Color CCD Zoom Camera

ZC(B)B-20(1)Z12 Communication Manual

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REVISION

No	Date	Content	Draftsman	Note
Rev1.00	22.Dec.2010	The first released X12 Camera Protocol sheet	C.Y.Jung	
Rev1.01	12.Jan.2011	Modify(Key action, Error Messages…)	C.Y.Jung	
Rev1.02	14.Jan.2011	Addition(Iris,AGC,Shutter Mode)	C.Y.Jung	
Rev1.03	19.Jan.2011	Modify(Dzoom value) Addition(L/L) Save Current Camera Status (26 page)	C.Y.Jung	
Rev1.04	21.Jan.2011	Addition(Gamma Mode)	C.Y.Jung	
Rev1.05	24.Jan.2011	Modify(Zoom/Focus Operation) 17page	C.Y.Jung	
Rev1.06	25.Jan.2011	Modify(W/B Manual Value)	C.Y.Jung	
Rev1.07	26.Jan.2011	Modify : AE Mode Addition : D&N Level D&N Delay	C.Y.Jung	
Rev1.08	1.Feb.2011	Modify : AGC	C.Y.Jung	
Rev1.09	22.Feb.2011	Modify : D&N Level Read Modify : 3DNR Read Modify : Focus Range	Y.C.Park	
Rev1.10	22.Mar.2011	Modify : Pelco-D,P Menu On/Off	Y.C.Park	

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Communication Format

ZC(B)B-20(1)Z12 RS-232C Communication Format

Communication between camera and user is available by using RS-232C.

Parameter of RS-232C

- Baud Rate : 4,800bps ~ 57,600bps
- Start bit : 1
- Stop bit : 1
- Data bits : 8
- None Parity
- Flow control : XON/XOFF,RTS/CTS is not supported

Packet Structure

The basic unit of Zoom's communication is called **'PACKET'**.
All bytes of the packet are ASCII format.
The first byte of the packet is called **'Header'**.
And the second and third bytes are **'ID'** of the camera. And the forth and the fifth bytes are **'Command Message'**. And from the sixth to the ninth bytes are **'Command Option'**.
And the last two bytes are **'Check sum'** of the packet.
The check sum is sum of 9 bytes(byte0~byte8).

- The header must be **'*'**.
- All bytes of the packet must be a Capital Letter.

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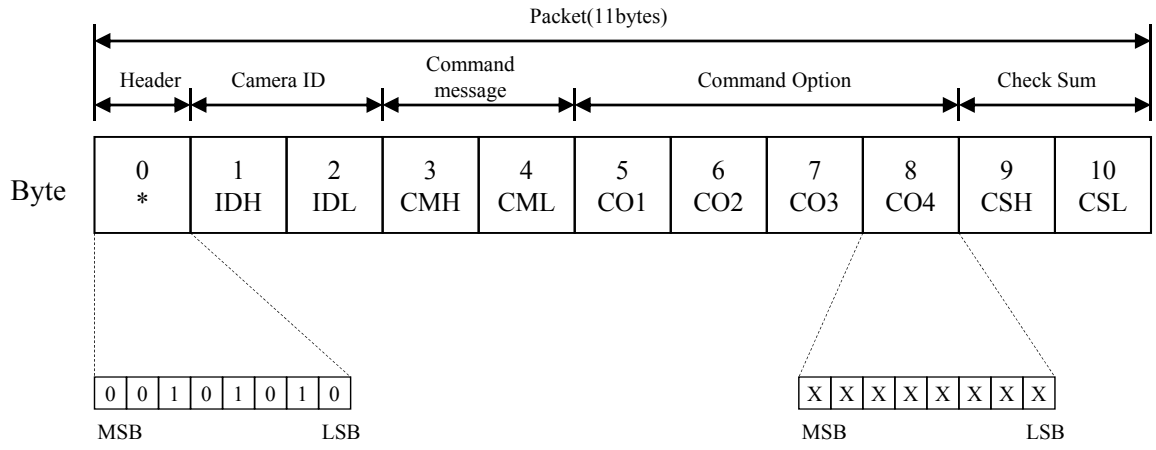

Command Packet Block

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Bytes of a packet

- Byte 0 : Header
  It must be the ASCII code '*' (2A hex)

- Byte 1 : High character of camera ID
  Byte 2 : Low character of camera ID

  Ex) current camera ID : 43 decimal
  43 decimal = 2B hex
  Byte 1 : ASCII code '2'(32 hex)
  Byte 2 : ASCII code 'B'(42 hex)

- Byte 3, Byte 4 : Command

- Byte 5 ~ Byte 8 : Option of command

- Byte 9 : High byte of check sum
  Byte 10 : Low byte of check sum

Check Sum Method

The value of check sum is calculated as follows.

Check Sum = Byte0 + Byte1+ … + Byte8

Ex) if ID = 43 d (2B hex), command = 75 hex, command option = 0000

command byte0~byte8 : * 2B 75 0000
ASCII format
: 2A 32 42 37 35 30 30 30 30
Sum = 2A+32+42+37+35+30+30+30+30
= 1CA hex
So the Check Sum = CA

So the complete command packet
= * 2B 75 0000 CA

Response from the camera

If the command packet is transmitted to the camera accurately, the camera will send the **'response packet'**. If the camera doesn't receive the right command packet, it will not send any response packet

Response Time

Most of the response packet will be transmitted as soon as the camera received the command packet.
This time is more than 2ms.

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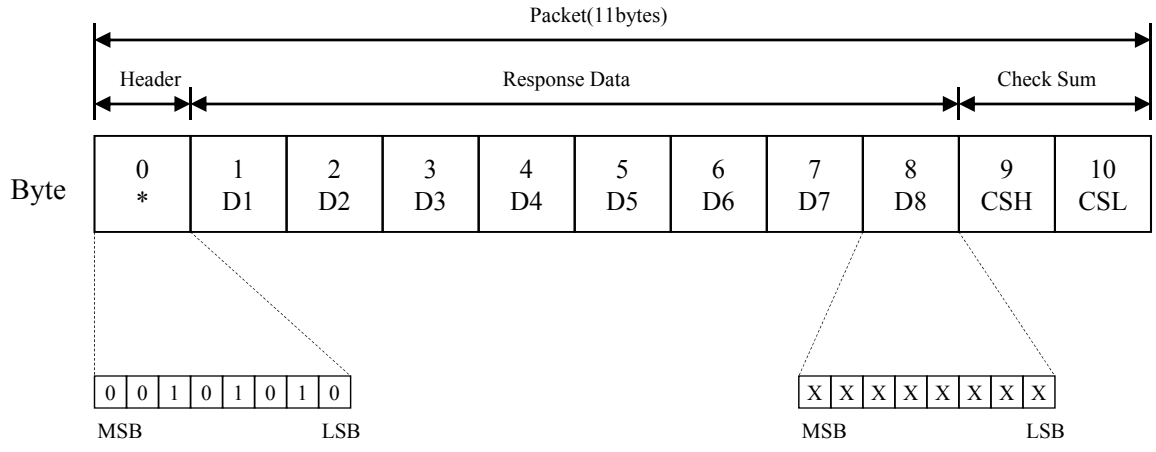

Response Packet Block

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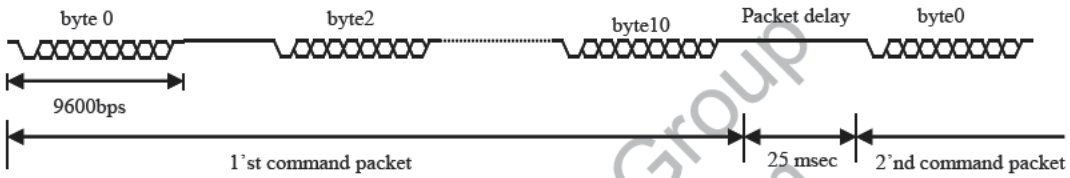
Communication Time Delay

When transmitting 1 packet(11 bytes), keep 2
milli-seconds waiting time between bytes.

