

Technical information: Protocol for remote control

June.23, 1995

The Z2000 series, the HV-C20 series, the HV-C12 and the HV-D Series of cameras can be remotely controlled from a PC, etc. The control method is described below.

1. Control specifications

- | | |
|--------------------------|--|
| (1) Bit rate | 9600bps, 4800bps, or 2400bps
Notes: See the operation manual for setting |
| (2) Communication system | Full duplex |
| (3) Sync system | Start-stop system |
| (4) Transmission system | Bit serial |
| (5) Used code | 8-bit binary |
| (6) Bit composition | Start bit : 1-bit
Data bit : 8-bit
Parity bit : None
Stop bit : 1-bit |
| (7) Error detection | 1. SUM check (16-bit)
2. Time check (Time between, the respond command and ACK, NAK receiving should be less than 0.5 second. |
| (8) Error correction | Request repeat system |
| (9) Kind of commands | Setting commands :
The each kind of setting command which is to send to the camera from PC.
Response request commands :
The command which is to request the response commands to send to the camera from PC.
Response commands :
The command which is to send the camera condition to PC from the camera. |

Note: When the HV-C20/C21 and HV-C12 is controlled from a PC, the capacity of the buffer for the transmitted serial data is 128 bytes. When the camera ends the processing of a received command, it releases the buffer area for the command.

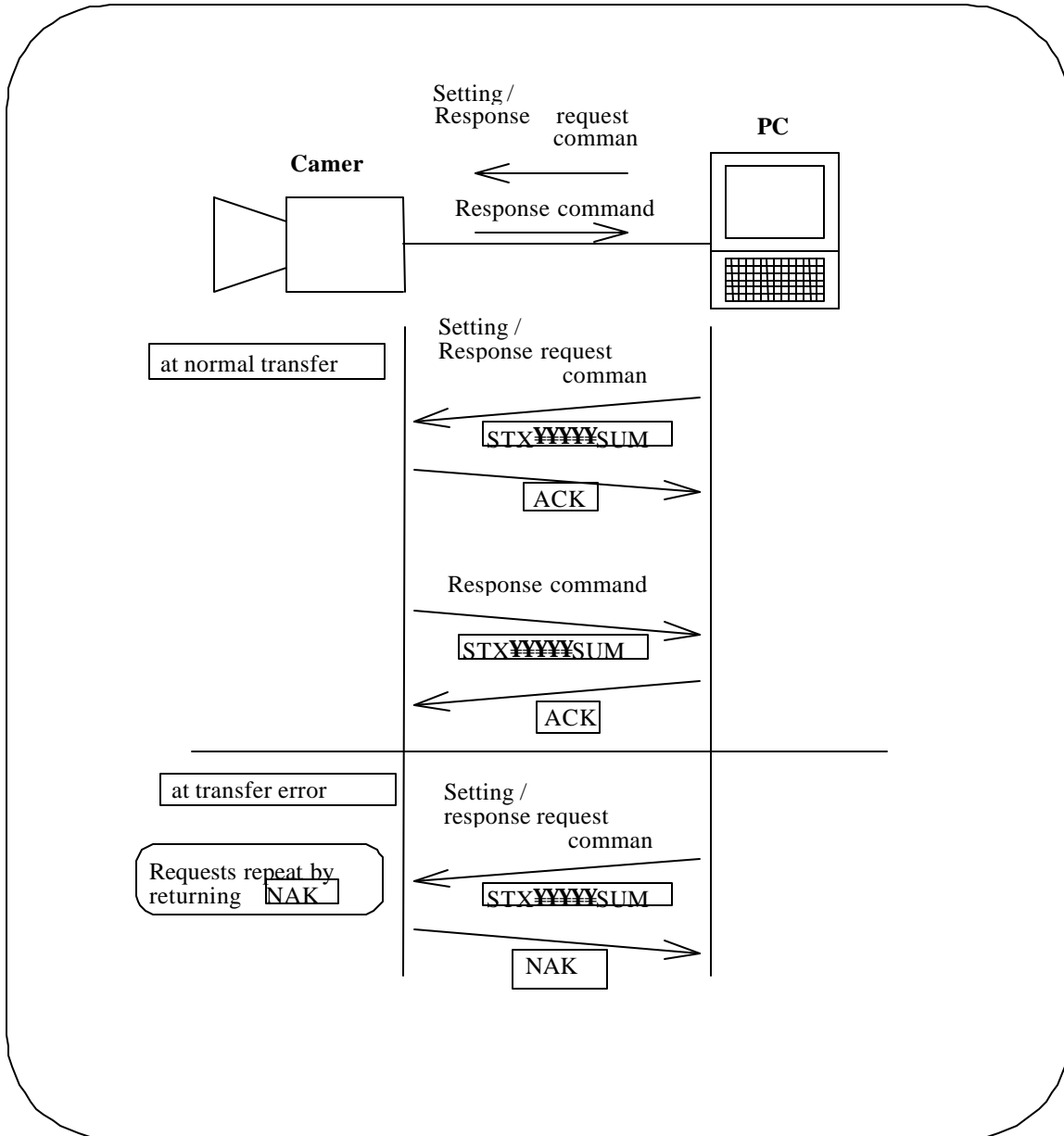
Though the processing time for a command is normally approx. 20ms, the processing time for a response request command, the auto white balance (AWB) command, the auto shading control (ASC) command, the auto black balance (A. BLACK) command, etc. is in units of second. When setting commands are being transmitted to the camera during the processing time, the receive buffer overflows, resulting in causing malfunction.

