Movement Speed	5.2 Sec : Wide to Tele	5.4 Sec : Wide to Tele
	Lens Initialize	Built-In	
	Privacy Function	ON/OFF(32 Programmable Zone/ 8 Programmable Zone per Screen)	
	FLIP	LEFT/RIGHT, UP/DOWN	
	FREEZE	On/Off	
	IRIS Control	Auto/Manual	
Operating Temperature/Humidity		0℃ to +50℃ / 20% to 80% RH	
Storge Temperature/Humidity		-20℃ to +60℃ / 20% to 95% RH	
Dimension		48.6(W)×53.8(H)×87(D)mm	
Weight		240g	

* Design and specification are subject to change without notice.

4. Precautions

1) Do not install the unit in an area that is dusty,greasy,wet or humid to avoid a decline in performance or operational failure.

2) Do not install the unit in an area that is subject to vibration. Also, protect the unit from any sudden impact or any kind of vibration as these may cause a decline in a performance or an operation failure.

3) Avoid placing the unit in an area exposed to direct sunlight that would cause the temperature inside the unit to rise resulting in an operation failure.

4) Be sure to use the specified screws of installing the camera unit. If not, serioue damage to the camera unit may occur.

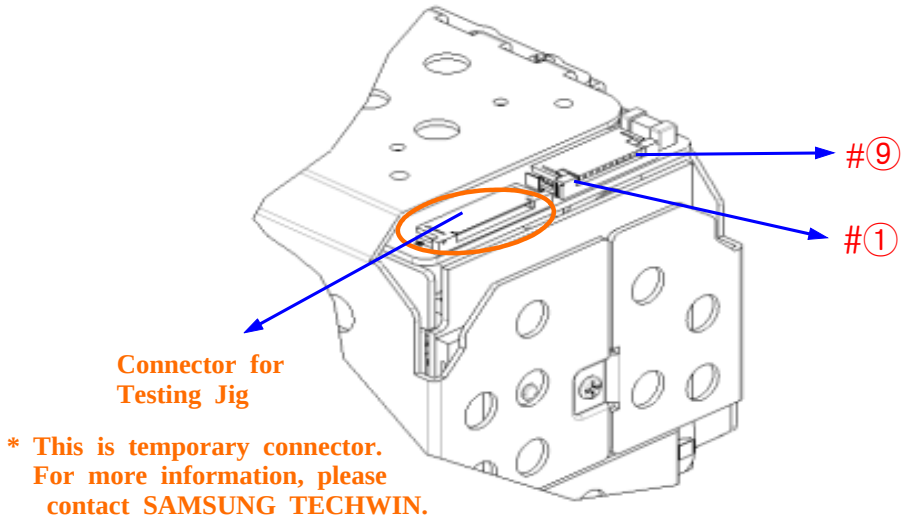
5) Always turn off the power supply before unplugging the interface connector. Failure to do this may cause an operational failure.
And, do not apply excessive voltage.(Use only the specified voltage)
Otherwise, you may get an electric shock or a fire may occur.

6) Always connect the power supply to the correct positive (+) and negative (-) terminals.Improper connections to the power supply will cause an operational failure.

7) Should you wish to use the camera unit for anything other than its intended use, please contact the manufacturer in advance.

8) It is recommended that auto-focus not be used on following subjects and scene.
- subjects with very dark surface (such as the black cloths or black curtain).
- subjects with very glossy or shiny surface (such as the exterior of automobiles).
- subjects with very little brightness contrast (such as the wall)
- subjects with very little or very strong back-lighting.
- scenes having a strong contrast between the right and left halves of the screen
- subjects with an object in front of them (such as animals in a cage)

5. Pin Specification for Camera Control Interface

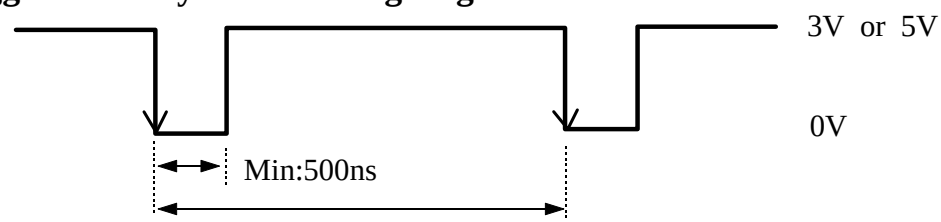


Connecting Condition

9 Pin FFC Connector : Compatible with 52207-0990,
1.0mm Pitch, Top Contact
Maker : Molex or Elco

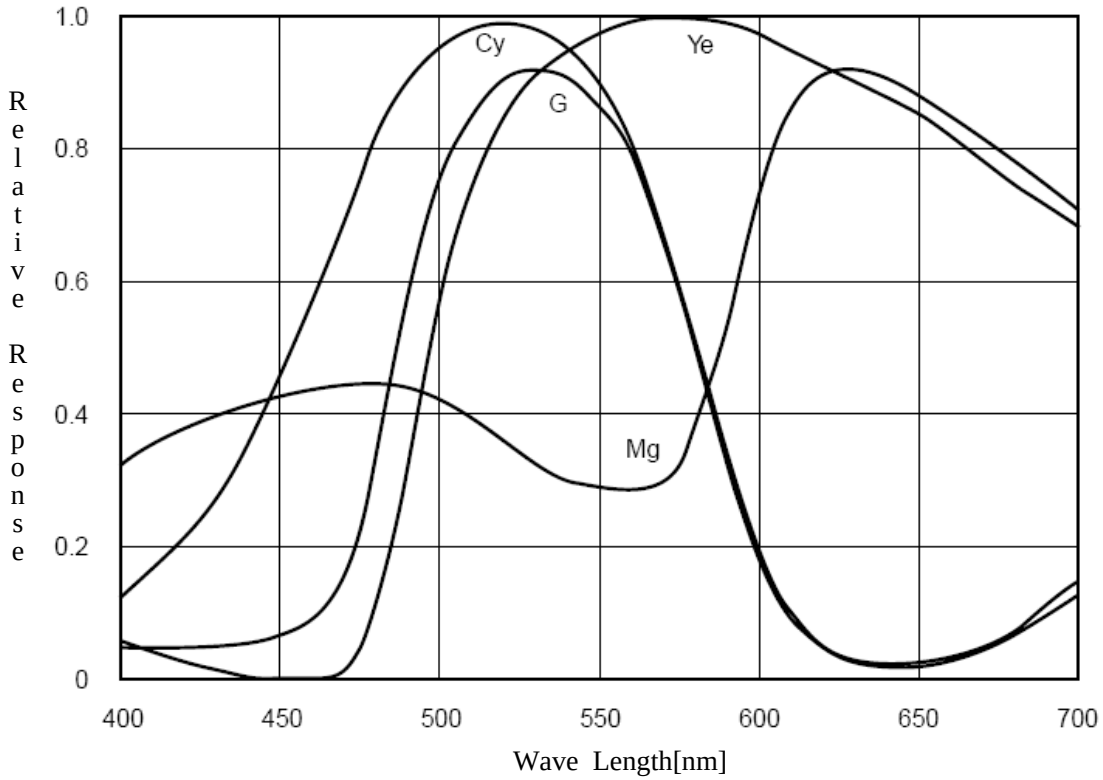
PIN_NO.	NAME	I/O	LEVEL
1	**GND**	-	
2	**TRIGGER_IN**	Input	External Line-Lock Pulse (Negative, 3 or 5Vp-p)
3	**GND**	-	
4	**VIDEO_OUT**	Output	1.0v±0.2v
5	**GND**	-	
6	**DC-IN**	Input	DC 8～15V(Recommended : 9V or 12V)
7	**GND**	-	
8	**TxD(for RS-232C)**	Output	CMOS Level(Low : Max.0.8V, High : Min. 2.7V)
9	**RxD(for RS-232C)**	Input	CMOS Level(Low : Max.0.8V, High : Min. 2.7V)

Trigger IN : Sync. to falling edge



60Hz ± 0.1Hz(NTSC)
50Hz ± 0.1Hz(PAL)

6. Spectral Sensitivity Characteristics



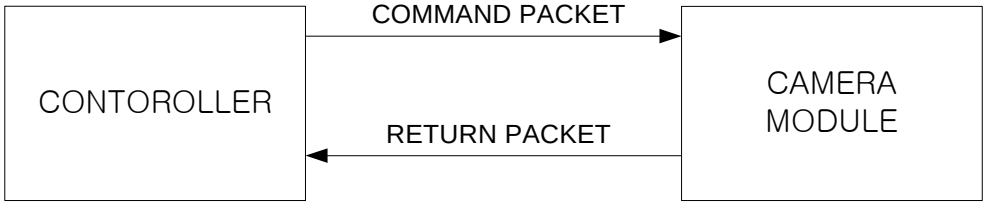
7. Communication Format

■ Communication Protocol

- communication speed : 9600bps, 19200bps, 38400bps(default)
- start bit : 1 bit
- data bit : 8 bits
- parity bit : even(default), odd, none
- stop bit : 1 bit

■ Communication Sequence

In this Command Reference, 'Command Packet' is defined as the packet sent from Host-Controller and 'Return Packet' is defined as the packet sent from Module Camera.
The Communication concludes when Host-controller receives a Return Packet from the Module Camera to a Command Packet as follows.
This Command Reference prescribes the Command Packet, Return Packet and the Time To between receipt of a Command Packet and transmission of a Return Packet.



■ Communication Packet Format

- Packet Type A consists of 6bytes, and Type B consists of 8bytes.

- Packet Format Type A.

Command Packet						ACK Packet					
W1	W2	W3	W4	W5	W6	W1	W2	W3	W4	W5	W6

[notes] Command Packet : Sending command from controller to camera
Return Packet : Sending back data from camera to controller

[Command Packet]

1st bit	W1	STX	Start of Text	A0h
2nd bit	W2	Command	Command	00h~FFh
3rd bit	W3	Parameter1	data	00h~FFh
4th bit	W4	Parameter2	data	00h~FFh
5th bit	W5	Parameter3	data	00h~FFh
6th bit	W6	ETX	End of Text	AFh

[Return Packet]

1st bit	W1	STX	Start of Text	A0h
2nd bit	W2	Command	Command	00h~FFh
3rd bit	W3	Parameter1	data	00h~FFh
4th bit	W4	Parameter2	data	00h~FFh
5th bit	W5	Parameter3	data	00h~FFh
6th bit	W6	ETX	End of Text	AFh

- Packet Format Type B.