After transmitting the first packet, wait for
25 ms to transmit next command packet.

- Packet delay time > 25ms

*) Byte delay and Packet delay is a time delay
for stable communication.



Delay Time Setting

Advice for communication

- If the command packet is transmitted only 4 bytes, then the camera will wait for remain 7 bytes continuously.
  At that moment if a new packet is transmitted to the camera, the previous 4 bytes will be ignored.

- If the camera doesn't send any response packet, there should be some troubles in communication line or any other communication condition.

- If the camera response mode is Skip Command response packet mode, then the camera will not send Command response packet. Even if the response mode is Skip Command response packet mode , the Data response packet will be transmitted to PC.

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Command List

ZBC(B)-20(1)Z12 RS-232C Command Reference

All of commands must be capital letters.

- '*' : Header
- 'X' : Don't Care
- 'x' : Not specified
- 'NN' : Camera ID
- 'YY' : Check Sum
- 'Z','S','M','P','Q' : Command Option
- 'R' : Response Packet Data
- '📠 ' : Indicate Response packet
- (!!) : Caution
- (AV) : Allowed camera version
  The command was allowed at the camera micro computer version x.x.
  Not describe : allowed all version

Response Packet

If the camera receives any command, it will judge the Response packet. If the command packet hasn't any error, then the camera will transmit the response packet.

- **Command Response Packet**
  It is a response that the camera received the command packet correctly.
  It has none information of camera status.
  It indicates only that the command is successfully received.

  format : * 00 00 00 00 AA

  Caution) This manual did Not describe Command response packet.

- **Data Response Packet**
  It is a response of the camera status or zoom/focus position, or any other information of the camera.

  format : * QQ RR SS MM YY

- **Preset Action Finished Response Packet**
  It is a response that the camera finish moving to the target preset position.

  Format : * NN 11 11 11 YY

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- **Motion Detected Response Packet**

  If the camera detect motions, the camera will be send Motion Detected Response Packet. The motion detection area and sensitivity is set by user – see the General Control command table.

  Format : *NNDDDDDDYY

- **One Shot AF Finished Response Packet**

  If user command the One shot AF action command, then the camera will execute one shot AF action. After the action, the camera will send the One Shot AF Finished Response Packet.

  Format : *NNAAAAAAYY

(Set the Response Packet)

Response Packet	Format	Set the Transmission of Response Packet		Example of Commands (cam id = 00)
		Set (Enable mode)	**Release** (Disable Mode	
Command Response Packet	*00 00 00 00 AA	*NNA801XXYY	*NNA800XXYY	*00710000B2 (reset) 📠 *00000000AA
Data Response Packet	*QQRRSSMMYY	Non	Non	*007C0200C6 (read camera status) 📠 *01000000AB
Preset Action Finished Response Packet	*NN 111111 YY	*NNAA01XXYY	*NNAA00XXYY	*00C60100C4 (move to external preset 01) 📠 *00 111111 B0
Motion Detected Response Packet	*NNDDDDDDYY	*NNA101PSYY	*NNA100XXYY	If motion is detected 📠 *00DDDDDD22
One Shot AF Finished Response Packet	*NNAAAAAAYY	*NN9F01XXYY	*NN9F00XXYY	*00A00000BB (one shot AF) 📠 *00AAAAAA10

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(General Response Packet - 1)

Response Packet	Format	The State of Reponse Packet		Example of Commands (cam id = 00)
Error Response Packet	📠 *NNEE0100YY 📠 *NNEE0200YY 📠 *NNEE0300YY 📠 *NNEE0400YY 📠 *NNEE0500YY 📠 *NNEE0501YY 📠 *NNEE0600YY	ASCII Error Checksum Error Focus Boundary Error Zoom Lens Moving Non ZTR Error Non ZTR Ack Command Not Executable	0~F YY *1) *2) *3) *4) *5)	*007**G**0000B2 → *00EE0100YY *007C0200**C0** → *00EE0200YY
OSD Menu Off Response Packet	📠 *NN222222YY	In OSD Menu Off action, tranfers response packet to target system.		*00780100BA(Menu On) *00780000BA(Menu Off) 📠*NN222222YY
Refresh Request Response Packet	📠 *NNCCCCCCYY	After time out for new refresh		

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(General Response Packet - 2)

Response Packet	Command Packet	Command Option		Contents
Non Zoom Tracking Move Status Response	*NNEE05RRYY	RR	00	If zoom lens is moving as tracking mode, non zoom tracking move command is ignored.
			01	When zoom lens status is no operation, this reponse packet is transferred to camera control device then zoom lens is non zoom tracking move to defined zoom position.
Lens Init Finished Response Packet	*NNBBBBBBYY	-	-	After lens initial action

*1) when focus target move(48 command) actions, if focus mode is auto or manual and the moving range of focus lens is not in the focus boundary then the camera sends the packets to the target system.
*2) when focus target move(48 command) actions, if zoom lens is tracking then focus lens is controlling by camera so it can't controll by manual
*3) At internal or external preset mode, when you try to set the non zoom tracking mode. if zoom lens is tracking or abnormal preset position, then you can't move to non zoom tracking mode.
*4) At internal or ecternal preset mode, when you try to set the non zoom tracking mode. Camera can move to non zoom tracking mode.
*5) It is impossible to changing mode at current mode. Reference to the Mode Condition Table (Page. 30)

• General Response Packet

The Error response packet transfers to target system in case of packet with ASCII error or checksum error.
In case of The ASCII packet error, It is caused by using in out of range for packet in ASCII data 0~F.
The response packet of OSD menu Off action transfers to OSD menu off action

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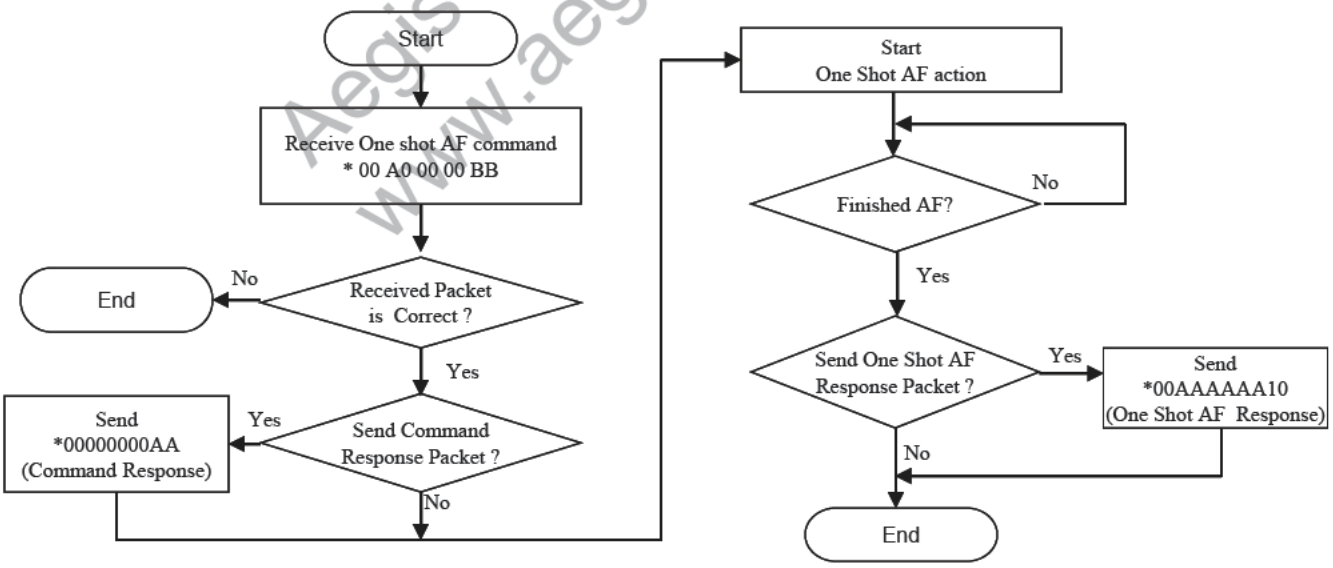
(Example) One Shot AF & One shot AF finished response packet (Camera ID = 00)



