

3200 Protocol

Technical Manual 6X-1085

February 26, 2008

Phone: 858-277-6700

info@cohu.com

Fax: 858-277-0221

www.cohu-cameras.com

Cohu Electronics • 3912 Calle Fortunada • San Diego, CA 92123-1827

COHU
Cohu Inc., Electronics Division

 Cohu Camera Control

3200 Series



3200 PROTOCOL DESCRIPTION

Rev. 1.1

3200 PROTOCOL

 CTRL + CLICK TO FOLLOW LINK		TABLE OF CONTENTS	PAGE
1.0	Communication Format	1	
1.1	Parameter of RS-232C	1	
1.2	Parameter of RS-422	1	
1.3	Packet Structure	1	
1.4	Bytes of a packet	2	
1.5	Response from the camera	2	
1.6	Checksum Method	2	
1.7	Response Time	2	
1.8	Communication Time Delay	3	
1.9	Advice for communication	3	
2.0	Command List	4	
2.1	Command Reference	4	
2.2	Response Packet	4	
2.2.1	Command Response Packet	4	
2.2.2	Data Response Packet	4	
2.2.3	Preset Action Finished Response Packet	4	
2.2.4	One Shot AF Finished Response Packet	4	
2.3	Set the Response Packet	5	
2.4	General Response Packet - 1	5	
2.5	General Response Packet - 2	6	
2.6	General Response Packet - Example	6	
3.0	General Control Commands - 1	7	
4.0	General Control Commands - 2	8	
5.0	Digital Effect and OSD Control Commands	9	
6.0	AE Control Command	10	
7.0	Focus Control Commands	11	
8.0	Zoom/Focus Operation Commands - 1	12	
9.0	Zoom/Focus Operation Commands - 2	13	
10.0	Preset Control Commands	13	
11.0	WB (White Balance) Control Commands	14	
12.0	Key Action Commands - 1	15	
13.0	Key Action Commands - 2	16	

**BLANK
PAGE**

1.0 ◀ COMMUNICATION FORMAT ▶

Communication between camera and user is available by using RS-232C or RS-422.

1.1. Parameter of RS-232C

- Baud Rate : 9600
- Data bits : 8
- Stop bits : 1
- No Parity
- Flow control : None (XON/XOFF,RTS/CTS is not supported)

1.2. Parameter of RS-422

- Baud Rate : 9600
- Data bits : 8
- Stop bits : 1
- No Parity

1.3. Packet Structure

The basic unit of the 3200 communication protocol is called a "PACKET". All bytes of the packet are ASCII format.

The first byte of the packet is called "Header".

The second and third bytes are the "ID" of the camera.

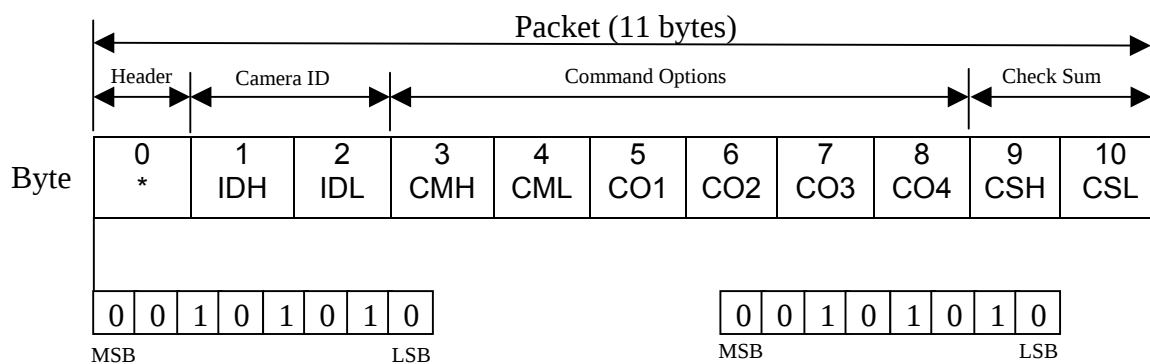
The forth and the fifth bytes are the "Command Message".

The sixth through ninth bytes are the "Command Option".

The last two bytes are the "Checksum" of the packet.

The Checksum is the sum of bytes 0 through 8.