Command Packet								ACK Packet							
W1	W2	W3	W4	W5	W6	W7	W8	W1	W2	W3	W4	W5	W6	W7	W8

[notes] Command Packet : Sending command from controller to camera
Return Packet : Sending back data from camera to controller

[Command Packet]

1st bit	W1	STX	Start of Text	A1h
2nd bit	W2	Command	Command	00h~FFh
3rd bit	W3	Parameter1	data	00h~FFh
4th bit	W4	Parameter2	data	00h~FFh
5th bit	W5	Parameter3	data	00h~FFh
6th bit	W6	Parameter4	data	00h~FFh
7th bit	W7	Parameter5	data	00h~FFh
8th bit	W8	ETX	End of Text	AFh

[Return Packet]

1st bit	W1	STX	Start of Text	A1h
2nd bit	W2	Command	Command	00h~FFh
3rd bit	W3	Parameter1	data	00h~FFh
4th bit	W4	Parameter2	data	00h~FFh
5th bit	W5	Parameter3	data	00h~FFh
6th bit	W6	Parameter4	data	00h~FFh
7th bit	W7	Parameter5	data	00h~FFh
8th bit	W8	ETX	End of Text	AFh

8. Command List

■ Command List of Transmitting

No.	Command Name	Reset					
1	Function	Reset All Data To Factory Default Value.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**01h**	00h	00h	00h	AFh
	Return Packet	A0h	**01h**	00h	00h	00h	AFh
	Parameter						

No.	Command Name	Save Data To EEPROM					
2	Function	Save The Modified Data To EEPROM.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**02h**	00h	00h	00h	AFh
	Return Packet	A0h	**02h**	00h	00h	00h	AFh
	Parameter						

No.	Command Name	Camera Title Setup					
3	Function	Set Camera Title String and Display Position On The Screen					
	Remark	This command normally is used for Box Type Zoom Camera using this camera module.					
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**03h**	**P1**	**P2**	**P3**	AFh
	Return Packet	A0h	**03h**	**P2**	**P2**	**P3**	AFh

Parameter

Packet 1: P1 = X position(NTSC:01h~1Bh, PAL:03h~1Bh) *Mode : BIT7(1/0)=ON/OFF
P2 = Y position(01h~0Ah)
P3 = string length(01h~14h)

Packet 2: P1 = Character No.1 of String
P2 = Character No.2 of String
P3 = Character No.3 of String

Packet 3: P1 = Character No.4 of String
P2 = Character No.5 of String
P3 = Character No.6 of String

Packet 4: P1 = Character No.7 of String
P2 = Character No.8 of String
P3 = Character No.9 of String

Packet 5: P1 = Character No.10 of String
P2 = Character No.11 of String
P3 = Character No.12 of String

Packet 6: P1 = Character No.13 of String
P2 = Character No.14 of String
P3 = Character No.15 of String

Packet 7: P1 = Character No.16 of String
P2 = Character No.17 of String
P3 = Character No.18 of String

Packet 8: P1 = Character No.19 of String
P2 = Character No.20 of String

<Title String Data>

Hex	Character	Hex	Character	Hex	Character	Hex	Character
01h	A	14h	T	27h	m	3Ah	5
02h	B	15h	U	28h	n	3Bh	6
03h	C	16h	V	29h	o	3Ch	7
04h	D	17h	W	2Ah	p	3Dh	8
05h	E	18h	X	2Bh	q	3Eh	9
06h	F	19h	Y	2Ch	r	3Fh	'\b'[Blank]
07h	G	1Ah	Z	2Dh	s	40h	(
08h	H	1Bh	a	2Eh	t	41h	)
09h	I	1Ch	b	2Fh	u	42h	<
0Ah	J	1Dh	c	30h	v	43h	>
0Bh	K	1Eh	d	31h	w	44h	-
0Ch	L	1Fh	e	32h	x	45h	/
0Dh	M	20h	f	33h	y	46h	#
0Eh	N	21h	g	34h	z	47h	!
0Fh	O	22h	h	35h	0	48h	?
10h	P	23h	i	36h	1	49h	,
11h	Q	24h	j	37h	2	4Ah	.
12h	R	25h	k	38h	3	4Bh	'\n'[CR]
13h	S	26h	l	39h	4		

No.	Command Name	Zoom Motor Stop					
4	Function	Stop Zoom Lens Movement					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**10h**	00h	00h	00h	AFh
	Return Packet	A0h	**10h**	00h	00h	00h	AFh
	Parameter						

No.	Command Name	Zoom Start					
5	Function	Move Zoom Lens To Tele / Wide Direction And Set Zoom Motor Speed.					
	Remark	During processing to the specific direction, if you wish to change direction, you have to stop zoom motor before changing direction. P3 data is used for only zoom tracking speed.					
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**11h**	**P1**	**P2**	**P3**	AFh
	Return Packet	A0h	**11h**	**P1**	**P2**	**P3**	AFh
	Parameter	P1: 00h = Tele End 01h = Wide End P2: 01h = Zoom Speed 1 (Min) 02h = Zoom Speed 2 03h = Zoom Speed 3 04h = Zoom Speed 4 05h = Zoom Speed 5 06h = Zoom Speed 6 07h = Zoom Speed 7 08h = Zoom Speed 8 (Factory default Max) P3: 00h = No skip 01h = 12 VD skip 02h = 10 VD skip 03h = 8 VD skip 04h = 6 VD skip 05h = 4 VD skip 06h = 2 VD skip 07h = 1 VD skip					

No.	Command Name	Zoom Direct					
6	Function	Move Zoom Lens To Target Position Directly.					
	Remark	If P1P2 is not 06EAh(Tele-end), P3 will be ignored.					
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**12h**	**P1**	**P2**	**P3**	AFh
	Return Packet	A0h	**12h**	**P1**	**P2**	**P3**	AFh
	Parameter	P1P2: 0000h~06EAh = Target Position P3: 00h = D-Zoom value 1x 01h = D-Zoom value 2x 02h = D-Zoom value 4x 03h = D-Zoom value 8x					

No.	Command Name	Focus Motor Stop					
7	Function	Stop Focus Lens Movement					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**19h**	00h	00h	00h	AFh
	Return Packet	A0h	**19h**	00h	00h	00h	AFh
	Parameter						

No.	Command Name	Focus Start					
8	Function	Move Focus Lens To Near / Far Direction.					
	Remark	Focus mode: Manual / Zoom Trigger					
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**1Ah**	**P1**	00h	00h	AFh
	Return Packet	A0h	**1Ah**	**P1**	00h	00h	AFh
	Parameter	P1: 00h = Near direction 01h = Far direction					

No.	Command Name	Focus Direct					
9	Function	Move Focus Lens To Target Position Directly.					
	Remark	Focus mode: Manual / Zoom Trigger Min/Max limit of target position varies from zoom position. Min/Max limit can get from command AAh. Before sending this command, you should get the information of Min/Max Limit from command AAh to avoid sending wrong data.					
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**1Bh**	**P1**	**P2**	00h	AFh
	Return Packet	A0h	**1Bh**	**P1**	**P2**	00h	AFh
	Parameter	P1P2: Target Position					

No.	Command Name	Focus Setup					
10	Function	Set Focus Mode, Zoom Tracking, Zoom Speed, And Zoom Magnification Display Mode On The Screen. And Set Digital Zoom Mode and Limitation.					
	Remark	**Please make sure if it has a return packet after mode is changed.**					
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**1Ch**	**P1**	**P2**	**P3**	AFh
	Return Packet	A0h	**1Ch**	**P1**	**P2**	**P3**	AFh
	Parameter	P1: BIT1~BIT0 = 00 = Manual Mode BIT1~BIT0 = 01 = Auto Mode BIT1~BIT0 = 10 = Zoom Trigger Mode(Factory default) P2: BIT7 = 0 = Zoom Tracking Mode Off BIT7 = 1 = Zoom Tracking Mode On(Factory default) BIT6 = 0 = Zoom Tracking Speed Fast(Factory default) BIT6 = 1 = Zoom Tracking Speed Slow BIT5 = 0 = Zoom magnification Display Off(Factory default) BIT5 = 1 = Zoom magnification Display On P3: BIT7 = 0 = D-Zoom Off(Factory default) BIT7 = 1 = D-Zoom On BIT1~0 = 00 = D-Zoom limit 1x BIT1~0 = 01 = D-Zoom limit 2x BIT1~0 = 10 = D-Zoom limit 4x BIT1~0 = 11 = D-Zoom limit 8x(Factory default)					

No.	Command Name	One Shot AF					
11	Function	Execute One-shot Auto Focus Function					
	Remark	This command will find focus point immediately at any time.					
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**1Dh**	00h	00h	00h	AFh
	Return Packet	A0h	**1Dh**	00h	00h	00h	AFh
	Parameter						

No.	Command Name	Brightness Setup					
12	Function	Adjust Brightness Value.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**1Eh**	**P1**	00h	00h	AFh
	Return Packet	A0h	**1Eh**	**P1**	00h	00h	AFh
	Parameter	P1: 00h~64h 32h = Factory default					

No.	Command Name	AWB Setup					
13	Function	Set AWB Mode, Color Temperature And Manual Offset.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**1Fh**	**P1**	**P2**	**P3**	AFh
	Return Packet	A0h	**1Fh**	**P1**	**P2**	**P3**	AFh
	Parameter	P1: BIT7~BIT6 = 00 = ATW(Factory default) mode BIT7~BIT6 = 01 = AWC mode BIT7~BIT6 = 10 = Manual mode BIT2 = 00 = ATW OUTDOOR BIT2 = 01 = ATW INDOOR BIT1~BIT0 = 00 = Manual Color Temperature 2000K BIT1~BIT0 = 01 = Manual Color Temperature 3200K BIT1~BIT0 = 10 = Manual Color Temperature 5100K P2(Manual Red offset): 00h~C8h 64h = Factory default P3(Manual Blue offset): 00h~C8h Blue offset 64h = Factory default					

No.	Command Name	BackLight Setup					
14	Function	Set BackLight Mode And WDR Limit					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**20h**	**P1**	**P2**	00h	AFh
	Return Packet	A0h	**20h**	**P1**	**P2**	00h	AFh
	Parameter	P1(Mode): 00h = OFF(Factory default) 01h = WDR P2(WDR Limit): 00h = Low 01h = Middle(Factory default) 02h = High					

No.	Command Name	Sync Setup					
15	Function	Set Sync Mode And Adjust Line-Lock Phase Value.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**21h**	**P1**	**P2**	**P3**	AFh
	Return Packet	A0h	**21h**	**P1**	**P2**	**P3**	AFh
	Parameter	P1(Mode): 00h = Internal(Factory default) 01h = Line Lock P2P3(Phase Value): 0000h(0 degree)~0167h(359 degree) 00E1h(225 degree) = Factory default					

No.	Command Name	Iris Setup					
16	Function	Set Iris Mode And Manual Iris Value.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**23h**	**P1**	**P2**	00h	AFh
	Return Packet	A0h	**23h**	**P1**	**P2**	00h	AFh
	Parameter	P1(Mode): 00h = Auto(Factory default) 01h = Manual P2(Manual Value): 00h~64h 32h = Factory default					

* This table shows F number according to the manual value.