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General Control Commands - 1

Command	Command Message	Command Packet	Command Option		Contents
Camera	Read Version	*NN7DXXXXYY ☎ *RR000000YY	RR	x	→ Current Camera u-com Version RR = 10, version1.0
	Read Status	*NN7C0PXXYY ☎ *0R000000YY	P	0	Focus Mode → R(0)[auto], R(1)[manual]
				1	ID display mode → R(0)[OFF],R(1)[ON]
				2	WDR state → R(0)[OFF],R(1)[ON]
				3	Backlight state → R(0)[OFF],R(1)[ON]
				4	Flickerless state → R(0)[OFF],R(1)[ON]
				5	ECL state → R(0)[OFF],R(1)[ON]
	Reset	*NN71XXXXYY	-	-	Reset the camera
ID	check	*NNA4PPXXYY	PP	00	Camera will (not) check the camera ID →Disable ID check
				01	Camer will (not) check the camera ID →Enable ID check
	on/off	*NN72XXXXYY	-	-	Toggle the camera ID. ON →OFF→ON…..
	read	*NN73XXXXYY ☎ *RR000000YY	RR	x	Read Current Camera ID → 00 ~ FF hex(total 256 IDs) Camera ID
	change	*NN74PPXXYY	PP	x	Change Camera ID → 00 ~ FF hex(total 256 IDs) New Camera ID
Key Action	Key Action	*NN75PPXXYY	PP	x	Key Action will be activated by this command. → Key Code **See Key action command for detail information**
Zoom Model Confirm	read	*NN7FXXXXYY ☎ *RR000000YY	RR	X	→Check of the Zoom Model 12 : 12x Zoom Model 35 : 35x Zoom Model
The Transmission of Command Response Packet	Set	*NNA8PPXXYY	PP	00	→Enable Transmission of Command Response Data
				01	→Don't Transmit the Command Response Data
Set Lens Refresh On/Off Status	Set	*NNBDPP00YY	PP	00 01	→Auto Refresh Off →Auto Refresh On
Read Lens Refresh On/Off Status	Read	*NNBCXXXXYY ☎*NNQQ0000YY	QQ	00 01	→Auto Refresh Off →Auto Refresh On

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General Control Commands - 2

Command	Command Message	Command Packet	Command Option		Contents
Auto Refresh Time Period	Set	*NNBFPP00YY	PP	x	→01~07(1day~7days)
	Read	*NNBE0000YY ☞*RR000000YY	RR	x	→01~07(1day~7days)
Power	on/off	*NN76PPXXYY	PP	00	Camera Power ON/OFF →OFF
			PP	01	Camera Power ON/OFF →ON
Lens	Initial End	☞*NNBBBBBBYY	-	-	Lens intiial end.
	Initial	*NNADXXXXYY	-	-	Execute Lens Initial action. After this action, the zoom and focus lenses will be moved to the working position. And continue the previous working. ☞ If this lens initial action is finished, then the Command Response Packet will be transmitted.
Day & Night	Change mode	*NN9DXXXXYY	-	-	Change Day&Night mode ..→ AUTO → DAY → NIGHT → EXT → CDS..
	Read Mode Status	*NN94XXXXYY ☞ *NNQQRR00YY	QQ	00 01 02 03 04	→D&N Auto mode →D&N Day mode →D&N Night mode →D&N EXT mode →D&N CDS mode
			RR	 00 01	**If day&night mode is auto, RR is effective value.** →Day Status →Night Status
	Set Mode	NN95PPXXYY	PP	00 01 02 03 04	→D&N Auto mode →D&N Day mode →D&N Night mode →D&N EXT mode →D&N CDS mode
	Level Set	*NN5APP00YY	PP	x	→D&N Level Set 00 hex ~ 0A hex (Dec:0~10)
	Level Read	*NN5C0000YY ☞*RR000000YY	RR	x	→D&N Level Read 00 hex ~ 0A hex (Dec:0~10)
	Delay Set	*NN5BPP00YY	PP	x	01 : D&N Delay 5 SEC 02 : D&N Delay 10 SEC 03 : D&N Delay 15 SEC 04 : D&N Delay 30 SEC 05 : D&N Delay 60 SEC
	Delay Read	*NN6C0000YY ☞*RR000000YY	RR	x	
INT / LL	Set	*NNEEPP00YY	PP	00 01	→Internal Sync Set →External Sync (L/L) Set
	Read	*NNB30000YY ☞*RR000000YY	RR	00 01	→Inernal Sync →External Sync (L/L)
	Set	*NNEF0PPPYY	PPP	x	→0hex~167hex (DEC: 0~359)
	Read	*NNB40000YY ☞*0RRR0000YY	RRR	x	→0hex~167hex (DEC: 0~359)

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Digital Effect and OSD Control Commands

Command	Command Message	Command Packet	Command Option		Contents
Freeze	On/Off	*NNAEPPXXYY	PP	01 00	→Freeze the picture →Live (release the freeze state)
Mirror	On/Off	*NN7BPPXXYY	PP	00 01	→Mirror OFF →Mirror ON
Digital Effect	Change Digital Effect	*NN7EPPXXYY	PP	00 01 02 03	→ No Digital effect is activated →V-Flip →Mirror →Rotate
	Read Digital Effect Status	*NN92XXXXYY *RR000000YY	RR	x	→ Current Digital Effect status 00 : No Digital effect 01 : V-Flip 02 : Mirror 03 : Rotate
Function OSD Display Mode	Read	*NN79XXXXYY *RR000000YY	RR	01 00	Read the function OSD display mode of camera →ON : Function OSD display is enable →OFF : Function OSD display is disable
	Change	*NN7APPXXYY	PP	01 00	Change the Function-OSD display mode of camera →F-OSD display ON mode →F-OSD display OFF mode
Menu OSD Control	On/Off	*NN78PP00YY	PP	01 00	Menu On Menu Off
Menu OSD Status	Read On/Off status	*NN93XXXXYY *RR000000YY	RR	00 01	→ Menu OSD Off Status → Menu OSD On Status
3D-DNR Status	Change	*NN8DPP00YY	PP	00 01	→ 3D-DNR Off Status → 3D-DNR On Status
	Read	*NN8EXXXXYY *RR000000YY	RR	00 01	→ 3D-DNR Off Status → 3D-DNR On Status
	Change	*NN49PP00YY	PP	00 01	→Global Motion Off Status →Global Motion On Status
	Read	*NN4AXXXXYY *RR000000YY	RR	00 01	→Global Motion Off Status →Global Motion On Status
	3D-DNR Level Set	*NN4BPP00YY	PP	x	→00 hex ~ 3F hex (Dec: 0~63)
	3D-DNR Level Read	*NN4CXXXXYY *RR000000YY	RR	x	→00 hex ~ 3F hex (Dec: 0~63)
Stabilizer Status	Change	*NN46PP00YY	PP	00 01	→ Stabilizer Off Status → Stabilizer On Status
	Read	*NN4DXXXXYY *RR000000YY	RR	00 01	→ Stabilizer Off Status → Stabilizer On Status