Therefore, be sure to transmit a response request command or a command related to the auto control functions after a response command has been returned from the camera.

2. Control sequence

2.1 Basic system

The setting command and the response command can be transmitted independently.
 The cameras cannot transmit the setting command during receiving response command or response request command.

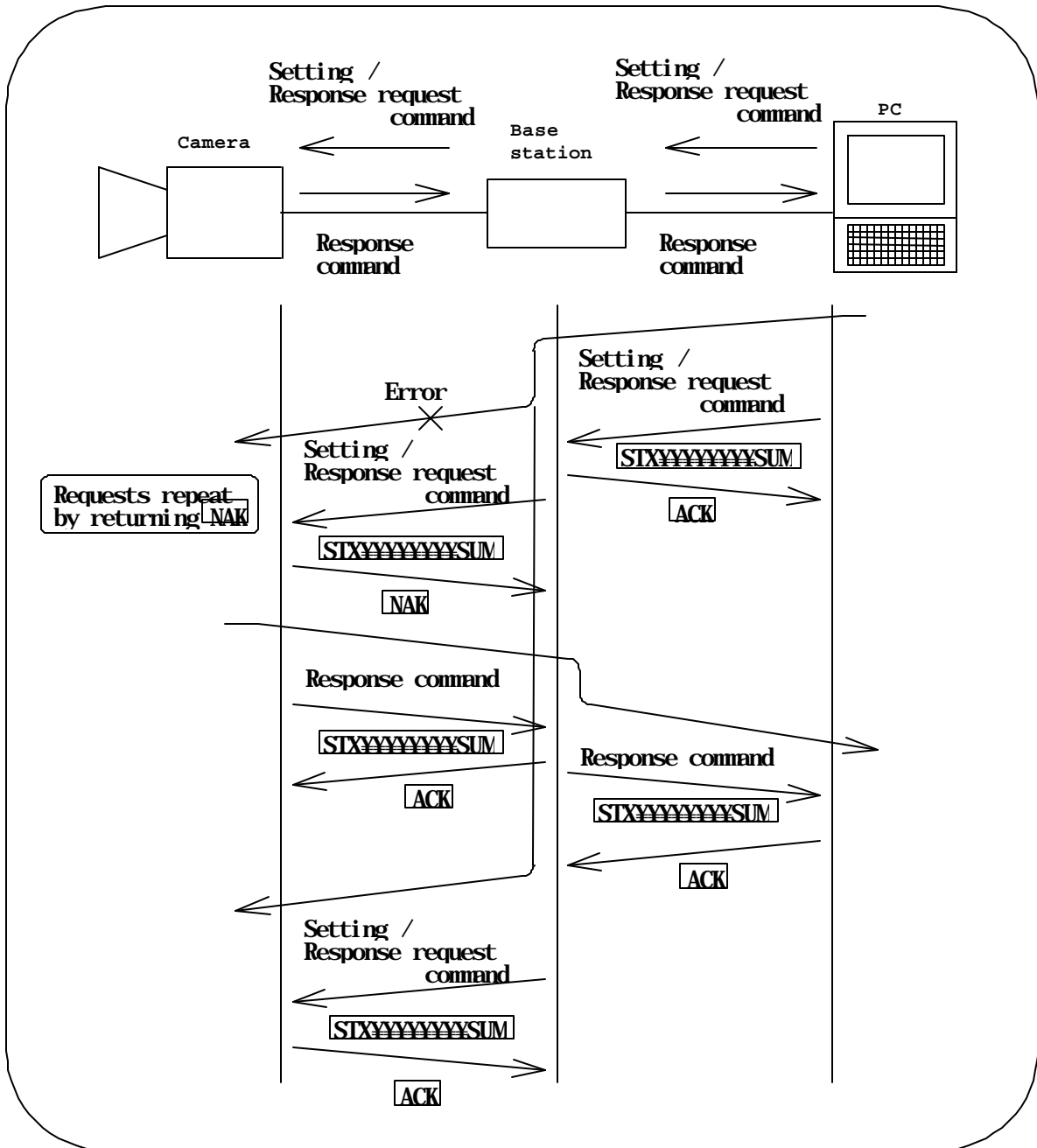


2.2 System via the base station

Combination of the Z-2000 camera and the base station RU-Z2.

The setting command and the response command can be transmitted independently.