P2	F#	P2	F#	P2	F#	P2	F#	P2	F#
00h	Close	14h	F8.30	28h	F4.15	3Ch	F2.77	50h	F2.08
01h	F165.97	15h	F7.90	29h	F4.05	3Dh	F2.73	51h	F2.05
02h	F82.99	16h	F7.54	2Ah	F3.95	3Eh	F2.68	52h	F2.03
03h	F55.32	17h	F7.22	2Bh	F3.86	3Fh	F2.64	53h	F2.00
04h	F41.49	18h	F6.92	2Ch	F3.77	40h	F2.60	54h	F1.98
05h	F33.19	19h	F6.64	2Dh	F3.69	41h	F2.56	55h	F1.96
06h	F27.66	1Ah	F6.38	2Eh	F3.61	42h	F2.52	56h	F1.94
07h	F23.71	1Bh	F6.15	2Fh	F3.53	43h	F2.48	57h	F1.92
08h	F20.75	1Ch	F5.93	30h	F3.46	44h	F2.45	58h	F1.90
09h	F18.44	1Dh	F5.72	31h	F3.39	45h	F2.41	59h	F1.87
0Ah	F16.60	1Eh	F5.53	32h	F3.32	46h	F2.38	5Ah	F1.85
0Bh	F15.09	1Fh	F5.35	33h	F3.25	47h	F2.34	5Bh	F1.83
0Ch	F13.83	20h	F5.19	34h	F3.19	48h	F2.31	5Ch	F1.81
0Dh	F12.77	21h	F5.03	35h	F3.13	49h	F2.28	5Dh	F1.80
0Eh	F11.86	22h	F4.88	36h	F3.07	4Ah	F2.25	5Eh	F1.78
0Fh	F11.06	23h	F4.74	37h	F3.02	4Bh	F2.22	5Fh	F1.76
10h	F10,37	24h	F4.61	38h	F2.96	4Ch	F2.19	60h	F1.74
11h	F9.76	25h	F4.49	39h	F2.91	4Dh	F2.16	61h	F1.72
12h	F9.22	26h	F4.37	3Ah	F2.86	4Eh	F2.13	62h	F1.70
13h	F8.74	27h	F4.26	3Bh	F2.81	4Fh	F2.11	63h	F1.69
								64h	F1.67

No.	Command Name	Shutter Setup					
17	Function	Set Shutter Mode And Manual Shutter Speed Value.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**24h**	**P1**	**P2**	00h	AFh
	Return Packet	A0h	**24h**	**P1**	**P2**	00h	AFh
	Parameter	P1: 00h = ESC(Factory default) 01h = Manual 02h = Anti-Flicker P2: 00h(NTSC:1/120000, PAL:1/120000) 01h(NTSC:1/60000, PAL:1/60000) 02h(NTSC:1/30000, PAL:1/30000) 03h(NTSC:1/10000, PAL:1/10000) 04h(NTSC:1/7000, PAL:1/7000) 05h(NTSC:1/5000, PAL:1/5000) 06h(NTSC:1/2500, PAL:1/2500) 07h(NTSC:1/1600, PAL:1/1600) 08h(NTSC:1/1000, PAL:1/1000) 09h(NTSC:1/700, PAL:1/700) 0Ah(NTSC:1/500, PAL:1/500) 0Bh(NTSC:1/250, PAL:1/250) 0Ch(NTSC:1/160, PAL:1/160) 0Dh(NTSC:1/60, PAL:1/50) = Factory default 0Eh(NTSC:x2, PAL:x2) 0Fh(NTSC:x4, PAL:x4) 10h(NTSC:x6, PAL:x6) 11h(NTSC:x8, PAL:x8) 12h(NTSC:x10, PAL:x10) 13h(NTSC:x12, PAL:x12) 14h(NTSC:x14, PAL:x14) 15h(NTSC:x16, PAL:x16) 16h(NTSC:x24, PAL:x24) 17h(NTSC:x32, PAL:x32) 18h(NTSC:x64, PAL:x64) 19h(NTSC:x128, PAL:x128)					

No.	Command Name	Slow Shutter Setup					
18	Function	Set Slow Shutter Mode And Limit.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**25h**	**P1**	**P2**	00h	AFh
	Return Packet	A0h	**25h**	**P1**	**P2**	00h	AFh
	Parameter	P1: 00h = OFF 01h = AUTO(Factory default) P2: 00h(x2) 01h(x4) = Factory default 02h(x6) 03h(x8) 04h(x10) 05h(x12) 06h(x14) 07h(x16) 08h(x24) 09h(x32) 0Ah(x64) 0Bh(x128)					

No.	Command Name	AGC / SSNR Setup					
19	Function	Set Auto Gain Control Mode And SSNR(Digital Noise Reduction) Mode.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**26h**	**P1**	**P2**	00h	AFh
	Return Packet	A0h	**26h**	**P1**	**P2**	00h	AFh
	Parameter	P1: (AGC) 00h = LOW 01h = MIDDLE(Factory default) 02h = HIGH 03h = OFF P2:(SSNR) 00h = LOW 01h = MIDDLE(Factory default) 02h = HIGH 03h = OFF					

No.	Command Name	Day Night Setup					
20	Function	Set Day Night mode.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**27h**	**P1**	**P2**	**P3**	AFh
	Return Packet	A0h	**27h**	**P1**	**P2**	**P3**	AFh
	Parameter	P1: BIT7~BIT6 = 00 = COLOR Mode(Factory default) BIT7~BIT6 = 01 = B/W Mode BIT7~BIT6 = 10 = AUTO Mode BIT0 = 0 = B/W Burst Mode Off(Factory default) BIT0 = 1 = B/W Burst Mode On P2P3: Color Burst Level = 0000h~012Ch 0096h(Factory default)					

No.	Command Name	Tone Setup					
21	Function	Adjust Tone Value.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**28h**	**P1**	00h	00h	AFh
	Return Packet	A0h	**28h**	**P1**	00h	00h	AFh
	Parameter	P1: 00h~64h 05h = Factory default					

No.	Command Name	Sharpness Setup					
22	Function	Adjust Sharpness Value.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**29h**	**P1**	00h	00h	AFh
	Return Packet	A0h	**29h**	**P1**	00h	00h	AFh
	Parameter	P1: 00h~64h 32h = Factory default					

No.	Command Name	Color Setup					
23	Function	Adjust Color Saturation Value.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**2Ah**	**P1**	00h	00h	AFh
	Return Packet	A0h	**2Ah**	**P1**	00h	00h	AFh
	Parameter	P1: 00h~64h 32h = Factory default					

No.	Command Name	Motion Detection Setup					
24	Function	Set Motion Detection Mode And Adjust Motion Detection Sensitivity Value.					
	Remark	If the motion is detected, camera returns the packet indicating the motion detected, then after 5 seconds, camera returns the no motion detected packet. Motion detection function operates under the condition that OSD is Off.					
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**2Bh**	**P1**	**P2**	00h	AFh
	Return Packet	A0h	**2Bh**	**P1**	**P2**	00h	AFh
	Parameter	P1(Mode): 00h = Off(Factory default) 01h = On P2(Sensitivity): 00h~64h 32h = Factory default					

No.	Command Name	Freeze Setup					
25	Function	Set Freeze Image Mode.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**2Ch**	**P1**	00h	00h	AFh
	Return Packet	A0h	**2Ch**	**P1**	00h	00h	AFh
	Parameter	P1: 00h = OFF(Factory default) 01h = ON					

No.	Command Name	H-Rev Setup					
26	Function	Set Horizontal Reversed Image Mode.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**2Dh**	**P1**	00h	00h	AFh
	Return Packet	A0h	**2Dh**	**P1**	00h	00h	AFh
	Parameter	P1: 00h = OFF(Factory default) 01h = ON					

No.	Command Name	V-Rev Setup					
27	Function	Set Vertical Reversed Image Mode.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**2Eh**	**P1**	00h	00h	AFh
	Return Packet	A0h	**2Eh**	**P1**	00h	00h	AFh
	Parameter	P1: 00h = OFF(Factory default) 01h = ON					

No.	Command Name	Infinite Position Setup					
28	Function	Move Zoom Lens To Wide-End Position.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**30h**	00h	00h	00h	AFh
	Return Packet	A0h	**30h**	00h	00h	00h	AFh
	Parameter						

No.	Command Name	Lens Initialization Setup					
29	Function	Execute Lens Initialization.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**31h**	**P1**	00h	00h	AFh
	Return Packet	A0h	**31h**	**P1**	00h	00h	AFh
	Parameter						

No.	Command Name	Privacy Mask Guidance Axis Display For Interacting With Pan And Tilt					
30	Function	Display The Guidance Axis For Privacy Mask Area Position Setup					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**34h**	**P1**	**P2**	00h	AFh
	Return Packet	A0h	**34h**	**P1**	**P2**	00h	AFh
	Parameter	P1: 00h = Left/Up axis selection 01h = Right/Down axis selection P2: 00h = Display Off 01h = Display On					

No.	Command Name	Privacy Area Setup Without Interworking Pan And Tilt							
31	Function	Set Privacy Area Top, Bottom, Left, Right Value Of Selected Area Of Each Group.							
	Remark	Bottom and Right value must be bigger than Top and Left. This command can be only used in non-interacting control with pan/tilt position.							
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
	Command Packet	A1h	**36h**	**P1**	**P2**	**P3**	**P4**	**P5**	AFh
	Return Packet	A1h	**36h**	**P1**	**P2**	**P3**	**P4**	**P5**	AFh
	Parameter	P1: BIT7~BIT6 = 00 = Group1(Factory default) BIT7~BIT6 = 01 = Group2 BIT7~BIT6 = 10 = Group3 BIT7~BIT6 = 11 = Group4 BIT5~BIT3 = 000 = Area1(Factory default) BIT5~BIT3 = 001 = Area2 BIT5~BIT3 = 010 = Area3 BIT5~BIT3 = 011 = Area4 BIT5~BIT3 = 100 = Area5 BIT5~BIT3 = 101 = Area6 BIT5~BIT3 = 110 = Area7 BIT5~BIT3 = 111 = Area8 BIT0 = 0 = Area Mode Off BIT0 = 1 = Area Mode On P2(Top) : 00h~61h(NTSC), 00h~75h(PAL) P3(Bottom): 00h~61h(NTSC), 00h~75h(PAL) P3(Left) : 00h~98h P3(Right) : 00h~98h							

No.	Command Name	Privacy Setup					
32	Function	Set Privacy Mode, Group, Group Color, And Group Area					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**37h**	**P1**	**P2**	**P3**	AFh
	Return Packet	A0h	**37h**	**P1**	**P2**	**P3**	AFh
	Parameter	P1(Mode): 00h = Off (Factory default) 01h = On P2: BIT7~BIT6 = 00 = Group1(Factory default) BIT7~BIT6 = 01 = Group2 BIT7~BIT6 = 10 = Group3 BIT7~BIT6 = 11 = Group4 BIT5~BIT3 = 000 = Black(Factory default) BIT5~BIT3 = 001 = Red BIT5~BIT3 = 010 = Blue BIT5~BIT3 = 011 = Green BIT5~BIT3 = 100 = White BIT2~BIT0 = 000 = Area1(Factory default) BIT2~BIT0 = 001 = Area2 BIT2~BIT0 = 010 = Area3 BIT2~BIT0 = 011 = Area4 BIT2~BIT0 = 100 = Area5 BIT2~BIT0 = 101 = Area6 BIT2~BIT0 = 110 = Area7 BIT2~BIT0 = 111 = Area8 P3: BIT7 = 0 = Area 8 Mode Off(Factory default) BIT7 = 1 = Area 8 Mode On BIT6 = 0 = Area 7 Mode Off(Factory default) BIT6 = 1 = Area 7 Mode On BIT5 = 0 = Area 6 Mode Off(Factory default) BIT5 = 1 = Area 6 Mode On BIT4 = 0 = Area 5 Mode Off(Factory default) BIT4 = 1 = Area 5 Mode On BIT3 = 0 = Area 4 Mode Off(Factory default) BIT3 = 1 = Area 4 Mode On BIT2 = 0 = Area 3 Mode Off(Factory default) BIT2 = 1 = Area 3 Mode On BIT1 = 0 = Area 2 Mode Off(Factory default) BIT1 = 1 = Area 2 Mode On BIT0 = 0 = Area 1 Mode Off(Factory default) BIT0 = 1 = Area 1 Mode On					