- The header must be '*'.
- Each byte of the packet must be a Capital Letter.



Command Packet

1.4. Bytes of a packet

- Byte 0 : Header (must be the ASCII code '*' or 2A hex)
- Byte 1 : High byte of camera ID
- Byte 2 : Low byte of camera ID

Example for 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 : Command Option
- Byte 9 : High byte of checksum
- Byte 10 : Low byte of checksum

1.5. 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 correct command packet, it will not send any response packet.

1.6. Checksum Method

The value of the checksum is calculated as follows:

Checksum = Byte0 + Byte1+ ... + Byte8

Example: 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

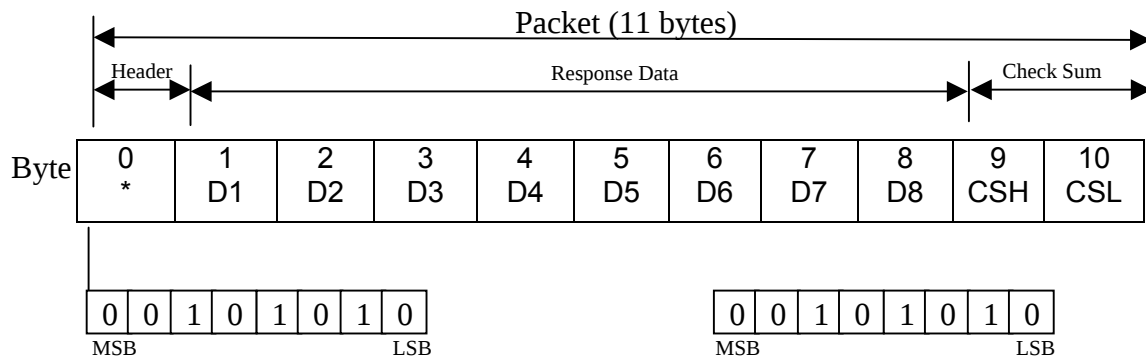
Sum = 2A+32+42+37+35+30+30+30+30 = 1CA hex

So, the Checksum = CA

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

1.7. Response Time

The response packet will be transmitted at least 2 ms after the camera receives the command packet.



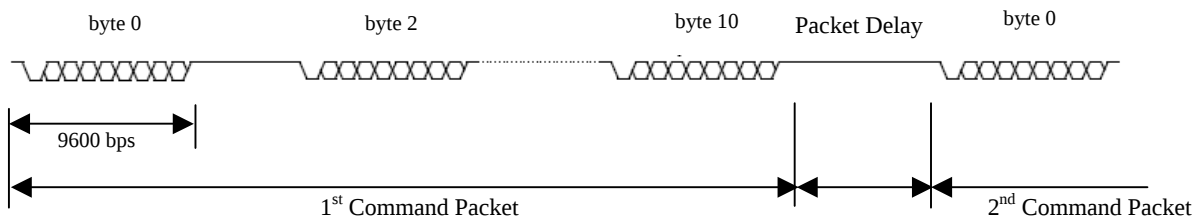
Response Packet

1.8. Communication Time Delay

When transmitting 1 packet (11 bytes), keep 2 milliseconds 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

1.9. Advice for communication

- If the command packet transmitted is only 4 bytes, then the camera will wait for the remaining 7 bytes. 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 a response packet there may be trouble with the communication line or other communication failure.
- If the camera response mode is "Skip Command response packet" mode, then the camera will not send Command response packet. However, the Data response packet will still be transmitted to the PC.

2.0 ◀ COMMAND LIST ▶

2.1. 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

☞ : Indicates Response packet

(!!) : Caution

2.2. Response Packet

If the camera receives any command, it will evaluate the message. If the command packet does not have an error, then the camera will transmit the response packet.

2.2.1. Command Response Packet

This is a response that the camera received the command packet correctly. It has no camera status information. It only indicates that the command is successfully received.

Format : * 00 00 00 00 AA

2.2.2. Data Response Packet

This is a response of the camera status or zoom/focus position, or other camera information.

Format : * QQ RR SS MM YY

2.2.3. Preset Action Finished Response Packet

This is a response that the camera finished moving to the target preset position.