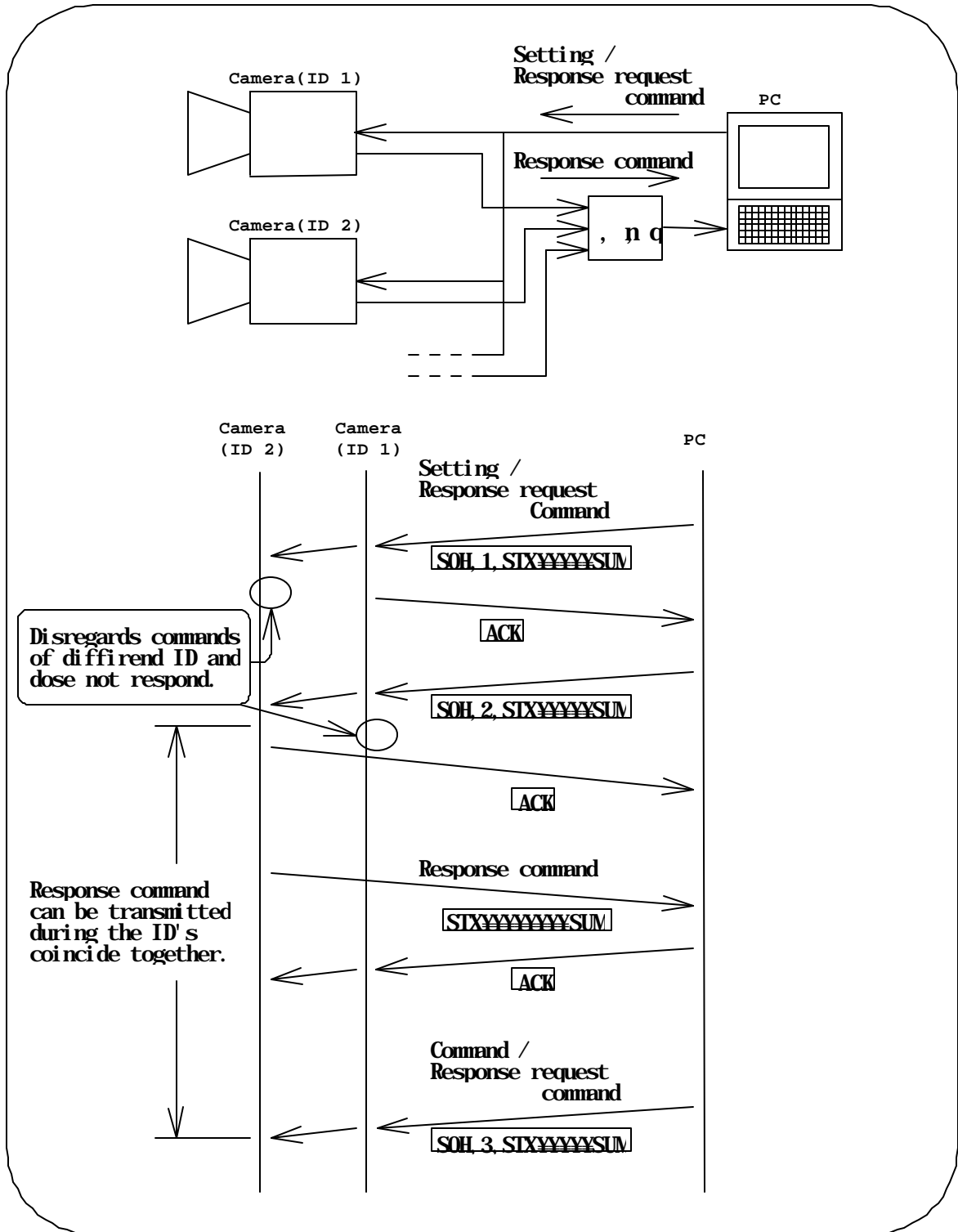
The cameras cannot transmit the setting command during receiving response command or response request command.



2.3 Multiple camera control system

The plural cameras (base stations) are controlled by a single PC.

Extended type message with heading is employed. Camera ID's should be previously set.



2.4 RC-Z2 system

Camera condition Data are send from Camera head to RC-Z2 at first power Up or RC-Z2 Control selector is turn from OFF to ON position for RC-Z2 Panel LED display initiall.

The RC-Z2 control setting command and the response command are transmitted when Panel control change.

Initial Setting

1:Control Response request command are send from RC-Z2

2:When RC-Z2 connect through RU-Z2, CTL AVAIL On Command will return from RU-Z2 (Not form Camera).