<table>
<tr><td>No.</td><td>Command Name</td><td colspan="8">Privacy Area Left and Top Position Setup</td></tr>
<tr><td rowspan="6">33</td><td>Function</td><td colspan="8">Set Privacy Area Left And Top Value Of Selected Area Of Each Group.</td></tr>
<tr><td>Remark</td><td colspan="8">This command should execute before command 3Bh.</td></tr>
<tr><td></td><td>Byte1</td><td>Byte2</td><td>Byte3</td><td>Byte4</td><td>Byte5</td><td>Byte6</td><td>Byte7</td><td>Byte8</td></tr>
<tr><td>Command Packet</td><td>A1h</td><td>3Ah</td><td>P1</td><td>P2</td><td>P3</td><td>P4</td><td>P5</td><td>AFh</td></tr>
<tr><td>Return Packet</td><td>A1h</td><td>3Ah</td><td>P1</td><td>P2</td><td>P3</td><td>P4</td><td>P5</td><td>AFh</td></tr>
<tr><td>Parameter</td><td colspan="8">P1: BIT7~BIT6 = 00 = Group1(Factory default)
BIT7~BIT6 = 01 = Group2
BIT7~BIT6 = 10 = Group3
BIT7~BIT6 = 11 = Group4
BIT5~BIT3 = 000 = Black(Factory default)
BIT5~BIT3 = 001 = Red
BIT5~BIT3 = 010 = Blue
BIT5~BIT3 = 011 = Green
BIT5~BIT3 = 100 = White
BIT2~BIT0 = 000 = Area1(Factory default)
BIT2~BIT0 = 001 = Area2
BIT2~BIT0 = 010 = Area3
BIT2~BIT0 = 011 = Area4
BIT2~BIT0 = 100 = Area5
BIT2~BIT0 = 101 = Area6
BIT2~BIT0 = 110 = Area7
BIT2~BIT0 = 111 = Area8
P2P3(Normalized Radian Value for Left Position): 0000h~1921h
P4P5(Normalized Radian Value for Top Position): 0000h~1921h
※ Left Position: (0 ~ 2π) x 2^{10}
Top Position: (0 ~ 2π) x 2^{10}</td></tr>
</table>

<table>
<tr><td>No.</td><td>Command Name</td><td colspan="8">Privacy Area Right and Bottom Position Setup</td></tr>
<tr><td rowspan="6">34</td><td>Function</td><td colspan="8">Set Privacy Area Right And Bottom Value Of Selected Area Of Each Group.</td></tr>
<tr><td>Remark</td><td colspan="8">This command should execute after command 3Ah</td></tr>
<tr><td></td><td>Byte1</td><td>Byte2</td><td>Byte3</td><td>Byte4</td><td>Byte5</td><td>Byte6</td><td>Byte7</td><td>Byte8</td></tr>
<tr><td>Command Packet</td><td>A1h</td><td>3Bh</td><td>P1</td><td>P2</td><td>P3</td><td>P4</td><td>P5</td><td>AFh</td></tr>
<tr><td>Return Packet</td><td>A1h</td><td>3Bh</td><td>P1</td><td>P2</td><td>P3</td><td>P4</td><td>P5</td><td>AFh</td></tr>
<tr><td>Parameter</td><td colspan="8">P1: BIT7~BIT6 = 00 = Group1(Factory default)
BIT7~BIT6 = 01 = Group2
BIT7~BIT6 = 10 = Group3
BIT7~BIT6 = 11 = Group4
BIT5~BIT3 = 000 = Black(Factory default)
BIT5~BIT3 = 001 = Red
BIT5~BIT3 = 010 = Blue
BIT5~BIT3 = 011 = Green
BIT5~BIT3 = 100 = White
BIT2~BIT0 = 000 = Area1(Factory default)
BIT2~BIT0 = 001 = Area2
BIT2~BIT0 = 010 = Area3
BIT2~BIT0 = 011 = Area4
BIT2~BIT0 = 100 = Area5
BIT2~BIT0 = 101 = Area6
BIT2~BIT0 = 110 = Area7
BIT2~BIT0 = 111 = Area8
P2P3(Normalized Radian Value for Right Position): 0000h~1921h
P4P5(Normalized Radian Value for Bottom Position): 0000h~1921h
※ Right Position: (0 ~ 2π) x 2^{10}
Bottom Position: (0 ~ 2π) x 2^{10}</td></tr>
</table>

No.	Command Name	Pan And Tilt Angle For Privacy							
35	Function	Read Current Pan And Tilt Angle Value For Interacting With Privacy Mask							
	Remark	Whenever pan and tilt are moving, this command should be provided to camera for interacting with privacy mask. Moving Status(P5) is the data to compensate mask display error when pan/tilt moves.							
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
	Command Packet	A1h	**3Ch**	**P1**	**P2**	**P3**	**P4**	**P5**	AFh
	Return Packet	A1h	**3Ch**	**P1**	**P2**	**P3**	**P4**	**P5**	AFh
	Parameter	P1P2(Pan Angle): 0000h~1921h P3P4(Tilt Angle): 0000h~1921h P5(Moving Status): BIT3 = (Tilt Direction (+): 0, Tilt Direction (-): 1) BIT2 = (Tilt Moving Off: 0, Tilt Moving On: 1) BIT1 = (Pan Direction (+): 0, Pan Direction (-): 1) BIT0 = (Pan Moving Off: 0, Pan Moving On: 1) ※ Pan Angle: (0 ~ 2π) x 2^{10} Tilt Angle: (0 ~ 2π) x 2^{10} Angle Resolution: 360° / 6433(1921h) ≒ 0.05°							

No.	Command Name	Key Function					
36	Function	Control Key Function To Operate OSD Menu Or Zoom And Focus Lens.					
	Remark	When OSD is ON, key function works to change OSD menu setup. When OSD is OFF, key function works to move zoom and focus lens. This command is mainly used to control Box Type Zoom Camera or change communication setup by OSD					
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**A0h**	**P1**	00h	00h	AFh
	Return Packet	A0h	**A0h**	**P1**	00h	00h	AFh
	Parameter	P1: 01h = Set Key 02h = Up Key / Tele Key 03h = Down Key / Wide Key 04h = Left Key / Near Key 05h = Right Key / Far Key					

No.	Command Name	Communication Setup					
37	Function	Set Serial Communication Setup. (Baud Rate & Parity Bit)					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**41h**	**P1**	**P2**	00h	AFh
	Return Packet	A0h	**41h**	**P1**	**P2**	00h	AFh
	Parameter	P1: 00h = 9600 bps 01h = 19200 bps 02h = 38400 bps (Factory default) P2: 00h = Even parity (Factory default) 01h = Odd parity 02h = None parity					

No.	Command Name	Focus Limit Extend					
38	Function	Set Far Focus Limit Extend or Not Extend.					
	Remark	If infinite scene is out of focus, use extend focus limit.					
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**ADh**	**P1**	00h	00h	AFh
	Return Packet	A0h	**ADh**	**P1**	00h	00h	AFh
	Parameter	P1: 00h = Extend 01h = Not Extend : 2400					

■ Command List of Receiving

No.	Command Name	Call Camera Information					
1	Function	Read TV Type, S/W Version And System Error.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**80h**	00h	00h	00h	AFh
	Return Packet	A0h	**80h**	**P1**	**P2**	**P3**	AFh
	Parameter	P1: 00h = PAL 01h = NTSC P2: S/W Version Number ex) P2: 1Bh, it means V2.7 P3: 00h = "No System Error" 01h = "Zoom Motor Error" 02h = "Focus Motor Error" 03h = "Day&Night Motor Error"					

No.	Command Name	Call Zoom Position					
2	Function	Read Current Zoom Lens Position.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**82h**	00h	00h	00h	AFh
	Return Packet	A0h	**82h**	**P1**	**P2**	**P3**	AFh
	Parameter	P1P2: 0000h(Wide) ~ 06EAh(Tele) P3: Digital Zoom Position 00h = D-Zoom position 1x 01h = D-Zoom position 2x 02h = D-Zoom position 4x 03h = D-Zoom position 8x					

No.	Command Name	Call Focus Position					
3	Function	Read Current Focus Lens Position.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**83h**	00h	00h	00h	AFh
	Return Packet	A0h	**83h**	**P1**	**P2**	00h	AFh
	Parameter	P1P2: 0000h(Near) ~ 09B3h(Far)					

No.	Command Name	Call AF Setup					
4	Function	Read Current Focus Mode, Zoom Tracking Mode, Zoom Speed, Zoom Magnification Display Mode, Digital Zoom Mode, Limit And Digital Zoom Limitation Value.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**84h**	00h	00h	00h	AFh
	Return Packet	A0h	**84h**	**P1**	**P2**	**P3**	AFh
	Parameter	P1: BIT1~BIT0 = 00 = Manual Mode BIT1~BIT0 = 01 = Auto Mode BIT1~BIT0 = 10 = Zoom Trigger Mode P2: BIT7 = 0 = Zoom Tracking Mode Off BIT7 = 1 = Zoom Tracking Mode On BIT6 = 0 = Zoom Speed Fast BIT6 = 1 = Zoom Speed Slow BIT5 = 0 = Zoom magnification Display Off BIT5 = 1 = Zoom magnification Display On P3: BIT7 = 0 = D-Zoom OFF BIT7 = 1 = D-Zoom ON BIT1~0 = 00 = D-Zoom limit 1x BIT1~0 = 01 = D-Zoom limit 2x BIT1~0 = 10 = D-Zoom limit 4x BIT1~0 = 11 = D-Zoom limit 8x					

No.	Command Name	Call Camera Title Setup					
5	Function	Read Camera Title String & Position.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**85h**	00h	00h	00h	AFh
	Return Packet	A0h	**85h**	**P1**	**P2**	**P3**	AFh
	Parameter	Packet 1: P1 = X position(NTSC:01h~1Bh, PAL:03h~1Bh) *Mode : BIT7(1/0)=ON/OFF P2 = Y position(01h~0Ah) P3 = string length(01h~14h) Packet 2: P1 = Character No.1 of String P2 = Character No.2 of String P3 = Character No.3 of String Packet 3: P1 = Character No.4 of String P2 = Character No.5 of String P3 = Character No.6 of String Packet 4: P1 = Character No.7 of String P2 = Character No.8 of String P3 = Character No.9 of String Packet 5: P1 = Character No.10 of String P2 = Character No.11 of String P3 = Character No.12 of String Packet 6: P1 = Character No.13 of String P2 = Character No.14 of String P3 = Character No.15 of String Packet 7: P1 = Character No.16 of String P2 = Character No.17 of String P3 = Character No.18 of String Packet 8: P1 = Character No.19 of String P2 = Character No.20 of String						

ASCII	CHARACTER	ASCII	CHARACTER	ASCII	CHARACTER	ASCII	CHARACTER
65	A	85	U	111	o	56	8
66	B	86	V	112	p	57	9
67	C	87	W	113	q	32	'\b'[Blank]
68	D	88	X	114	r	40	(
69	E	89	Y	115	s	41	)
70	F	90	Z	116	t	60	<
71	G	97	a	117	u	62	>
72	H	98	b	118	v	45	-
73	I	99	c	119	w	47	/
74	J	100	d	120	x	35	#
75	K	101	e	121	y	33	!
76	L	102	f	122	z	63	?
77	M	103	g	48	0	44	,
78	N	104	h	49	1	46	.
79	O	105	i	50	2	64	'\n'[CR]
80	P	106	j	51	3		
81	Q	107	k	52	4		
82	R	108	l	53	5		
83	S	109	m	54	6		
84	T	110	n	55	7		