Format : * NN 11 11 11 YY

2.2.4. One Shot AF Finished Response Packet

If the One Shot AF command is sent, the camera will execute a one shot AF action.

After the One Shot AF action is complete, the camera will send the One Shot AF Finished Response Packet.

Format : *NNAAAAAYY

2.3. 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	*NNA800XXYY	*NNA801XXYY	*00710000B2 (reset) 📡 *00000000AA
Data Response Packet	*QRRSSMMYY	Non	Non	*007C0200C6 (read camera status) 📡 *01000000AB
Preset Action Finished Response Packet	*NN 111111 YY	*NNAA01XXYY	*NNAA00XXYY	*00D00100BF (move to preset 01) 📡 *00 111111 B0
One Shot AF Finished Response Packet	*NNAAAAAAYY	*NN9F01XXYY	*NN9F00XXYY	*00A00000BB (one shot AF) 📡 *00AAAAAA10

2.4. General Response Packet - 1

Response Packet	Format	The State of Response Packet		Example of Commands (cam id = 00)
Error Response Packet	📡 *NNEE0100YY 📡 *NNEE0200YY 📡 *NNEE0300YY 📡 *NNEE0400YY 📡 *NNEE0500YY 📡 *NNEE0501YY	ASCII Error Checksum Error Focus Boundary Error Zoom Lens Moving Non ZTR Error Non ZTR Ack	0~F YY *1) *2) *3) *4)	*007C0000B2 "00" *00EE0100YY *007C0200C0 "00" *00EE0200YY
OSD Menu Off Response Packet	📡 *NN222222YY	In OSD Menu Off action, transfers response packet to target system.		00780100BA(Menu On) *00780000BA (Menu Off) 📡 *NN222222YY
Refresh Request Response Packet	📡 *NNCCCCCY	After time out for new refresh		

*1) If the moving range of the lens focus is not within the "focus boundary" then the camera will send a Focus Boundary Error packets to the target system.

*2) If the zoom lens is in the tracking mode, then the lens focus is controlled by the camera. If a manual focus command is received during this time the camera will send a Zoom Lens Moving error packet.

*3) If a non-zoom tracking preset command is received while the zoom lens is moving in the tracking mode, or if it is at an abnormal preset position, the camera will send a Non ZTR error packet.

*4) If a non-zoom tracking preset command is received while the zoom lens is in the tracking mode, but not moving, the camera will send a Non ZTR ACK.