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AE Control Command 1

Command	Command Message	Command Packet	Command Option		Contents
AE Mode	Change	*NN8FPPXXYY	PP	x	→AE Mode →00:OFF 01:BLC 02:WDR 03:ECL
	Read	*NNDFXXXXYY ☞ *RR000000YY	RR	x	→AE Mode →00:OFF 01:BLC 02:WDR 03:ECL
Backlight	Backlight Level Set	*NN82PPXXYY	PP	x	→Backlight Level → 01:Low 02:Middle 03:High
	Backlight Level Read	*NN83XXXXYY ☞ *RR000000YY	RR	x	→Backlight Level →01:Low 02:Middle 03:High
WDR	WDR Level Set	*NNE8PPXXYY	PP	x	→WDR Level →01:W-Front 02:W-Center 03:W-Rear 04:User
	WDR Level Read	*NNE9XXXXYY ☞ *RR000000YY	RR	x	→WDR Level →01:W-Front 02:W-Center 03:W-Rear 04:User
	User Long Shutter Set	*NNEAPPXXYY	PP	x	→00 hex ~ 3C hex (Dec:0~60)
	User Long Shutter Read	*NNEBXXXXYY ☞ *RR000000YY	RR	x	→00 hex ~ 3C hex (Dec:0~60)
	User Short Set	*NNECPPXXYY	PP	x	→00 hex ~ 3C hex (Dec:0~60)
	User Short Read	*NNEDXXXXYY ☞ *RR000000YY	RR	x	→00 hex ~ 3C hex (Dec:0~60)
ECL	ECL Area Setting	*NN5DPPPPYY	PPPP	x	→0000 hex~FFFF hex (4 x 4 0:Off 1:On) ex) F000 hex (frist line On/ The other off)
	ECL Area Reading	*NN6DXXXXYY ☞ *RRRR0000YY	RRRR	x	→0000 hex~FFFF hex (4 x 4 0:Off 1:On) ex) F000 hex (frist line On/ The other off)
	ECL Mask Color Set	*NN5EPPXXYY	PP	x	→ECL Color Set →00:Gray 01:Dgray 02:Black
	ECL Mask Color Read	*NN6EXXXXYY ☞ *RR000000YY	RR	x	→ECL Color Read →00:Gray 01:Dgray 02:Black
	ECL Level Set	*NN5FPPXXYY	PP	x	→00 hex ~ 64 hex (Dec: 0~100)
	ECL Level Read	*NN6FXXXXYY ☞ *RR000000YY	RR	x	→00 hex ~ 64 hex (Dec: 0~100)
Sharpness Data	Read	*NNB5XXXXYY ☞ *RR000000YY	RR	x	→00 hex ~ 64 hex : Sharpness data (Dec : 0~100)
	Set	*NNB6PPXXYY	PP	x	→00 hex ~ 64 hex : Sharpness data (Dec : 0~100)
Flickerless Mode	Set	*NN90PPXXYY	PP	00 01	→OFF(inactive) →ON(active)

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AE Control Command 2

Command	Command Message	Command Packet	Command Option		Contents
Shutter	Read	*NN43XXXXYY ☛*RR000000YY	RR	00 01 02 03	→Shutter Off Mode →Shutter Auto Mode →Shutter Auto Flickerless Mode →Shutter Manual Mode
	Change	*NN42PPXXYY	PP	00 01 02 03	→Shutter Off Mode →Shutter Auto Mode →Shutter Auto Flickerless Mode →Shutter Manual Mode
	Set the slow shutter max field	*NN9CPPXXYY	PP	x	→Slow shutter max field index(00 ~ 07) Index : 00 0 02 03 04 05 06 07 Field : 00 02 04 08 16 32 64 128
	Read the slow shutter max field	*NN98XXXXYY ☛*RR000000YY	RR	x	→Slow shutter max field index(00 ~ 07) Index : 00 01 02 03 04 05 06 07 Field : 00 02 04 08 16 32 64 128
	Set Shutter Speed	*NN86PPXXYY	PP	x	→00(00h) ~ 12(0ch) : Shutter Speed(high) →13(0dh) ~ 26(1ah): Shutter Speed(low)
	Read Shutter Speed Counter	*NN85XXXXYY ☛*RR000000YY	RR	x	→00(00h) ~ 12(0ch) : Shutter counter 0 : 1/90000 1 : 1/50000 2 : 1/30000 3 : 1/10000 4 : 1/7000 5 : 1/5000 6 : 1/2500 7 : 1/1600 8: 1/1000 9: 1/700 10: 1/500 11: 1/250 12: 1/160 13: x2 14: x3 15: x4 16: x5 17: x6 18: x8 19: x10 20: x12 21: x14 : 22: x16 23: x24 24: x32 25: x64 26: x128
AGC	Read	*NN45XXXXYY ☛*RR000000YY	RR	00 01 02 03 04	→Gain Off Mode →Gain Low Mode →Gain Middle Mode →Gain High Mode →Gain Manual Mode
	Change	*NN44PPXXYY	PP	00 01 02 03 04	→Gain Off Mode →Gain Low Mode →Gain Middle Mode →Gain High Mode →Gain Manual Mode
	Read Level	*NN8BXXXXYY ☛ *RR000000YY	RR	x	→00hex ~ 20 hex : AGC control level data → AGC Menual (0dB~32dB)
	Set Level	*NN87PPXXYY	PP	x	→ 00hex ~ 20 hex : AGC level data
Brightness	Set	*NN91PPXXYY	PP	x	→00 hex ~ 64 hex : Brightness level data
	Read Level	*NN88XXXXYY ☛ *RR000000YY	RR	x	→00 hex ~ 64 hex : Brightness level data

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AE Control Command 3

Command	Command Message	Command Packet	Command Option		Contents
Iris Level	Read	*NN41XXXXYY ☛*RR000000YY	RR	00 01	→Iris Auto Mode →Iris Manual Mode
	Change	*NN40PPXXYY	PP	00 01	→Iris Auto Mode →Iris Manual Mode
	Read	*NN89XXXXYY ☛ *RR000000YY	RR	X	→00 hex ~ 64 hex : Iris control level data
	Set	*NN8APPXXYY	PP	x	Set the Iris Open Level →00hex ~ 64 hex : Iris control level data
Exposure Mode	Read	*NN80XXXXYY ☛*0R000000YY	R	0 1 2 3 4 5 6 7	→Auto Exposure mode →Shutter Manual mode →Iris Manual mode →AGC Manual mode →Shutter/Iris/AGC all Manual mode →Shutter/Iris Manual mode →Shutter/AGC Manual mode →Iris/AGC Manual mode
	Set	*NN810PXXYY	P	0 1 2 3 4 5 6 7	→Auto Exposure mode →Shutter Manual mode →Iris Manual mode →AGC Manual mode →Shutter/Iris/AGC all Manual mode →Shutter/Iris Manual mode →Shutter/AGC Manual mode →Iris/AGC Manual mode
Gamma Mode	Set	*NN6APPXXYY	PP	00 01 02	→CRT Mode Set →LCD Mode Set →USER Mode Set
	Read	*NN9AXXXXYY ☛ *RR000000YY	RR	00 01 02	→CRT Mode →LCD Mode →USER Mode
	Set	*NN6BPPXXYY	PP	x	Gamma User →2D hex ~ 64 hex (DEC : 45~100)
	Read	*NN9BXXXXYY ☛ *RR000000YY	RR	x	Gamma User →2D hex ~ 64 hex (DEC : 45~100)

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Focus Control Commands

Command	Command Message	Command Packet	Command Option		Contents
Set Focus	Auto Mode	*NN4EXXXXYY	-	-	Set Focus Mode as Auto Focusing Mode (Basic focus mode)
	Manual Mode	*NN4FXXXXYY	-	-	Set Focus Mode as Manual Focusing Mode (Basic focus mode)
	Special Mode	*NNABPPXXYY	PP	00 01	Set Focus Mode as Special Focusing Mode →Disable Focus Special Mode, set Basic focus mode only →Set Focus Special Mode
One Shot Auto Focus	Execute only one time	*NNA0XXXXYY	-	-	Execute Auto Focusing only one time (!!) See Key Action Commands-2
Protect Auto Focusing	Toggle	*NNA2XXXXYY	-	-	Toggle command Protect All Auto Focusing function. Protect→release→protect→release→… (!!)Power on : default status is release mode
Rain Focus Mode	Set	*NNA3PPXXYY	PP	00 01 02 03 04 05 06	Protect focusing at a certain distance. →RM0 : 10cm Focal Range →RM1 : 50cm Focal Range →RM2 : 1m Focal Range →RM3 : 1.5m Focal Range →RM4 : 2m Focal Range →RM5: 3m Focal Range →RM6: 5m Focal Range (ex) protect focusing in the distance 50cm *NN A3 01 00 YY
The One Shot AF Finished Response Packet	Set	*NN9FPPXXYY	PP	00 01	(Don't) Transmit One Shot AF finish Response Packet when the camera finished the One Shot AF action. →Don't Transmit One Shot AF finish Response Packet →Enable Transmission of One Shot AF finish Response Packet (!!) ☛ One Shot AF finish Response Packet *NNAAAAAAYY