No.	Command Name	Call Brightness Setup					
6	Function	Read Current Brightness Value.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**86h**	00h	00h	00h	AFh
	Return Packet	A0h	**86h**	**P1**	00h	00h	AFh
	Parameter	P1: 00h ~ 64h					

No.	Command Name	Call AWB Setup					
7	Function	Read Current Auto White Balance Mode State.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**87h**	00h	00h	00h	AFh
	Return Packet	A0h	**87h**	**P1**	**P2**	**P3**	AFh
	Parameter	P1: BIT7~BIT6 = 00 = ATW Mode BIT7~BIT6 = 01 = AWC Mode BIT7~BIT6 = 10 = Manual Mode BIT2 = 00 = ATW OUTDOOR BIT2 = 01 = ATW INDOOR BIT1~BIT0 = 00 = Manual Color Temperature 2000K BIT1~BIT0 = 01 = Manual Color Temperature 3200K BIT1~BIT0 = 10 = Manual Color Temperature 5100K P2: 00h~C8h = Manual Red offset P3: 00h~C8h = Manual Blue offset					

No.	Command Name	Call BackLight Setup					
8	Function	Read Current Backlight Mode And WDR Limit.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**88h**	00h	00h	00h	AFh
	Return Packet	A0h	**88h**	**P1**	**P2**	00h	AFh
	Parameter	P1(Mode): 00h = Off 01h = WDR P2(Limit): 00h = Low 01h = Middle 02h = High					

No.	Command Name	Call Sync Setup					
9	Function	Read Current SYNC Mode And Line Lock Phase Value.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**89h**	00h	00h	00h	AFh
	Return Packet	A0h	**89h**	**P1**	**P2**	**P3**	AFh
	Parameter	P1(Mode): 00h = Internal 01h = Line Lock P2P3(Value): 0000h~0167h					

No.	Command Name	Call Freeze, H-Rev, V-Rev Setup					
10	Function	Read Current Freeze Mode, Horizontal Reverse And Vertical Reverse Mode.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**8Ah**	00h	00h	00h	AFh
	Return Packet	A0h	**8Ah**	**P1**	**P2**	**P3**	AFh
	Parameter	P1(Freeze): 00h = Off 01h = On P2(Horizontal): 00h = Off 01h = On P3(Vertical): 00h = Off 01h = On					

No.	Command Name	Call IRIS Setup					
11	Function	Read Current Iris Mode And Iris Value.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**8Bh**	00h	00h	00h	AFh
	Return Packet	A0h	**8Bh**	**P1**	**P2**	00h	AFh
	Parameter	P1(Mode): 00h = Auto 01h = Manual P2(Value): 00h~68h					

No.	Command Name	Call Shutter Setup					
12	Function	Read Current Shutter Mode And Shutter Value.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**8Ch**	00h	00h	00h	AFh
	Return Packet	A0h	**8Ch**	**P1**	**P2**	00h	AFh
	Parameter	P1(Mode): 00h = ESC 01h = Manual 02h = Anti-Flicker P2(Value): 00h(NTSC:1/120000, PAL:1/120000) 01h(NTSC:1/60000, PAL:1/60000) 02h(NTSC:1/30000, PAL:1/30000) 03h(NTSC:1/10000, PAL:1/10000) 04h(NTSC:1/7000, PAL:1/7000) 05h(NTSC:1/5000, PAL:1/5000) 06h(NTSC:1/2500, PAL:1/2500) 07h(NTSC:1/1600, PAL:1/1600) 08h(NTSC:1/1000, PAL:1/1000) 09h(NTSC:1/700, PAL:1/700) 0Ah(NTSC:1/500, PAL:1/500) 0Bh(NTSC:1/250, PAL:1/250) 0Ch(NTSC:1/160, PAL:1/160) 0Dh(NTSC:1/60, PAL:1/50) 0Eh(NTSC:x2, PAL:x2) 0Fh(NTSC:x4, PAL:x4) 10h(NTSC:x6, PAL:x6) 11h(NTSC:x8, PAL:x8) 12h(NTSC:x10, PAL:x10) 13h(NTSC:x12, PAL:x12) 14h(NTSC:x14, PAL:x14) 15h(NTSC:x16, PAL:x16) 16h(NTSC:x24, PAL:x24) 17h(NTSC:x32, PAL:x32) 18h(NTSC:x64, PAL:x64) 19h(NTSC:x128, PAL:x128)					

No.	Command Name	Call Slow Shutter Setup					
13	Function	Read Current Slow Shutter Mode And Slow Shutter Limit.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**8Dh**	00h	00h	00h	AFh
	Return Packet	A0h	**8Dh**	**P1**	**P2**	00h	AFh
	Parameter	P1(Slow Shutter Mode): 00h = Off 01h = Auto P2(Slow Shutter Limit): 00h(x2) 01h(x4) 02h(x6) 03h(x8) 04h(x10) 05h(x12) 06h(x14) 07h(x16) 08h(x24) 09h(x32) 0Ah(x64) 0Bh(x128)					

No.	Command Name	Call AGC / SSNR Setup					
14	Function	Read Current AGC And SSNR Mode.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**8Eh**	00h	00h	00h	AFh
	Return Packet	A0h	**8Eh**	**P1**	**P2**	00h	AFh
	Parameter	P1(AGC): 00h = Low 01h = Middle 02h = High 03h = Off P2(SSNR): 00h = Low 01h = Middle 02h = High 03h = Off					

No.	Command Name	Call Day Night Setup					
15	Function	Read Current Day And Night Setup.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**8Fh**	00h	00h	00h	AFh
	Return Packet	A0h	**8Fh**	**P1**	**P2**	**P3**	AFh
	Parameter	P1: BIT7~BIT6 = 00 = COLOR Mode BIT7~BIT6 = 01 = B/W Mode BIT7~BIT6 = 10 = AUTO Mode BIT0 = 0 = B/W Burst Mode Off BIT0 = 1 = B/W Burst Mode On P2P3(Color Burst Value) : 0000h~012Ch					

No.	Command Name	Call Tone Setup					
16	Function	Read Current Tone Value.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**90h**	00h	00h	00h	AFh
	Return Packet	A0h	**90h**	**P1**	00h	00h	AFh
	Parameter	P1: 00h~68h					

No.	Command Name	Call Sharpness Setup					
17	Function	Read Current Sharpness Value.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**91h**	00h	00h	00h	AFh
	Return Packet	A0h	**91h**	**P1**	00h	00h	AFh
	Parameter	P1: 00h~68h					

No.	Command Name	Call Color Setup					
18	Function	Read Current Color Saturation Value.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**92h**	00h	00h	00h	AFh
	Return Packet	A0h	**92h**	**P1**	00h	00h	AFh
	Parameter	P1: 00h~68h					

No.	Command Name	Call Privacy Group Status					
19	Function	Read Current Privacy Group Status					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**93h**	**B1**	00h	00h	AFh
	Return Packet	A0h	**93h**	**P1**	**P2**	**P3**	AFh
	Parameter	B1: BIT1~BIT0 = 00 = Group1(Factory default) BIT1~BIT0 = 01 = Group2 BIT1~BIT0 = 10 = Group3 BIT1~BIT0 = 11 = Group4 P1(Privacy Mode): 00h = Off 01h = On P2: BIT7~BIT6 = 00 = Group1 BIT7~BIT6 = 01 = Group2 BIT7~BIT6 = 10 = Group3 BIT7~BIT6 = 11 = Group4 BIT5~BIT3 = 000 = Black BIT5~BIT3 = 001 = Red BIT5~BIT3 = 010 = Blue BIT5~BIT3 = 011 = Green BIT5~BIT3 = 100 = White BIT2~BIT0 = 000 = Area1 BIT2~BIT0 = 001 = Area2 BIT2~BIT0 = 010 = Area3 BIT2~BIT0 = 011 = Area4 BIT2~BIT0 = 100 = Area5 BIT2~BIT0 = 101 = Area6 BIT2~BIT0 = 110 = Area7 BIT2~BIT0 = 111 = Area8 P3: BIT7 = 0 = Area 8 Mode Off BIT7 = 1 = Area 8 Mode On BIT6 = 0 = Area 7 Mode Off BIT6 = 1 = Area 7 Mode On BIT5 = 0 = Area 6 Mode Off BIT5 = 1 = Area 6 Mode On BIT4 = 0 = Area 5 Mode Off BIT4 = 1 = Area 5 Mode On BIT3 = 0 = Area 4 Mode Off BIT3 = 1 = Area 4 Mode On BIT2 = 0 = Area 3 Mode Off BIT2 = 1 = Area 3 Mode On BIT1 = 0 = Area 2 Mode Off BIT1 = 1 = Area 2 Mode On BIT0 = 0 = Area 1 Mode Off BIT0 = 1 = Area 1 Mode On					

No.	Command Name	Call Privacy Top / Bottom					
20	Function	Read Top / Bottom Position Value Of Privacy Mask Area					
	Remark	This command can be only used in non-interacting control with pan/tilt position.					
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**94h**	**B1**	00h	00h	AFh
	Return Packet	A0h	**94h**	**P1**	**P2**	**P3**	AFh
	Parameter	B1: BIT7~BIT6 = 00 = Group1(Factory default) BIT7~BIT6 = 01 = Group2 BIT7~BIT6 = 10 = Group3 BIT7~BIT6 = 11 = Group4 BIT5~BIT3 = 000 = Area1(Factory default) BIT5~BIT3 = 001 = Area2 BIT5~BIT3 = 010 = Area3 BIT5~BIT3 = 011 = Area4 BIT5~BIT3 = 100 = Area5 BIT5~BIT3 = 101 = Area6 BIT5~BIT3 = 110 = Area7 BIT5~BIT3 = 111 = Area8 P1: BIT0 = 0 = Area Mode Off BIT0 = 1 = Area Mode On P2(Top): 00h~61h(NTSC), 00h~75h(PAL) P3(Bottom): 00h~61h(NTSC), 00h~75h(PAL)					

No.	Command Name	Call Privacy Left / Right					
21	Function	Read Left / Right Position Value Of Privacy Mask Area					
	Remark	This command can be only used in non-interacting control with pan/tilt position.					
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**95h**	**B1**	00h	00h	AFh
	Return Packet	A0h	**95h**	**P1**	**P2**	**P3**	AFh
	Parameter	B1: BIT7~BIT6 = 00 = Group1(Factory default) BIT7~BIT6 = 01 = Group2 BIT7~BIT6 = 10 = Group3 BIT7~BIT6 = 11 = Group4 BIT5~BIT3 = 000 = Area1(Factory default) BIT5~BIT3 = 001 = Area2 BIT5~BIT3 = 010 = Area3 BIT5~BIT3 = 011 = Area4 BIT5~BIT3 = 100 = Area5 BIT5~BIT3 = 101 = Area6 BIT5~BIT3 = 110 = Area7 BIT5~BIT3 = 111 = Area8 P1: BIT0 = 0 = Area Mode Off BIT0 = 1 = Area Mode On P2(Left): 00h~98h P3(Right): 00h~98h					