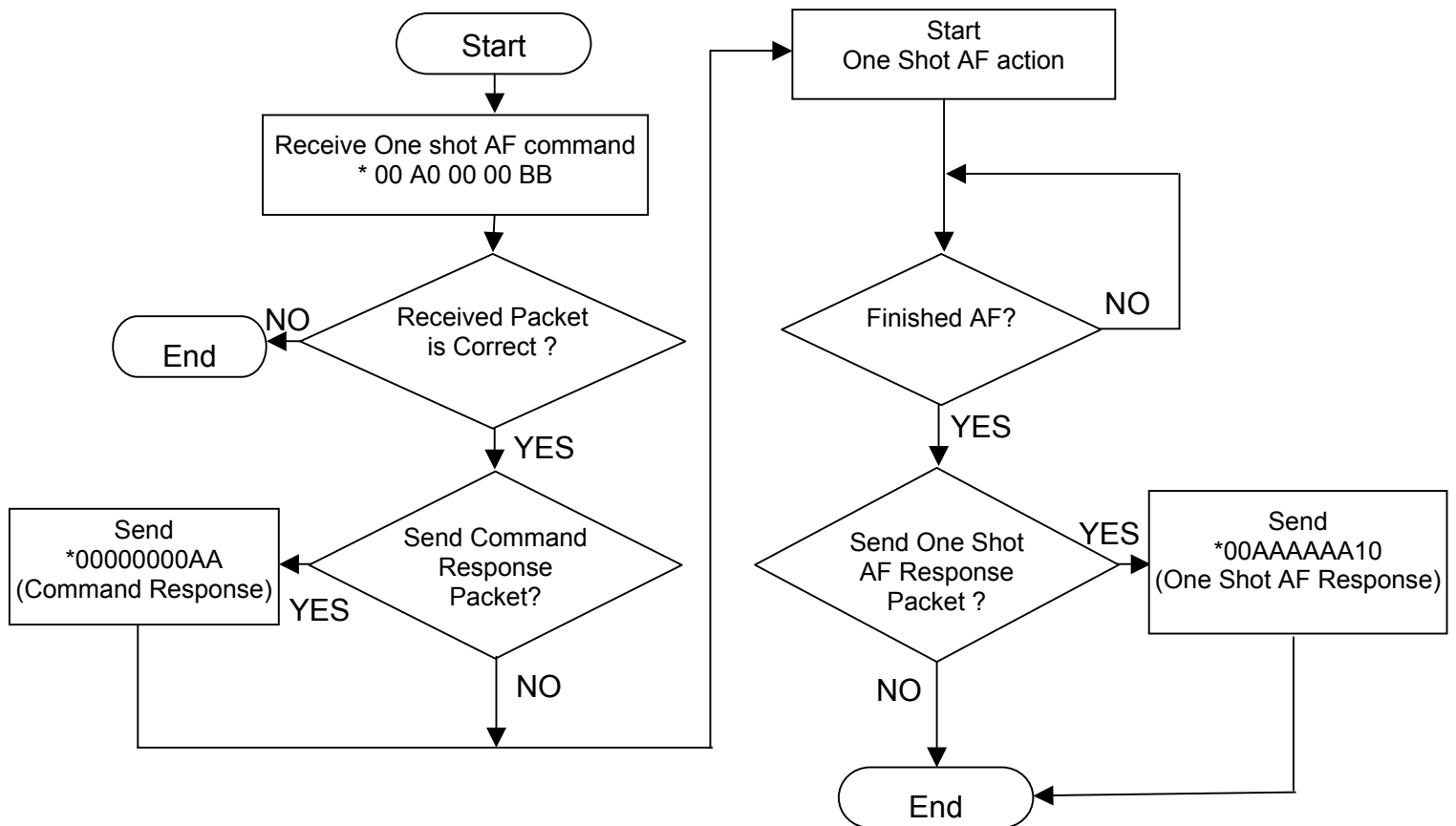
2.5. General Response Packet - 2

Response Packet	Command Packet	Command Option		Contents
Non Zoom Tracking Move Status Response	*NNEERR00YY	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 response 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

2.6. General Response Packet - Example

- The Error response packet is transferred to the target system if a packet with ASCII error or checksum error is received.
- An ASCII packet error is typically caused by using an out of range for packet in ASCII data 0~F.
- The response packet of an OSD menu Off action relates to an OSD menu off action

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



3.0 ◀ General Control Commands - 1 ▶

Command	Command Message	Command Packet	Command Option		Contents
Camera	Read Version	*NN7DXXXXY Y  *RR000000YY	RR	x	→ Current Camera u-com Version RR = 23, version 2.3
	Read Status	*NN7C0PXXY Y  *0R000000 YY	P	0	Focus Mode → R(0)[auto], R(1)[manual]
				1	ID display mode → R(0)[OFF],R(1)[ON]
				3	Backlight state → R(0)[OFF],R(1)[ON]
				4	Flickerless state → R(0)[OFF],R(1)[ON]
	Reset	*NN71XXXXY Y	-	-	Reset the camera
ID	check	*NNA4PPXXYY	PP	00	Camera will (not) check the camera ID → Disable ID check
				01	Camera 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	*NN7FXXXXY  *RR000000YYY	RR	X	→ Check of the Zoom Model 22 : 22x Zoom Model 30 : 30x 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	→ Auto Refresh Off
				01	→ Auto Refresh On
Read Lens Refresh On/Off Status	Read	*NNBCXXXXYY  *NNQQ0000Y Y	QQ	00	→ Auto Refresh Off
				01	→ Auto Refresh On
Set Auto Refresh Time Period	Set	*NNBFPP00YY	PP	x	→ 01~FE(1hour~7days)
Read Auto Refresh Read Time Period	Read	*NNBE0000YY  *RR000000YY	RR	X	→ 01~FE(1hour~7days)