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Zoom/Focus Operation Commands - 1

Command	Command Message	Command Packet	Command Option		Contents
Read Position	Zoom	*NNC0XXXXY 📻*0ZZZRR00YY	ZZZ	x	→Current Zoom Lens Position (032~600 hex)
			RR	x	→Digital Zoom Position (0A ~ 78 hex)
	Focus	*NNC1XXXXYY 📻 *0ZZZ0000YY	ZZZ	x	→Current Focus Lens Position (2F7hex~offsetMax (4D8±@hex)) * α will be changed by Lens Offset Adjustment.
Move to Zoom Position	Non Zoom Tracking	*NN470ZZZYY	ZZZ	x	→Target Zoom Lens Position (032~600 hex) (!!) Moving Method : Non Zoom Tracking Mode
	Slow Optical Zoom Tracking	*NNA90ZZZYY	ZZZ	x	→Target Zoom Lens Position (032~600 hex) (!!) Moving Method : Slow Zoom Tracking Mode
	Slow Optical And Digital Zoom Tracking	*NNACZZPPYY	ZZ	x	→Zoom Ratio (01 ~ 0C hex)
			PP	x	→Digital Zoom Position (0A ~ 78 hex) (!!) Moving Method : Slow Zoom Tracking Mode <Digital position for zoom ratio> Zoom ratio PP(Digital position(hex)) 12 0A(D.zoom x1) ~ ~ 144 78(D.zoom x12) (ex) Move to zoom ratio x12 * NN AC 0C 00 YY (ex) Move to zoom ratio x48 * NN AC 0C 28 YY
Move to Focus Position	Set	*NN480ZZZYY	ZZZ	x	→Target Focus Lens Position (2F7hex~offsetMax (4D8±@hex)) * α will be changed by Lens Offset Adjustment. (!!) The range of ZZZ Focus Special Mode : (2F7hex~offsetMax (4D8±@hex)) Focus Auto/Manual Mode : The range of ZZZ is decided by camera.

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Zoom/Focus Operation Commands - 2

Command	Command Message	Command Packet	Command Option		Contents
Step Tele/Wide	Tele	*NNA5ZZXXYY	ZZ	x	Move Zoom Lens as received steps from current position. →00 ~ FF hex : zoom step to move(Tele) (!!) Moving Method : Non Zoom Tracking Mode (!!) See Key Action Commands-2 (ex) move 4 steps to tele * NN A5 04 00 YY
	Wide	*NNA6ZZXXYY	ZZ	x	Move Zoom Lens as received steps from current position. →00 ~ FF hex : zoom step to move(Wide) (!!) Moving Method : Non Zoom Tracking Mode
Step Number of Tele/Wide	Set	*NNA7ZZXXYY	ZZ	x	Set Zoom steps to use in S-Tele,S-Wide command of Key Action Command. → 00 ~ FF hex : zoom step of S-Tele,S-Wide
Zoom Start / Stop Position	Set	*NN9ESRRRYY	S	x	Set zoom start ratio and zoom stop ratio. →Zoom Start Ratio (!!) S → 0: Set Zoom start Ratio 1: Set Zoom stop Ratio
			RRR	x	→Zoom Start Ratio (1 ~ 0C hex) 1E hex = 12 dec →Zoom Stop Ratio (Zoom Start Ratio ~ 90 hex) 90 hex =144 dec (!!) RRR 1 ~ 90 hex Zoom Stop Ratio > Zoom Start Ratio
	Read	*NN99XXXXYY *SS0RRR00YY	SS	x	Read zoom start ratio and zoom stop ratio →Zoom Start Ratio (Optical Zoom Ratio) (01 hex ~ 0C hex)
			RRR	x	→Zoom Stop Ratio (Digital Zoom Ratio) (01 hex ~ 90 hex) **Reference to the Set Zoom Start ratio/Stop ratio command.**

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Preset Control Commands

Command	Command Message	Command Packet	Command Option		Contents
Current Position as IPP*	Save	*NNC7PPXXYY	PP	x	→01 ~ FF hex : Index of Internal Preset Position (total 255 preset position)
Move to Selected IPP*	Non Zoom Tracking	*NNC8PPXXYY	PP	x	→01 ~ FF hex : Index of Internal Preset Position (total 255 preset position) (!!) Moving Method : Non Zoom Tracking Mode
	Slow Zoom Tracking	*NNCFPPXXYY	PP	x	→01 ~ FF hex : Index of Internal Preset Position (total 255 preset position) (!!) Moving Method : Slow Zoom Tracking Mode
	Quick Zoom Tracking	*NND0PPXXYY	PP	x	→01 ~ FF hex : Index of Internal Preset Position (total 255 preset position) (!!) Moving Method : Quick Zoom Tracking Mode
Save Received position as EPP*	Zoom position	*NNC3PZZZYY	P	x	→0 ~ 7 hex : Index of External Preset Position (total 8 preset position)
			ZZZ	x	→Zoom Position (032 ~ 600 hex)
	Focus position	*NNC4PZZZYY	P	x	→0 ~ 7 hex : Index of External Preset Position (total 8 preset position)
			ZZZ	x	Focus Position : (2F7hex~offsetMax (4D8±@hex)) * α will be changed by Lens Offset Adjustment.
	D-Zoom position	*NNC50PZZYY	P	x	→0 ~ 7 hex : Index of External Preset Position (total 8 preset position)
			ZZ	x	Digital Zoom Position (0A ~ 78 hex)
Move to Selected EPP*	Non Zoom Tracking	*NNC60PXXYY	P	x	→0 ~ 7 hex : Index of External Preset Position (!!) Moving Method : Non Zoom Tracking Mode
	Slow Zoom Tracking	*NNC90PXXYY	P	x	→0 ~ 7 hex : Index of External Preset Position (!!) Moving Method : Slow Zoom Tracking Mode
	Quick Zoom Tracking	*NNCA0PXXYY	P	x	→0 ~ 7 hex : Index of External Preset Position (!!) Moving Method : Quick Zoom Tracking Mode
The Transmission of The PRP*	Set	*NNAAPPXXYY	PP	00 01	(Don't) Transmit Preset Response Packet when the zoom lens moved to the target preset position. →Don't Transmit Preset Response Data →Enable Transmission of Preset Response Data (!!) ☛ Preset response packet : *NN111111YY

**** IPP (Internal Preset Position) , EPP (External Preset Position) , PRP (Preset Response Packet)***

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WB (White Balance) Control Commands

Command	Command Message	Command Packet	Command Option		Contents
Color	On/Off	*NNB0PPXXYY	PP	00 01	→Color OFF →Color ON
WB Mode	Read	*NNB1XXXXYY ☎ *RR000000YY	RR	00 01 02 03 04 05	→AWB Mode →ATW Mode →Indoor Mode →Outdoor Mode →Push Mode →Menual Mode
	Set	*NNB2PPXXYY	PP	00 01 02 03 04 05	→AWB Mode →ATW Mode →Indoor Mode →Outdoor Mode →Push Mode →Menual Mode
	One Push Set	*NNAFXXXXYY	-	-	→One Push Set (WB Mode : *Push Mode *)
Adjusting Color Data at Menual*	Read Red	*NNB7XXXXYY ☎ *RR000000YY	RR	x	→ 00 hex ~ FF hex : RED adjust data
	Read BLUE	*NNB8XXXXYY ☎ *RR000000YY	RR	x	→ 00 hex ~ FF hex : BLUE adjust data
	Set RED	*NNB9PPXXYY	PP	x	→HEX : 9C ~ FF / 00 / 01 ~ 64 hex →DEC :-100 ~ - 1 / 0 / 1 ~ 100 dec
	Set BLUE	*NNBAPPXXYY	PP	x	→HEX : 9C ~ FF / 00 / 01 ~ 64 hex →DEC :-100 ~ - 1 / 0 / 1 ~ 100 dec