No.	Command Name	Call Motion Detection Setup					
22	Function	Read Current Motion Detection Mode And Sensitivity.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**96h**	00h	00h	00h	AFh
	Return Packet	A0h	**96h**	**P1**	**P2**	00h	AFh
	Parameter	P1: 00h = Off 01h = On P2: 00h~68h					

No.	Command Name	Call Motion Detection State					
23	Function	Read Current Motion Detection State					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**97h**	00h	00h	00h	AFh
	Return Packet	A0h	**97h**	**P1**	00h	00h	AFh
	Parameter	P1: 00h = No Motion Detected 01h = Motion Detected					

No.	Command Name	Call Privacy Setup					
25	Function	Read Current Privacy Setup Status.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**98h**	00h	00h	00h	AFh
	Return Packet	A0h	**98h**	**P1**	**P2**	**P3**	AFh
	Parameter	P1(Mode): 00h = Off 01h = On P2: BIT7~BIT6 = 00 = Group1 BIT7~BIT6 = 01 = Group2 BIT7~BIT6 = 10 = Group3 BIT7~BIT6 = 11 = Group4 BIT5~BIT3 = 000 = Black BIT5~BIT3 = 001 = Red BIT5~BIT3 = 010 = Blue BIT5~BIT3 = 011 = Green BIT5~BIT3 = 100 = White BIT2~BIT0 = 000 = Area1 BIT2~BIT0 = 001 = Area2 BIT2~BIT0 = 010 = Area3 BIT2~BIT0 = 011 = Area4 BIT2~BIT0 = 100 = Area5 BIT2~BIT0 = 101 = Area6 BIT2~BIT0 = 110 = Area7 BIT2~BIT0 = 111 = Area8 P3: BIT7 = 0 = Area 8 Mode Off BIT7 = 1 = Area 8 Mode On BIT6 = 0 = Area 7 Mode Off BIT6 = 1 = Area 7 Mode On BIT5 = 0 = Area 6 Mode Off BIT5 = 1 = Area 6 Mode On BIT4 = 0 = Area 5 Mode Off BIT4 = 1 = Area 5 Mode On BIT3 = 0 = Area 4 Mode Off BIT3 = 1 = Area 4 Mode On BIT2 = 0 = Area 3 Mode Off BIT2 = 1 = Area 3 Mode On BIT1 = 0 = Area 2 Mode Off BIT1 = 1 = Area 2 Mode On BIT0 = 0 = Area 1 Mode Off BIT0 = 1 = Area 1 Mode On					

No.	Command Name	Call OSD status					
26	Function	Read Current OSD Status.					
	Remark						
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**A4h**	00h	00h	00h	AFh
	Return Packet	A0h	**A4h**	**P1**	00h	00h	AFh
	Parameter	P1: 00h = OSD Off 01h = OSD On					

No.	Command Name	Call AF Status					
27	Function	Read Auto Focus Algorithm Status.					
	Remark	Focus Mode: Auto / Zoom Trigger					
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**A9h**	00h	00h	00h	AFh
	Return Packet	A0h	**A9h**	**P1**	00h	00h	AFh
	Parameter	P1: 00h = AF Algorithm is Busy. 01h = AF Algorithm is Complete Work.					

No.	Command Name	Call Current Focus Range					
28	Function	Read Current Focus Min / Max Range According To Zoom Position					
	Remark	Before sending Focus Direct Command, you should send this command to get Min/Max focus range according to zoom position.					
		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
	Command Packet	A0h	**AAh**	**B1**	**B2**	**B3**	AFh
	Return Packet	A0h	**AAh**	**P1**	**P2**	**P3**	AFh
	Parameter	B1B2: Zoom Position = 0000h ~ 06EAh B3: 00h = Focus Limit Min 01h = Focus Limit Max P1P2: Focus Limit Value P3: 00h = Focus Limit Min 01h = Focus Limit Max					

9. Function Overview

■ Function Initial Setting Table

Function Mode	Initial Setting	Sub Function
Cam Title	Off	Yes
White Balance	ATW	Yes
Backlight	Off	Yes
Motion Detection	Off	Yes
Focus	Zoom Trigger	No
Zoom Tracking	On	No
Zoom Speed	Fast	No
Digital Zoom	Off	Yes
Display Zoom Magnification	Off	No
Brightness Level	50	No
Iris	Auto	Yes
Shutter	Esc	Yes
AGC	Middle	No
SSNR(Noise Reduction)	Middle	No
Sens-Up(Slow Shutter)	Auto	Yes
Privacy	Off	Yes
Day/Night	Color	Yes
Sync	Internal	Yes
Freeze	Off	No
H-Rev(horizontal reverse)	Off	No
V-Rev(vertical reverse)	Off	No
Tone Level	5	No
Sharpness Level	50	No
Color Level	50	No

■ Function Dependancy Table

· Function Mode

- CTN : Camera Title On
- WBM : White Balance Manual Mode
- AWC : One Push Auto White Balance Mode
- ATW : Auto Tracking White Balance Mode
- WDR : Wide Dynamic Range Mode
- MDN : Motion Detection On
- FMM : Focus Manual Mode
- FOP : Focus Zoom Trigger Mode
- FAM : Focus Auto Mode
- ZTN : Zoom Tracking On
- DZN : Digital Zoom On
- INF : Infinite Position Mode
- LNI : Lens Initialization Mode
- IRA : Iris Auto Mode
- IRM : Iris Manual Mode
- SHE : Shutter ESC Mode
- SHA : Shutter Anti-Flicker Mode
- SHM : Shutter Manual Mode
- GOF : AGC Off
- GON : AGC On
- NRN : SSNR(Noise Reduction) On
- SLA : Sens-Up(Slow Shutter) Auto
- PRN : Privacy On
- DNA : Day/Night Auto Mode
- DNC : Day/Night Color Mode
- DNB : Day/Night B/W Mode
- SYL : Sync Line-Lock Mode
- FRN : Freeze On
- HRN : H-Reverse On
- VRN : V-Reverse On

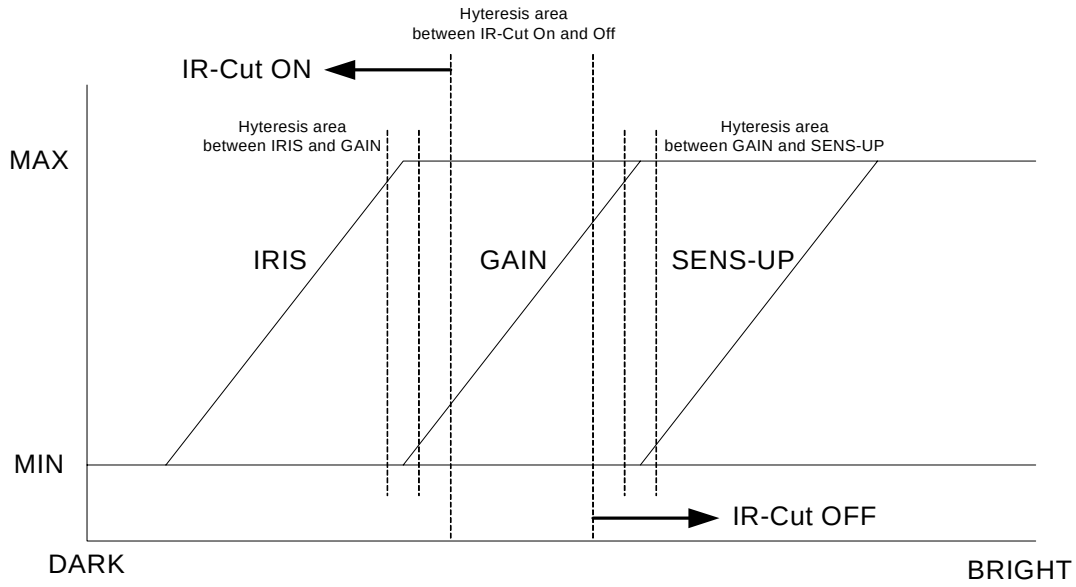
Mode	CTN	WBM	AWC	ATW	WDR	MDN	FMM	FOP	FAM	ZTN	DZN	INF	LNI	IRA	IRM	SHE	SHA	SHM	GOF	GON	NRN	SLA	PRN	DNA	DNC	DNB	SYL	FRN	HRN	VRN
CTN	-	○	○	○	○	○	○	○	○	○	○	X	X	○	○	○	○	○	○	○	○	○	○	○	○	○	○	X	○	○
WBM	○	-	X	X	○	○	○	○	○	○	○	X	X	○	○	○	○	○	○	○	○	○	○	○	○	○	○	X	○	○
AWC	○	X	-	X	○	○	○	○	○	○	○	X	X	○	○	○	○	○	○	○	○	○	○	○	○	○	○	X	○	○
ATW	○	X	X	-	○	○	○	○	○	○	○	X	X	○	○	○	○	○	○	○	○	○	○	○	○	○	○	X	○	○
WDR	○	○	○	○	-	○	○	○	○	○	○	X	X	○	○	○	○	X	○	○	○	○	○	○	○	○	○	X	○	○
MDN	○	○	○	○	○	-	○	○	○	○	○	X	X	○	○	○	○	○	○	○	○	○	○	○	○	○	○	X	○	○
FMM	○	○	○	○	○	○	-	X	X	X	○	X	X	○	○	○	○	○	○	○	○	○	○	○	○	○	○	X	○	○
FOP	○	○	○	○	○	○	X	-	X	○	○	X	X	○	○	○	○	○	○	○	○	○	○	○	○	○	○	X	○	○
FAM	○	○	○	○	○	○	X	X	-	○	○	X	X	○	○	○	○	○	○	○	○	○	○	○	○	○	○	X	○	○
ZTN	○	○	○	○	○	○	X	○	○	-	○	X	X	○	○	○	○	○	○	○	○	○	○	○	○	○	○	X	○	○
DZN	○	○	○	○	○	○	○	○	○	○	-	X	X	○	○	○	○	○	○	○	○	○	○	○	○	○	○	X	○	○
INF	○	○	○	○	○	○	○	○	○	○	○	-	X	○	○	○	○	○	○	○	○	○	○	○	○	○	○	X	○	○
LNI	○	○	○	○	○	○	○	○	○	○	○	X	-	○	○	○	○	○	○	○	○	○	○	○	○	○	○	X	○	○
IRA	○	○	○	○	○	○	○	○	○	○	○	X	X	-	X	X	○	○	○	○	○	○	○	○	○	○	○	X	○	○
IRM	○	○	○	○	○	○	○	○	○	○	○	X	X	X	-	○	○	○	○	○	○	○	○	○	○	○	○	X	○	○
SHE	○	○	○	○	○	○	○	○	○	○	○	X	X	X	○	-	X	X	○	○	○	○	○	○	○	○	○	X	○	○
SHA	○	○	○	○	○	○	○	○	○	○	○	X	X	○	○	X	-	X	○	○	○	X	○	○	○	○	○	X	○	○
SHM	○	○	○	○	X	○	○	○	○	○	○	X	X	○	○	X	X	-	○	○	○	X	○	○	○	○	○	X	○	○
GOF	○	○	○	○	○	○	○	○	○	○	○	X	X	○	○	○	○	○	-	X	X	X	○	X	○	○	○	X	○	○
GON	○	○	○	○	○	○	○	○	○	○	○	X	X	○	○	○	○	○	X	-	○	○	○	○	○	○	○	X	○	○
NRN	○	○	○	○	○	○	○	○	○	○	○	X	X	○	○	○	○	○	X	○	-	○	○	○	○	○	○	X	○	○
SLA	○	○	○	○	○	○	○	○	○	○	○	X	X	○	○	○	X	X	X	○	○	-	○	○	○	○	○	X	○	○
PRN	○	○	○	○	○	○	○	○	○	○	○	X	X	○	○	○	○	○	○	○	○	○	-	○	○	○	○	X	○	○
DNA	○	○	○	○	○	○	○	○	○	○	○	X	X	○	○	○	○	○	X	○	○	○	○	-	X	X	○	X	○	○
DNC	○	○	○	○	○	○	○	○	○	○	○	X	X	○	○	○	○	○	○	○	○	○	○	X	-	X	○	X	○	○
DNB	○	○	○	○	○	○	○	○	○	○	○	X	X	○	○	○	○	○	○	○	○	○	○	X	X	-	○	X	○	○
SYL	○	○	○	○	○	○	○	○	○	○	○	X	X	○	○	○	○	○	○	○	○	○	○	○	○	○	-	○	○	○
FRN	○	○	○	○	○	○	○	○	○	○	○	X	X	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	○	○
HRN	○	○	○	○	○	○	○	○	○	○	○	X	X	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	○
VRN	○	○	○	○	○	○	○	○	○	○	○	X	X	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-