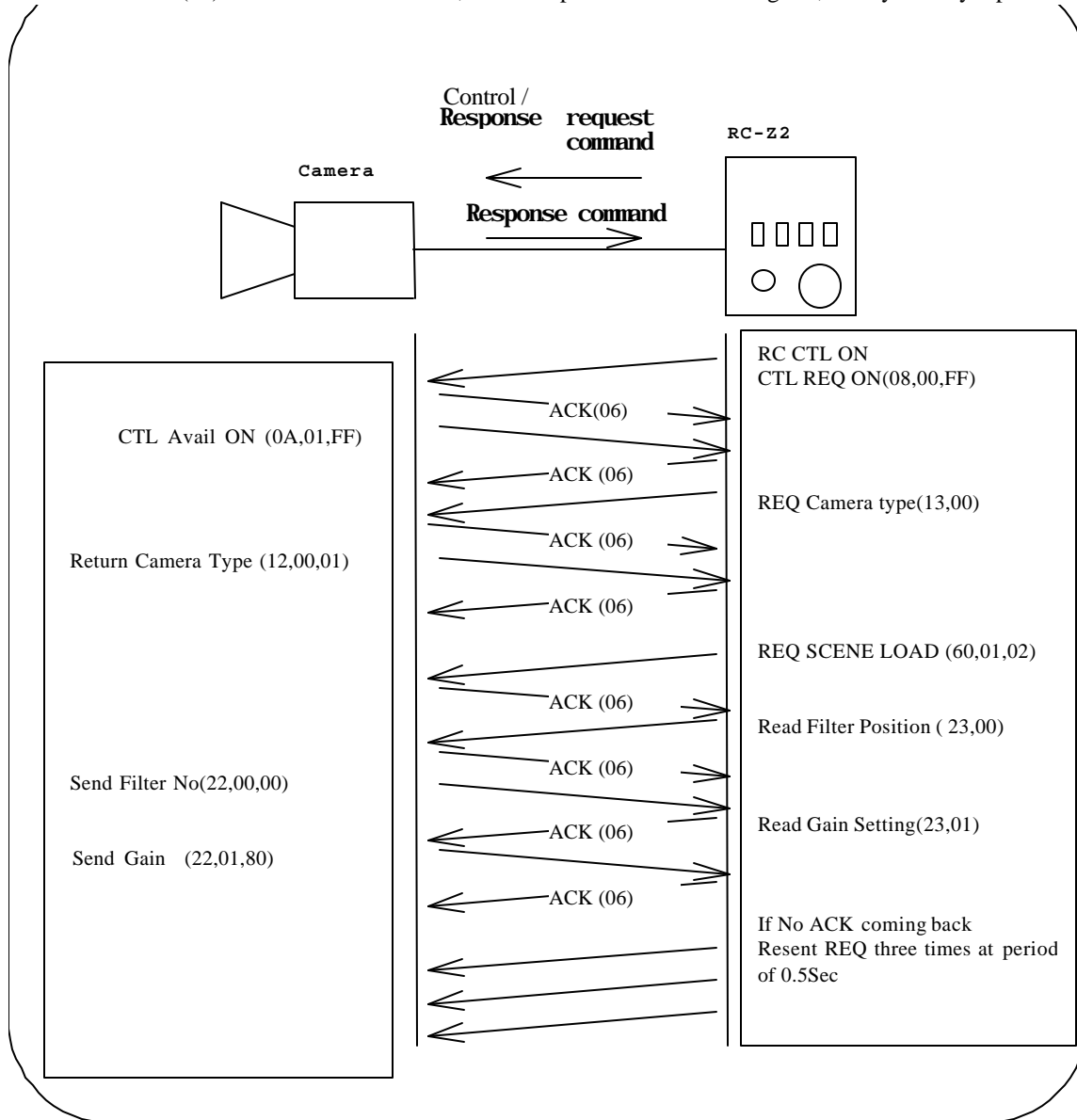
3:After receive ACK(06), Ask camera type from RC-Z2 (13,00), Camera return ACK (06) then send Camera type (12,00,01).ACK (06) from RC-Z2

4:RC-Z2 Request File load(60,01,02), ACK(06) return from Camera

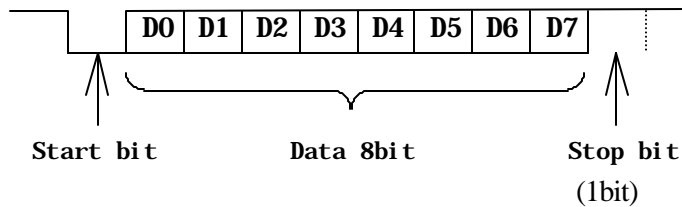
5:RC-Z2 Ask Filter position Data(23,00), ACK(06) then Camera return filter position Data (22,00,00). ACK (06)

6:RC-Z2 request Gain Setting Data (23,01). ACK(06) then Camera return Gain setting Data (22,01,80). ACK (06)

7:If No ACK(06)are detect whit in 0.5 sec, Re-send previous command again , this cycle may repute three time.