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MD(Motion Dectection) Control Commands 1

Command	Command Message	Command Packet	Command Option		Contents
Motion Detection On/Off	Set	*NN50QQXXYY	QQ	01 00	→Motion Dectection ON →Motion Dectection OFF
	Read	*NN60XXXXYY ☞ *RR000000YY	RR	01 00	→Motion Dectection ON →Motion Dectection OFF
Mask State	Set	*NN51QQPPYY	QQ	01 02 03 04	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4
			PP	01 00	→Mask State ON (Mask 1 ~ 4) →Mask State OFF (Mask 1 ~ 4)
	Read	*NN61QQXXYY ☞*QQRR0000YY	QQ	01 02 03 04	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4
			RR	01 00	→Mask State ON (Mask 1 ~ 4) →Mask State OFF (Mask 1 ~ 4)
Mask Width	Set	*NN52QQPPYY	QQ	0 02 03 04	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4
			PP	x	→Mask(1~4) Width Value 10 ~ 64Hex (Dec 16~100)
	Read	*NN62QQXXYY ☞*QQRR0000YY	QQ	01 02 03 04	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4
			RR	x	→Mask(1~4) Width Value 10 ~ 64Hex (Dec 16~100)
Mask Height	Set	*NN53QQPPYY	QQ	01 02 03 04	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4
			PP	x	→Mask(1~4) Height Value 0C ~ 64Hex (Dec 12~100)
	Read	*NN63QQXXYY ☞*QQRR0000YY	QQ	01 02 03 04	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4
			RR	x	→Mask(1~4) Height Value 0C ~ 64Hex (Dec 12~100)

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MD(Motion Dectection) Control Commands 2

Command	Command Message	Command Packet	Command Option		Contents
Mask MoveX	Set	*NN54QQPPYY	QQ	01 02 03 04	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4
			PP	x	→Mask(1~4) MoveX Value 08~64Hex (Dec 8 ~ 100)
	Read	*NN64QQXXYY ☞*QQRR0000YY	QQ	01 02 03 04	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4
			RR	x	→Mask(1~4) MoveX Value 08~64Hex (Dec 8 ~ 100)
Mask MoveY	Set	*NN55QQPPYY	QQ	01 02 03 04	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4
			PP	x	→Mask(1~4) MoveY Value 06~64Hex (Dec 6 ~ 100)
	Read	*NN65QQXXYY ☞*QQRR0000YY	QQ	01 02 03 04	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4
			RR	x	→Mask(1~4) MoveY Value 06~64Hex (Dec 6 ~ 100)
Motion Zoom On/Off **&** **Motion Alaram On/Off**	Set	*NN56QQSPYY	QQ	01 02 03 04	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4
			S	x	<0>: Motion Zoom OFF <1>:Motion Zoom ON
			P	x	<0>: Motion Alaram OFF <1>:Motion Alaram ON
	Read	*NN66QQXXYY ☞*QQSP0000YY	QQ	01 02 03 04	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4
			S	x	<0>: Motion Zoom OFF <1>:Motion Zoom ON
			P	x	<0>: Motion Alaram OFF <1>:Motion Alaram ON
Mask Senstivity	Set	*NN57QQPPYY	QQ	01 02 03 04	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4
			PP	x	→Mask(1~4) Senstitivy 00~64Hex (Dec 0 ~ 100)

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MD(Motion Dectection) Control Commands 3

Command	Command Message	Command Packet	Command Option		Contents
Mask Senstivity	Read	*NN67QQXXYY ☎*QQRR0000YY	QQ	01 02 03 04	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4
			RR	x	→Mask(1~4) Senstivity 00~64Hex (Dec 0 ~ 100)
Motion Target Zoom	Set	*NN58QQXXYY	QQ	x	→Mask(1~4) Targer Zoom01~0CHex (Dec x1~x12)
	Read	*NN68XXXXYY ☎*RR000000YY	RR	x	→Mask(1~4) Targer Zoom01~0CHex (Dec x1~x12)
D-Well Time	Set	*NN59QQXXYY	QQ	0 1 2 3 4	0 : D-Well Time 5 Sec 1 : D-Well Time 10 Sec 2 : D-Well Time 15 Sec 3 : D-Well Time 30 Sec 4 : D-Well Time 60 Sec
	Read	*NN69XXXXYY ☎*RR000000YY	RR	0 1 2 3 4	0 : D-Well Time 5 Sec 1 : D-Well Time 10 Sec 2 : D-Well Time 15 Sec 3 : D-Well Time 30 Sec 4 : D-Well Time 60 Sec

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Privacy Control Commands 1

Command	Command Message	Command Packet	Command Option		Contents
Privacy On/Off	Set	*NND1QQXXYY	QQ	01 00	→Privacy ON →Privacy OFF
	Read	*NND2XXXXYY ☞ *RR000000YY	RR	01 00	→Privacy ON →Privacy OFF
Mask State	Set	*NND3QQPPYY	QQ	01 02 03 04 05 06 07 08	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4 →Mask Number 5 →Mask Number 6 →Mask Number 7 →Mask Number 8
			PP	01 00	→Mask Stat ON (Mask 1 ~ 8) →Mask State OFF (Mask 1 ~ 8)
	Read	*NND4QQXXYY ☞*QQRR0000YY	QQ	01 02 03 04 05 06 07 08	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4 →Mask Number 5 →Mask Number 6 →Mask Number 7 →Mask Number 8
			RR	01 00	→Mask State ON (Mask 1 ~ 8) →Mask State OFF (Mask 1 ~ 8)
Mask Color	Set	*NND5PPXXYY	PP	00 01 02 03 04 05 06	→Mask Color White →Mask Color Gray →Mask Color Yellow →Mask Color Green →Mask Color Red →Mask Color Blue →Mask Color Black
	Read	*NND6QQXXYY ☞*RR000000YY	RR	00 01 02 03 04 05 06	→Mask Color White →Mask Color Gray →Mask Color Yellow →Mask Color Green →Mask Color Red →Mask Color Blue →Mask Color Black

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Privacy Control Commands 2

Command	Command Message	Command Packet	Command Option		Contents
Mask Width	Set	*NND7QQPPYY	QQ	01	→Mask Number 1
				02	→Mask Number 2
				03	→Mask Number 3
				04	→Mask Number 4
				05	→Mask Number 5
				06	→Mask Number 6
				07	→Mask Number 7
				08	→Mask Number 8
			PP	x	→Mask(1~8) Width Value 04 ~ 64Hex (Dec 4~100)
	Read	*NND8QQPPYY ☞*QQRR0000YY	QQ	01	→Mask Number 1
				02	→Mask Number 2
				03	→Mask Number 3
				04	→Mask Number 4
				05	→Mask Number 5
				06	→Mask Number 6
				07	→Mask Number 7
				08	→Mask Number 8
			RR	x	→Mask(1~8) Width Value 04 ~ 64Hex (Dec 4~100)
Mask Height	Set	*NND9QQPPYY	QQ	01	→Mask Number 1
				02	→Mask Number 2
				03	→Mask Number 3
				04	→Mask Number 4
				05	→Mask Number 5
				06	→Mask Number 6
				07	→Mask Number 7
				08	→Mask Number 8
			PP	x	→Mask(1~8) Height Value 04 ~ 64Hex (Dec 4~100)
	Read	*NNDAQQPPYY ☞*QQRR0000YY	QQ	01	→Mask Number 1
				02	→Mask Number 2
				03	→Mask Number 3
				04	→Mask Number 4
				05	→Mask Number 5
				06	→Mask Number 6
				07	→Mask Number 7
				08	→Mask Number 8
			RR	x	→Mask(1~8) Height Value 04 ~ 64Hex (Dec 4~100)
Mask MoveX	Set	*NNDBQQPPYY	QQ	01	→Mask Number 1
				02	→Mask Number 2
				03	→Mask Number 3
				04	→Mask Number 4
				05	→Mask Number 5
				06	→Mask Number 6
				07	→Mask Number 7
				08	→Mask Number 8
			PP	x	→Mask(1~8) MoveX Value 02 ~ 64Hex (Dec 2~100)