■ Focus

- **Auto Mode**
  - Auto Focust mode adjusts the focus position Automatically.
- **Zoom Trigger Mode**
  - Whenever zoom position is changed, camera becomes Auto Focus mode to adjust focus position. After it finished, focus position is fixed and camera changes back to Zoom Trigger mode.
- **Manual Mode**
  - Focus position can be adjusted by manual only.
- **One Shot AF Function**
  - Whenever One Shot AF command is sent, camera becomes Auto Focus mode to adjust focus position. After it finished, focus position is fixed and camera changes back to Zoom Trigger mode.

■ Exposure

- **Default Setting Diagram**



- **Brightness**
  - Brightness value is the target luminance.
    Iris, shutter, and gain will work to keep the target luminance.
- **Iris**
  - Iris Auto

    Iris gets the highest priority to control exposure automatically, and shutter is fixed.
    If Backlight, AGC, SSNR, DayNight, and Sens-up mode are not Off,
    according to input luminance level, they will work to keep the target brightness.
  - Iris Manual

    Iris is fixed, and give the exposure control priority to other resources.
- **Shutter**
  - Shutter ESC

    If Iris mode is manual and shutter mode is ESC, shutter gets the highest priority to control exposure automatically. According to input luminance value, Backlight, AGC, SSNR, DayNight, and Sens-up will work. if they are not Off.

- Shutter Anti-Flicker

In case of NTSC, shutter speed value is fixed to 1/100.

In case of PAL, shutter speed value is fixed to 1/120.

- Shutter Manual

Shutter speed value can be set by manually.

· **AGC and SSNR**

- When Input luminance level is too dark, AGC will make brighter image automatically.
- When gain level is higher and higher, SSNR will reduce the gain noise to make clearer image.

· **Sens-Up**

- When Input luminance level is too dark, Sens-Up(Slow Shutter) function is set automatically. User can select the sens-up limit value.

· **Day Night**

- DayNight Auto

When Input luminance level is low, IR Cut Filter is switched to the B/W position for increasing infrared sensitivity automatically. And, it switches back to Color position when luminance is quite increased.

- DayNight Color

IR-Cut Filter is fixed to color position.

- DayNight B/W

IR-Cut Filter is fixed to B/W position.

[Note]

When DayNight mode is set to Auto under the condition which the strong IR light is flickering periodically, A malfunction of IR-Cut filter may occur.

· **Backlight**

- When the input image background is too bright or dark, WDR function will work to make the object of image clearer.

■ White Balance

· **ATW Mode**

- This mode automatically adjusts color temperature range from 1800K to 10500K.

· **AWC Mode**

- Whenever this mode is sent, camera becomes ATW mode to adjust color temperature. After it finished, color temperature is fixed.

· **Manual Mode**

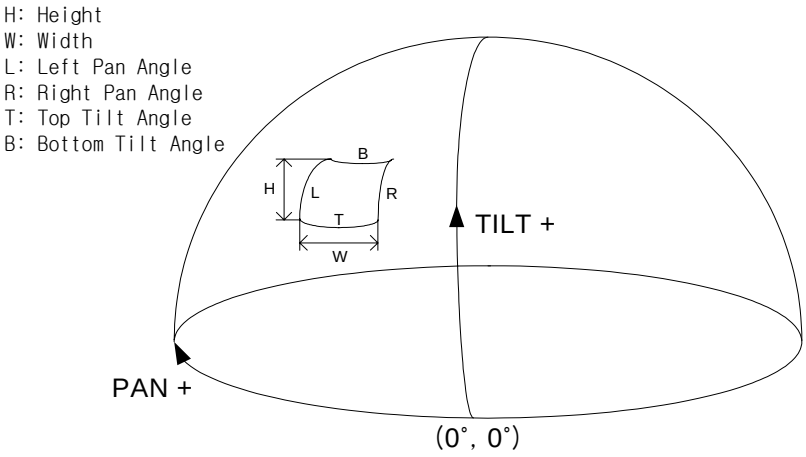
- R/B gain can be adjusted by manual.

■ Privacy Mask

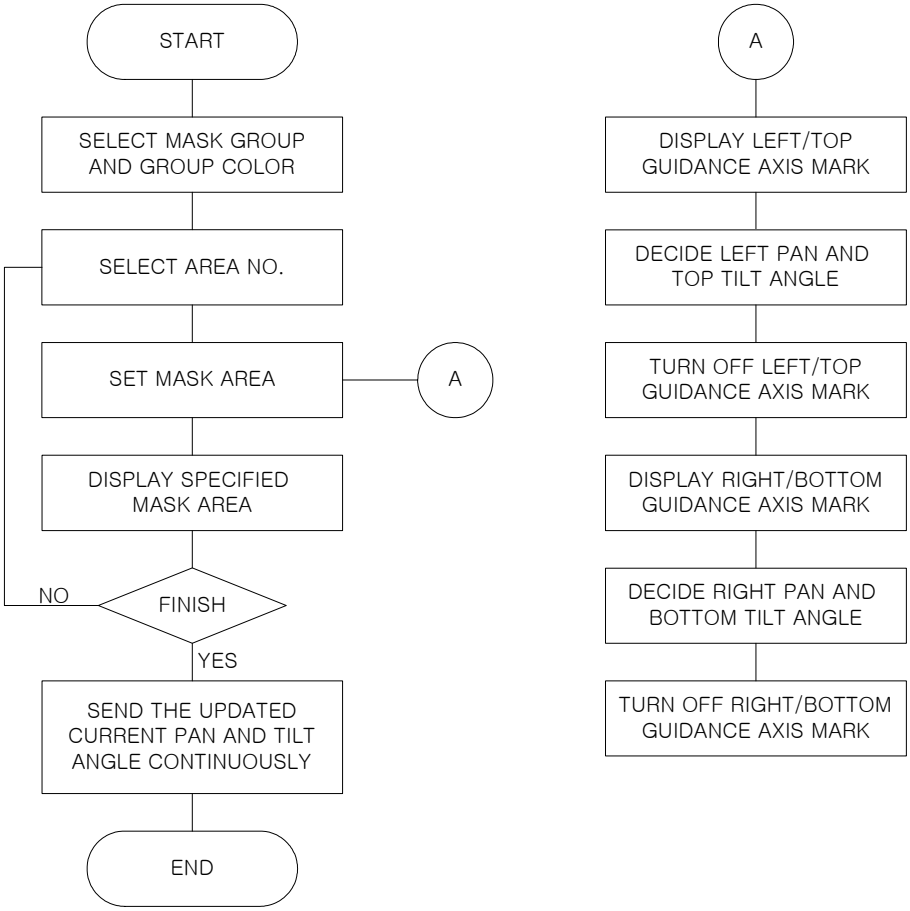
· **Feature**

- Total 32 mask zones divided by 4 groups.
- Mask can be visible on 8 positions per group on the screen simultaneously.
- mask color can be set to each group and mask area can be controlled by Individual On/Off.
- Supporting interacting with Zoom position.
- Supporting interacting or non-interworking with Pan/Tilt.
- Factory default mode of privacy mask function is to support interacting with Pan/Tilt.

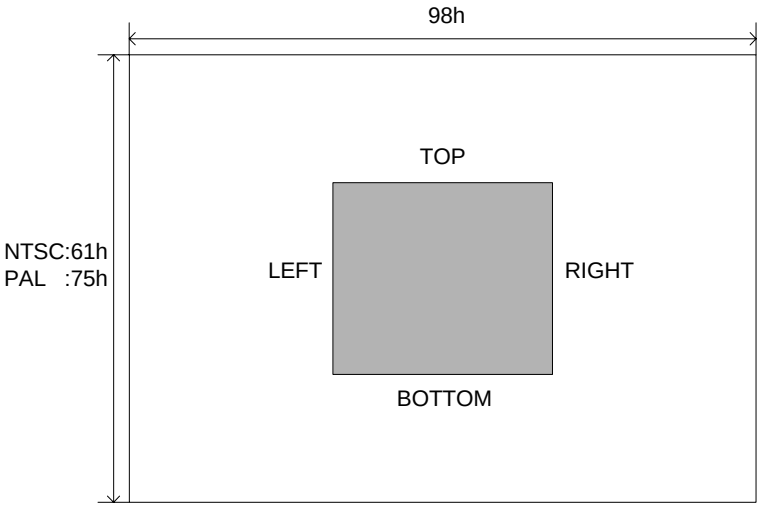
· **Privacy mask Interacting with Pan/Tilt**



- Pan/Tilt angle data should be converted to normalized radian value before sending to camera.
- Converted Pan/Tilt value: [Radian(Angle)] x 2^{10} , Angle: 0° ~ 360°
- Pan Value Range: (0 ~ 2π) x 2^{10}
  Tilt Value Range: (0 ~ 2π) x 2^{10}
  Angle Resolution: 360° / 6433(1921h) ≒ 0.05°
- Height ≤ 45° , Width ≤ 45°
- Flowchart of privacy mask display sequence



· **Privacy mask of non-Interacting with Pan/Tilt**



- Right and Bottom value should be bigger than Left and Top value.

[Note]

If Speed Dome Controller wants to use privacy mask function of non-interworking with pan/tilt, Camera system mode should be changed at production line of Samsung Techwin.

■ Others

· **Freeze**

- Freeze function captures the output image using memory.

· **H/V-Rev and Digital Zoom**

- H-Rev function reverses the output image horizontally.
- V-Rev function flips over the output image vertically.
- Digital Zoom function enlarges the output image using memory by digitally.

[Note]

If Above 3 functions are sent simultaneously, it should keep the sending order.
For example, Speed Dome Controller normally has User Preset function.
H-Rev, V-Rev, and D-Zoom can be included to User Preset Items.
In this case, those functions should keep the sending order to avoid confliction.
The first is that D-Zoom mode should be Off using Focus Setup command(1Ch).
The second is H-Rev, the third is V-Rev, the forth is that D-Zoom mode should be turned On.
And the last is sending the specified D-Zoom value using Zoom Direct Command(12h).