4.0 ◀ General Control Commands - 2 ▶

Command	Command Message	Command Packet	Command Option		Contents
Power	on/off	*NN76PPXXYY	PP	00	Camera Power ON/OFF → OFF
			PP	01	Camera Power ON/OFF → OFF
Lens	Initial End	 *NNBBBBBBY Y	-	-	Lens initial 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 ... OFF → AUTO → ON → OFF ...
	Read Mode Status	*NN94XXXXYY  *NNQRR00Y Y	QQ	00 01 02	→ Day Status → Auto Status → Night Status
			RR	00 01	If day & night mode is auto, RR is effective value. → Day Status → Night Status
	Set Mode	*NN95PPXXYY	PP	01 00 02	→ D & N Auto mode → D & N Day → D & N Night mode

5.0 ◀ 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	*NN7EXXXYY  *0R000000YY	R	0 1 2 3 4 5 6	→ No Digital effect is activated → WIDE(Cinema) effect ON → ART on → Mirror on → Negative on → Color off → Mosaic on
	Read Digital Effect Status	*NN92XXXXYY  *RR000000YY	RR	x	→ Current Digital Effect status RR : 1byte hex bit7 : not used, bit6 : not used bit5: <1>mosaic On <0> off bit4: <1>monochrome <0> color bit3 : <1>negative On <0>off bit2 : <1>mirror On <0>off bit1 : <1>art On <0>off bit0 : <1>wide cinema On <0>off ex) RR = 23, then, Current Digital Effect status = 23hex 23(hex) = 0010 0011 (bin) mosaic On, art On, wide cinema On
Negative	On/Off	*NN8CPPXXYY	PP	00 01	→ Negative mode OFF → Negative mode ON
Function OSD Display Mode	Read	*NN79XXXXYY  *RR000000YY	RR	00 01	Read the function OSD display mode of camera → ON mode : All OSD display is enable → OFF mode : All OSD display is disabled except for Menu OSD display.
	Change	*NN7APPXXYY	PP	00 01	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	00 01	Menu Off Menu On
Menu OSD Status	Read On/Off status	*NN93XXXXYY  *NNRR0000YY	RR	00 01	→ Menu OSD Off Status → Menu OSD On Status

6.0 ◀ AE Control Command ▶

Command	Command Message	Command Packet	Command Option		Contents
Backlight Mode	Set	*NN82PPXXYY	PP	X	→ 00 ~ 0A: Backlight Mode
	Read	*NN83XXXXYY  *RR000000YY	RR	X	→ 00 ~ 0A : Backlight Mode
Sharpness Data	Read	*NNB5XXXXYY  *RR000000YY	RR	X	→ 00 hex ~ 0F hex : Sharpness data
	Set		PP	X	→ 00 hex ~ 0F hex : Sharpness data
Flickerless Mode	Set	*NN90PPXXYY	PP	00 01	→ OFF(inactive) → ON(active)
Shutter	Set the slow shutter max field	*NN9CPPXXYY	PP	X	→ Slow shutter max field index(00 ~ 09) Index : 00 01 02 03 04 05 06 07 08 09 Field : 00 02 04 08 12 16 24 32 64 128
	Read the slow shutter max field	*NN98XXXXYY  *QQ000000YY	QQ	X	→ Slow shutter max field index(00 ~ 09) Index : 00 01 02 03 04 05 06 07 08 09 Field : 00 02 04 08 12 16 24 32 64 128
	Set Shutter Speed	*NN86PPXXYY	PP	X	→ 00(00h) ~ 27(1Bh) : Shutter counter
	Read Shutter Speed Counter	*NN85XXXXYY  *RR000000YY	RR	X	→ 00(00h) ~ 27(1Bh) : Shutter counter 00 : 1/60 01 : 1/125 04 : 1/250 09 : 1/500 14 : 1/1000 21 : 1/2000 25 : 1/4000 27 : 1/10000
AGC	Read Level	*NN8BXXXXYY  *RR000000YY	RR	X	→ 00 hex ~ FF hex : AGC control level data
	Set Level	*NN87PPXXYY	PP	X	→ 00 hex ~ FF hex : AGC level data
Brightness	Set	*NN91PPXXYY	PP	X	→ 00 hex ~ 60 hex : Brightness level data Menu display : (Brightness/2)Dec
	Read Level	*NN88XXXXYY  *RR000000YY	RR	X	→ 00 hex ~ 60 hex : Brightness level data
Iris Level	Read	*NN89XXXXYY  *RR000000YY	RR	X	→ 00 hex ~ FF hex : Iris control level data
	Set	*NN8APPXXYY	PP	X	Set the Iris Open Level → 00 hex ~ FF hex : Iris control level data
Exposure Mode	Read	*NN80XXXXYY  *OR000000YY	R	0 1 2 3 4	→ Auto Exposure mode → Shutter Manual mode → Iris Manual mode → AGC Manual mode → Shutter/Iris/AGC all Manual mode
	Set	*NN810PXXYY	P	0 1 2 3 4	→ Auto Exposure mode → Shutter Manual mode → Iris Manual mode → AGC Manual mode → Shutter/Iris/AGC all Manual mode