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Privacy Control Commands 3

Command	Command Message	Command Packet	Command Option		Contents
Mask MoveX	Read	*NNDCQQPPYY ☎*QQRR0000YY	QQ	01 02 03 04 05 06 07 08	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4 →Mask Number 5 →Mask Number 6 →Mask Number 7 →Mask Number 8
			RR	x	→Mask(1~8) MoveX Value 02 ~ 64Hex (Dec 2~100)
Mask MoveY	Set	*NNDDQQPPYY	QQ	01 02 03 04 05 06 07 08	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4 →Mask Number 5 →Mask Number 6 →Mask Number 7 →Mask Number 8
			PP	x	→Mask(1~8) **MoveY** Value 02 ~ 64Hex (Dec 2~100)
	Read	*NNDEQQPPYY ☎*QQRR0000YY	QQ	01 02 03 04 05 06 07 08	→Mask Number 1 →Mask Number 2 →Mask Number 3 →Mask Number 4 →Mask Number 5 →Mask Number 6 →Mask Number 7 →Mask Number 8
			RR	x	→Mask(1~8) **MoveY** Value 02 ~ 64Hex (Dec 2~100)
Save	**Set**	***NNC2XXXXYY**	-	-	**→Save Current Camera Status (EEPROM)**

Response Control Command

Command	Command Message	Command Packet	Command Option		Contents
Command Response	Read	*NNCB0000YY ☎*RR000000YY	RR	0 1	→Command Response Disable Mode →Command Response Enable Mode
Preset Finished Response	Read	*NNCC0000YY ☎*RR000000YY	RR	0 1	→Preset Aution Finished Response Disable Mode →Preset Aution Finished Response Enable Mode
Motion Detected Response	Read	*NNCD0000YY ☎*RR000000YY	RR	0 1	→Motion Detected Response Disable Mode →Motion Detected Response Enable Mode
1 Shot AF Finished Response	Read	*NNCE0000YY ☎*RR000000YY	RR	0 1	→One Shot AF Finished ResPonse Disable Mode →One Shot AF Finished ResPonse Enable Mode

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Key Action Commands - 1 (*NN 75 PP XX YY)

Command Option(PP)	Key Code	Contents
09	KC_STOP	▪Key Action Stop Action This Command must be followed after the other key action commands below. If continuous key service is needed, don't send this command. And, when you want to stop the continuous action, send this Stop command.
00	KC_NKEY	▪Non Key Service
01	KC_TELE	▪Slow zoom Tele
02	KC_QTELE	▪Quick zoom Tele
03	KC_WIDE	▪Slow zoom Wide
04	KC_QWIDE	▪Quick zoom Wide
05	KC_FAR	▪Move focus to Far (in manual focus mode)
06	KC_NEAR	▪Move focus to Near(in manual focus mode)
07	KC_SFAR	▪Move focus to S-Far (in manual focus mode) (1step)
08	KC_SNEAR	▪Move focus to S-Near(in manual focus mode)(1step)
0A	KC_POWER	▪Toggles Power ON/OFF
0B	KC_FOCUS_AM	▪Toggles Focus Auto/Manual Mode
0C	KC_F_PUSH	▪Activates focus auto Action only one time(in manual focus mode)
0D	KC_M_SET	▪In Menu mode, toggles item selection mode / item adjust mode
0E	KC_INITIAL	▪Initialize camera to Manufacturer's conditions
0F	KC_OSD_ONOFF	▪Toggles Function OSD Off/On mode
10	KC_MENU	▪Toggles Menu On/Off
11	KC_SET_MENU	▪Menu On / In Menu Mode, toggles item selection mode / item adjust mode
12	KC_LANGUAGE	▪Change OSD language
13	KC_BL	▪Toggles Backlight mode
14	KC_FLICKER	▪Toggles Flicker mode
15	KC_SSC_UP	▪Shutter speed counter Up
16	KC_SSC_DN	▪Shutter speed counter Down
17	KC_D_EFT	▪Switches Digital Effect modes
18	KC_MIRROR	▪Toggles Mirror mode
19	KC_NEGA	▪It is not supported from Blue-i DSP
1A	KC_MONO	▪Toggles Mono/Color mode
1C	KC_SRP_UP	▪Sharpness Data Up
1D	KC_SRP_DN	▪Sharpness Data Down
1E	KC_BRT_UP	▪Brightness Data Up
1F	KC_BRT_DN	▪Brightness Data Down
20	KC_ZM_SUP	•Zoom Start Ratio Up
21	KC_ZM_SDN	•Zoom Start Ratio Down
22	KC_ZM_EUP	•Zoom Stop Ratio Up
23	KC_ZM_EDN	•Zoom Stop Ratio Down
24	KC_WB_PUSH	•In white balance push auto mode(manual mode), It indicates Push Action.
25	KC_AWB_UP	•Switch AWB modes (ATW-→INDOOR→OUTDOOR→PUSH→MENUAL→AWB)
26	KC_AWB_DN	•Switch AWB modes in reverse sequence of KC_AWB_UP

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Key Action Commands - 2 (*NN 75 PP XX YY)

Command Option(PP)	Key Code	Contents
27	KC_R_UP	•In Special WB mode, R gain Up
28	KC_R_DN	•In Special WB mode, R gain Down
29	KC_B_UP	•In Special WB mode, B gain Up
2A	KC_B_DN	•In Special WB mode, B gain Down
2D	KC_AE_MAN	•Set AE mode to Manual mode
2E	KC_IRIS_UP	•Increase Iris Level
2F	KC_IRIS_DN	•Decrease Iris Level
30	KC_AGC_UP	▪Increase AGC gain
31	KC_AGC_DN	▪Decrease AGC gain
32	KC_LED	▪It is not supported from Blue-i DSP
38	KC_CINEMA	▪It is not supported from Blue-i DSP
39	KC_MOSAIC	▪It is not supported from Blue-i DSP
3A	KC_ART	▪It is not supported from Blue-i DSP
3B	KC_AUTO_PAN	▪Auto Panning action(only act in digital zoom region)
3C	KC_PAN_RIGHT	▪Pan Right action(only act in digital zoom region)
3D	KC_PAN_LEFT	▪Pan Left action(only act in digital zoom region)
3E	KC_TILT_UP	▪Tilt Up action(only act in digital zoom region)
3F	KC_TILT_DN	▪Tilt Down action(only act in digital zoom region)
40	KC_AUTO_TILT	▪Auto Tilting action (only act in digital zoom region)
41	KC_STELE	▪Step Tele
42	KC_SWIDE	▪Step Wide
43	KC_MB_RESET	▪It is not supported from Blue-i DSP
44	KC_FREEZE	▪Toggles Freeze/Live mode
45	KC_REVERSE	▪Toggles Reverse/Normal mode
46	KC_1SHOT_AF	▪Execute Auto Focusing one time
47	KC_DAYNIGHT	▪Day&Night mode change, (AUTO→DAY→NIGHT→EXT→CDS)
48	KC_MAXFLDUP	▪Slow shutter max field up
49	KC_MAXFLDDN	▪Slow shutter max field down

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Support Pelco-D compatible Protocol Commands

- **Pelco-D compatible Protocol Packet (sub-standard command only)**
  If P/D condition in *Menu OSD protocol set*, the camera work in pelco-d standard protocol mode. We only support **7 commands orders** in pelco-d standard protocol. If users needs more infomation, please refer to Pelco-D protocol in Pelco web site.