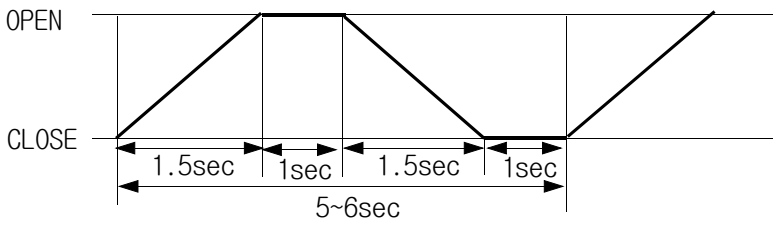
10. DC Power Supply

- Voltage Source : DC 8V～15V
- Power Consumption : 3.15W(steady-state)
  4.5 W(Max. :)

11. Reliability and Environment Condition

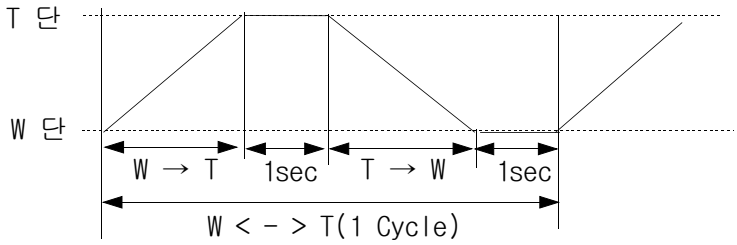
- IRIS : 500,000 times(Room Temperature)

The change of Iris's speed or the failure of the iris's operation should not happen when the Iris's operation is tested for the 500,000 times from CLOSE to OPEN. A time's cycle is 5sec~6sec.



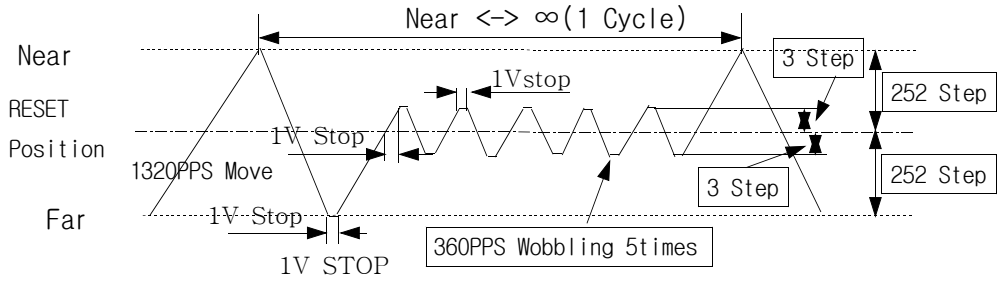
- ZOOM : 500,000 times

The failure of Zooming operation should not happen when Zooming is tested for the 500,000 times from TELE to WIDE.
The step between TELE and WIDE is 1,743.
The test should be done by the following speed condition.



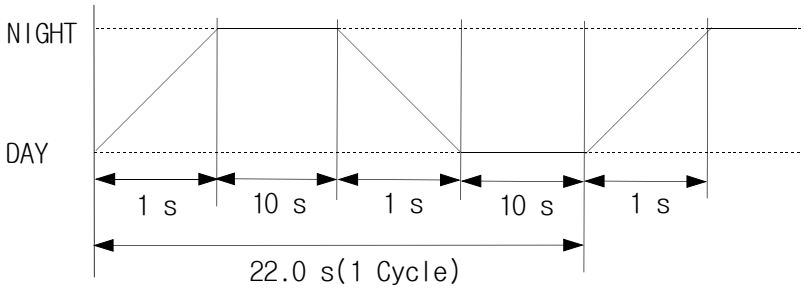
- Focus : 500,000 times

The failure of Focusing operation should not happen when Focusing is tested by the following cycle for the 500,000 times.



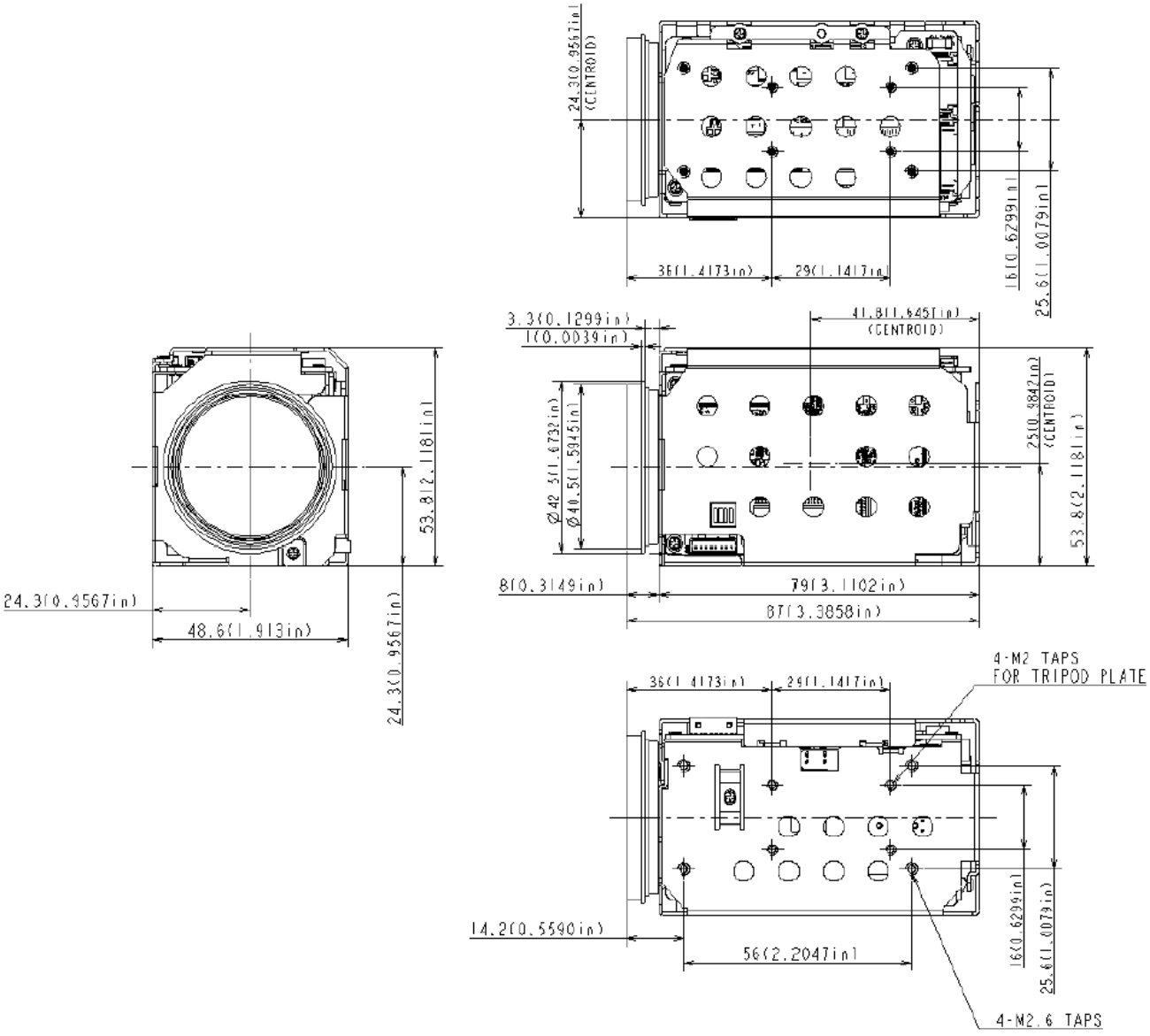
- Day & Night : 50,000 times

The failure of DAY/NIGHT operation should not happen when the function of the DAY/NIGHT is tested by the following cycle for the 50,000 times.
Motor Voltage = 5V, Frequency = 480pps



12. Mechanical Dimension

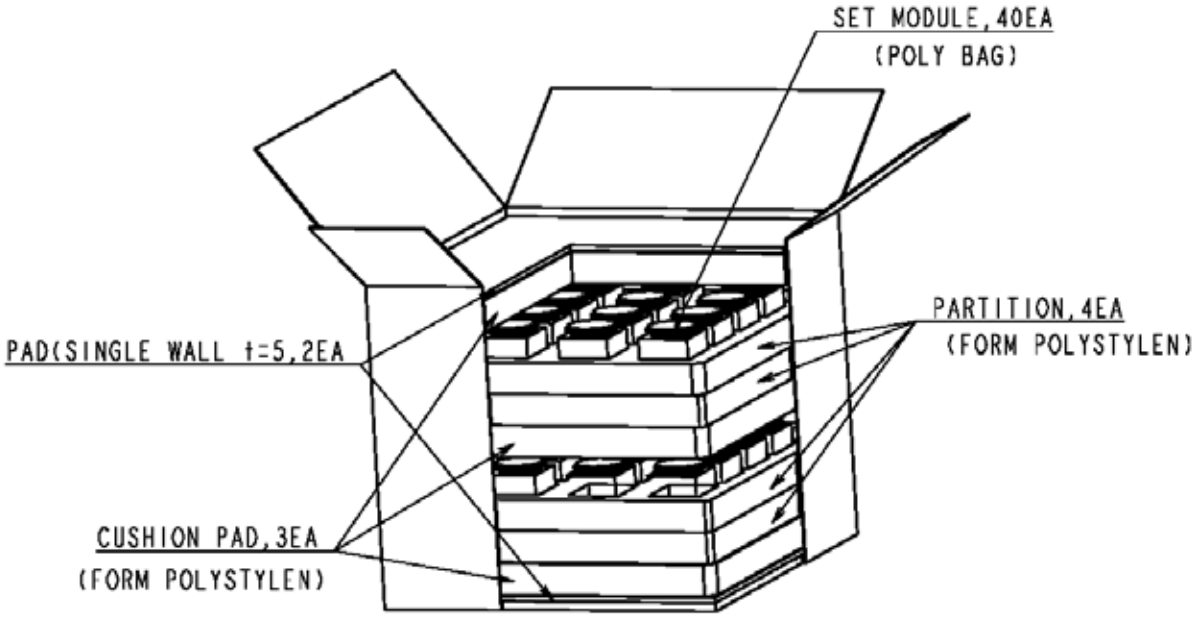
·Dimension (W x H x D) 48.6(W) x 53.8(H) x 87(D)mm
·Weight 240 g
·Machine Serial Number Serial number is printed on ID label.



13. Package Specifications

Internal Packaging

1.PAD :SINGLE WALL(t=5)(SIZE330x380x5t)
2.CUSHION PAD :FORM POLYSTYLEN(SIZE330x380x30)
3.PARTITION :FORM POLYSTYLEN(SIZE330x380x30)
4.POLY BAG :P.E. SHEET
5.LENS CAP :P.E(t=0.5)(SIZEΦ47x4.7)
6.Number of Camera Module : 40EA.



14. Changes and Modifications of this Product Specification

- Changes or modifications of this production specifications must be submitted, in writing, for mutual consent between both parties.

- Changes and modifications to the specifications must be authorized, in writing, before such changes and modifications can be engineered.