7.0 ◀ Focus Control Commands ▶

Command	Command Message	Command Packet	Command Option		Contents
Set Focus	Auto Mode	*NN4EXXXYY	-	-	Set Focus Mode as Auto Focusing Mode (Basic focus mode)
	Manual Mode	*NN4FXXYY	-	-	Set Focus Mode as Manual Focusing Mode (Basic focus mode)
One Shot Auto Focus	Execute only one time	*NNA0XXYY	-	-	Execute Auto Focusing only one time (!!) See Key Action Commands-2
Protect Auto Focusing	Toggle	*NNA2XXYY	-	-	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 : Disable All Focal Range → RM1 : 10cm Focal Range → RM2 : 50cm Focal Range → RM3 : 80cm Focal Range → RM4 : 130cm Focal Range → RM5: 2m Focal Range → RM6: 4m Focal Range (ex) protect focusing in the distance 50cm *NN A3 02 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 *NNAAAAYY

8.0 ◀ Zoom/Focus Operation Commands - 1 ▶

Command	Command Message	Command Packet	Command Option		Contents
Read Position	Zoom	*NNC0XXXXY  *0ZZZRR00YY	ZZZ	X	→ Current Zoom Lens Position (000~6CF hex)
			RR	X	→ Digital Zoom Position (00 ~ E7 hex)
	Focus	*NNC1XXXXYY  *0ZZZ0000YY	ZZZ	X	→ Current Focus Lens Position (2C0hex~offsetMax (6F0±X)) * X will be changed by Lens Offset Adjustment.
Move to Zoom Position	Non Zoom Tracking	*NN470ZZZYY	ZZZ	X	→ Target Zoom Lens Position (000~6CF hex) (!!) Moving Method : Non Zoom Tracking Mode
	Slow Optical Zoom Tracking	*NNA90ZZZYY	ZZZ	X	→ Target Zoom Lens Position (000~6CF hex) (!!) Moving Method : Slow Zoom Tracking Mode
Move to Focus Position	Set	*NN480ZZZYY	ZZZ	X	→ Target Focus Lens Position (2C0hex~offsetMax (6F0±X)) * X will be changed by Lens Offset Adjustment. (!!) The range of ZZZ Focus Special Mode : (2C0hex~offsetMax(6F0±X)) Focus Auto/Manual Mode : The range of ZZZ is decided by camera.

9.0 ◀ 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 Y 0: Set Zoom start Ratio 1: Set Zoom stop Ratio
			RRR	X	→ Zoom Start Ratio (1 ~ 1E hex) 1E hex = 30 dec → Zoom Stop Ratio (1 ~ 12C hex) 12C hex = 300 dec (!!) RRR 1 ~ 12C hex Zoom Stop Ratio > Zoom Start Ratio
	Read	*NN99XXXXYY 📡 *SS0RRR00YY	SS RRR	X X	Read zoom start ratio and zoom stop ratio → Zoom Start Ratio (Optical Zoom Ratio) (00 hex ~ 1E hex) → Zoom Stop Ratio (Digital Zoom Ratio) (00 hex ~ 12C hex) Reference to the Set Zoom Start ratio/Stop ratio command.