- **Pelco-D protocol Byte Format**
  RS485 -- **4,8**00bps ~ 57,600bps, 1 Start bit, 8 data bits, 1 stop bit, no parity

- **Pelco-D protocol Message Format.**

BYTE1	BYTE2	BYTE3	BYTE4	BYTE5	BYTE6	BYTE7
Sync Byte	Address	CMD1	CMD2	DATA1	DATA2	CHECKSUM

The Sync Byte is always 0xFF (If Camera ID is 0xFF, then The Sync Error is possible)

- **Pelco-D protocol Check sum Format.**

Byte 2 + Byte 3 + Byte 4 + Byte 5+ Byte 6 = Check sum
The check sum is the 8 bit (modulo 256) sum of the bytes(2 through 6) in the packet

- **Peclo-D Standard protocol Command Set**

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
CMD1	Sense	Reser-ved	Reser-ved	Auto/ Manua l scan	Camera On/off	Iris Close	Iris Open	Focus Near
CMD2	Focus far	Zoom wide	Zoom tele	Down	Up	Left	Right	Always0

The reserved bits (6 and 5) should be set to 0.

- **Support protocol command Packet**

- Zoom Tele : 0xFF + ID + 0x00 + 0x20 + 0x00 + 0x00 + checksum
- Zoom Wide 0xFF + ID + 0x00 + 0x40 + 0x00 + 0x00 + checksum
- Focus Near : 0xFF + ID + 0x01 + 0x00 + 0x00 + 0x00 + checksum
- Focus Far : 0xFF + ID + 0x00 + 0x80 + 0x00 + 0x00 + checksum

- Iris Open : 0xFF + ID + 0x02 + 0x00 + 0x00 + 0x00 + checksum
- Iris Close : 0xFF + ID + 0x04 + 0x00 + 0x00 + 0x00 + checksum
- Flip : 0xFF + ID + 0x00 + 0x07 + 0x00 + 0x21 + checksum

- Continuous Key Stop :
  0xFF + ID + 0x00 + 0x00 + don't care + don't care + checksum

- OSD Menu On/Off :
  1) 0xFF + ID + 0x00 + 0x03 + 0x00 + 0x5F + checksum
  2) 0xFF + ID + 0x00 + 0x05 + 0x00 + 0x5F + checksum
  3) 0xFF + ID + 0x00 + 0x07 + 0x00 + 0x5F + checksum

- Camera Power
  On : 0xFF + ID + 0x88 + 0x00 + 0x00 + 0x00 + checksum
  OFF : 0xFF + ID + 0x08 + 0x00 + 0x00 + 0x00 + checksum

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Support Pelco-P compatible Protocol Commands

- **Pelco-P compatible Protocol Packet (sub-standard command only)**
  If P/P condition in *Menu OSD protocol set*, the camera work in pelco-d standard protocol mode. We only support 8 **commands orders** in pelco-d standard protocol. If users needs more infomation, please refer to Pelco-P protocol in Pelco web site.

- **Pelco-P protocol Byte Format**
  RS485 -- **4,8**00bps ~ 57,600bps, 1 Start bit, 8 data bits, 1 stop bit, no parity

- **Pelco-P protocol Message Format.**

BYTE1	BYTE2	BYTE3	BYTE4	BYTE5	BYTE6	BYTE7	BYTE8
STX	Address	DATA1	DATA2	DATA3	DATA4	ETX	CHECKSUM

The Sync Byte is always 0xA0 (If Camera ID is 0xA0, then The Sync Error is possible)

- **Pelco-P protocol Check sum Format.**

Byte 1(XOR)Byte2(XOR)Byte3(XOR)Byte4(XOR)Byte5(XOR)Byte6(XOR)Byte7 = Check sum
The check sum is the 8 bit (modulo 256) XOR of the bytes(1 through 7) in the packet

- **Peclo-P Standard protocol Command Set**

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
DATA1	0	Camera On	AutoScan On	Camera on/off	Iris Close	Iris Open	Focus Near	Focus Far
DATA2	0	Zoom wide	Zoom tele	Tilt Down	Tilt Up	Pan Left	Pan Right	0(for pan/tilt)

(Data3 : Pan Speed 00 ~ 3F and 40 for Turbo / Data4 : Tilt Speed 00 ~ 3F)

- **Support protocol command Packet**

- Zoom Tele : 0xA0 + ID + 0x00 + 0x20 + 0x00 + 0x00 + 0xAF + checksum
- Zoom Wide : 0xA0 + ID + 0x00 + 0x40 + 0x00 + 0x00 + 0xAF + checksum
- Focus Near : 0xA0 + ID + 0x02 + 0x00 + 0x00 + 0x00 + 0xAF + checksum
- Focus Far : 0xA0 + ID + 0x01 + 0x00 + 0x00 + 0x00 + 0xAF + checksum

- Iris Open : 0xA0 + ID + 0x04 + 0x00 + 0x00 + 0x00 + 0xAF + checksum
- Iris Close : 0xA0 + ID + 0x08 + 0x00 + 0x00 + 0x00 + 0xAF + checksum
- Flip : 0xA0 + ID + 0x00 + 0x07 + 0x00 + 0x21 + 0xAF + checksum

- Continuous Key Stop :
  0xA0 + ID + 0x00 + 0x00 + don't care + don't care + 0xAF + checksum

- OSD Menu On/Off :
  1) 0xA0 + ID + 0x00 + 0x03 + 0x00 + 0x5F + 0xAF + checksum
  2) 0xA0 + ID + 0x00 + 0x05 + 0x00 + 0x5F + 0xAF checksum
  3) 0xA0 + ID + 0x00 + 0x07 + 0x00 + 0x5F + 0xAF checksum

- Camera Power
  On : 0xA0+ ID + 0x50 + 0x00 + 0x00 + 0x00 + 0xAF checksum
  OFF : 0xA0 + ID + 0x40 + 0x00 + 0x00 + 0x00 + 0xAF checksum

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* Mode Condition *

Focus	Near/Far	Push AF	Zoom Direct	Focus Direct	ZmFo Direct
Focus Auto	X	O	O	O	O
Focus Manual	O	O	O	O	O

	3D-DNR		Day & Night				BLC			
Exposure	On	Off	Auto	D&N	Ext	CDS	BLC	WDR	ECL	BLC
Iris Auto	O	O	O	O	O	O	O	O	O	O
Iris Manual	O	O	O	O	O	O	O	X	O	O
Shutter Auto	O	O	O	O	O	O	O	O	O	O
Shutter A.FLK	O	O	O	O	O	O	O	O	O	O
Shutter Manual	O	O	O	O	O	O	O	X	O	O
Shutter Off	O	O	O	O	O	O	O	X	O	O
AGC High	O	O	O	O	O	O	O	O	O	O
AGC Middle	O	O	O	O	O	O	O	O	O	O
AGC Low	O	O	O	O	O	O	O	O	O	O
AGC Off	X	O	X	O	O	O	O	X	O	O
AGC Manual	X	O	X	O	O	O	O	X	O	O
Sens-Up Off	O	O	O	O	O	O	O	O	O	O
Sens-Up x2~x256	O	O	O	O	O	O	O	O	O	O

White Balance	AWB	ATW	INDOOR	OUTDOOR	Red Gain	Blue Gain	Push WB
AWB	O	O	O	O	O	O	X
ATW	O	O	O	O	O	O	X
Indoor	O	O	O	O	O	O	X
Outdoor	O	O	O	O	O	O	X
Push WB	X	X	X	X	X	X	O
Manual	O	O	O	O	O	O	O

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