10.0 ◀ Preset Control Commands ▶

Command	Command Message	Command Packet	Command Option		Contents
Current Position as IPP*	Save	*NNC7PPXXYY	PP	X	→ 00 ~ A7 hex : Index of Internal Preset Position (total 167 preset position)
Move to Selected IPP*	Non Zoom Tracking	*NNC8PPXXYY	PP	X	→ 00 ~ A7 hex : Index of Internal Preset Position (total 167 preset position) (!!) Moving Method : Non Zoom Tracking Mode
	Slow Zoom Tracking	*NNCFPPXXYY	PP	X	→ 00 ~ A7 hex : Index of Internal Preset Position (total 167 preset position) (!!) Moving Method : Slow Zoom Tracking Mode
	Quick Zoom Tracking	*NND0PPXXYY	PP	X	→ 00 ~ A7 hex : Index of Internal Preset Position (total 167 preset position) (!!) Moving Method : Quick Zoom Tracking Mode

11.0 ◀ 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	→ Auto Mode → Special → Indoor → Outdoor → Push Auto
	Set	*NNB2PPXXYY	PP	00 01 02 03 04	→ Auto Mode → Special → Indoor → Outdoor → Push Auto
Adjusting Color Data at Special WB Mode	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	→ 00 hex ~ FF hex : RED adjust data
	Set BLUE	*NNBAPPXXYY	PP	X	→ 00 hex ~ FF hex : BLUE adjust data

12.0 ◀ 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 01 02 03 04 05 06 07 08 0A 0B 0C 0D 0E 0F	KC_NKEY KC_TELE KC_QTELE KC_WIDE KC_QWIDE KC_FAR KC_NEAR KC_SFAR KC_SNEAR KC_POWER KC_FOCUS_AM KC_F_PUSH KC_M_SET KC_INITIAL KC OSD_ONOFF	◆ Non Key Service ◆ Slow zoom Tele ◆ Quick zoom Tele ◆ Slow zoom Wide ◆ Quick zoom Wide ◆ Move focus to Far (in manual focus mode) ◆ Move focus to Near(in manual focus mode) ◆ Move focus to S-Far (in manual focus mode) (1step) ◆ Move focus to S-Near(in manual focus mode)(1step) ◆ Toggles Power ON/OFF ◆ Toggles Focus Auto/Manual Mode ◆ Activates focus auto Action only one time(in manual focus mode) ◆ In Menu mode, toggles item selection mode / item adjust mode ◆ Initialize camera to Manufacturer's conditions ◆ Toggles Function OSD Off/On mode
10 11 12 13 14 15 16 17 18 19 1A 1C 1D 1E 1F	KC_MENU KC_SET_MENU KC_LANGUAGE KC_BL KC_FLICKER KC_SSC_UP KC_SSC_DN KC_D_EFT KC_MIRROR KC_NEGA KC_MONO KC_SRP_UP KC_SRP_DN KC_BRT_UP KC_BRT_DN	◆ Toggles Menu On/Off ◆ Toggles Menu On/Off ◆ Change OSD language ◆ Toggles Backlight mode ◆ Toggles Flicker mode ◆ Shutter speed counter Up ◆ Shutter speed counter Down ◆ Switches Digital Effect modes (Cinema→Art→Mirror→Nega→Mono→Mosaic) ◆ Toggles Mirror mode ◆ Toggles Negative mode ◆ Toggles Mono/Color mode ◆ Sharpness Data Up ◆ Sharpness Data Down ◆ Brightness Data Up ◆ Brightness Data Down
20 21 22 23 24 25 26	KC_ZM_SUP KC_ZM_SDN KC_ZM_EUP KC_ZM_EDN KC_WB_PUSH KC_AWB_UP KC_AWB_DN	Zoom Start Ratio Up Zoom Start Ratio Down Zoom Stop Ratio Up Zoom Stop Ratio Down In white balance push auto mode(manual mode), It indicates Push Action. Switch AWB modes (auto→special→indoor→outdoor→push auto) Switch AWB modes in reverse sequence of KC_AWB_UP

13.0 ◀ 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	◆ External LED On/Off toggle
38	KC_CINEMA	◆ Toggles Wide Picture mode
39	KC_MOSAIC	◆ Toggles Mosaic mode
3A	KC_ART	◆ Toggles Art mode
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	◆ Memory Board Reset
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, OFF → AUTO → ON
48	KC_MAXFLDUP	◆ Slow shutter max field up
49	KC_MAXFLDDN	◆ Slow shutter max field down