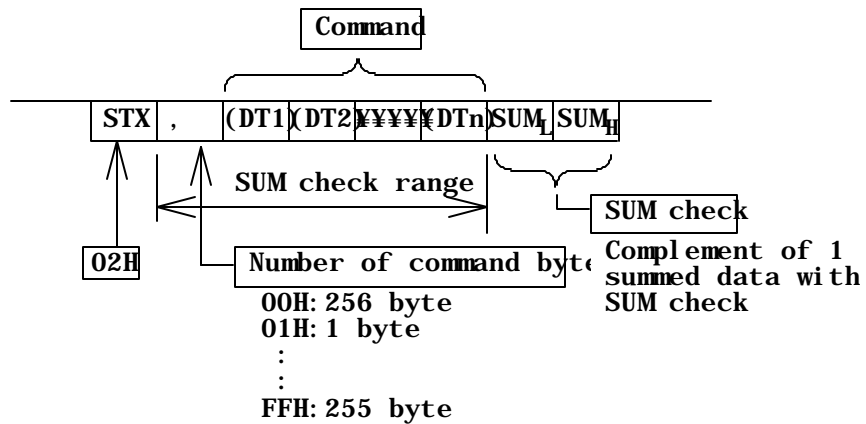
3. Character (1 byte) bit composition



4. Message composition

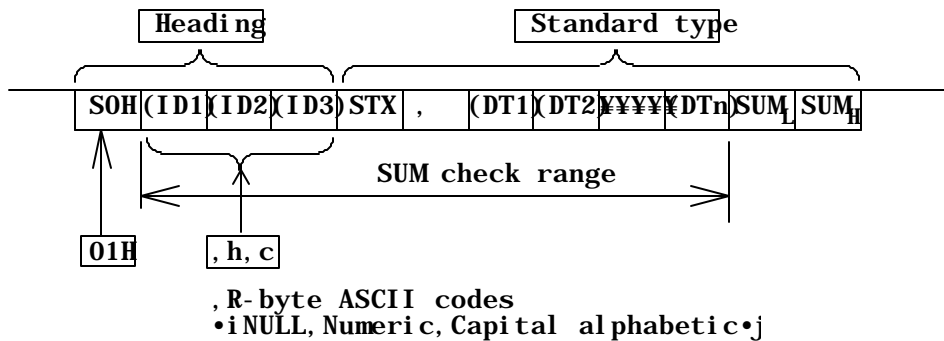
4.1 Standard type

Transmits one command per a message.
The response command is certainly standard type.



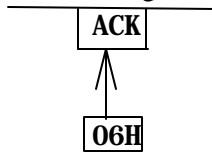
4.2 Extended type with heading

Adds the heading to the standard message when the plural cameras are controlled.
Only the cameras respond whose 3-byte ID's of the head coincide together.
It can operate by the setting command or the response request command.



4.3 Normal response

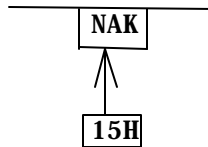
Returns ACK when the received message has no transfer errors.



4.4 Abnormal response

Returns NAK when the received message has transfer errors.

Repeat the message when received NAK.



4.5 Example of standard type message

(Case of the HV-C20 color camera "BAR/CAM:BAR" command)

STX	:	02H
n	:	04H (4 byte commands)
DT1 DT4	:	20H 08H 01H FEH
SUM	:	04H+20H+08H+01H+FEH=01H 2BH
Complement of 1 summed data : FEH D4H(SUM _H :FEH,SUM _L :D4H)		

Therefore, the message composition of "BAR/CAM:BAR" is shown below.

02H 04H 20H 08H 01H FEH D4H FEH

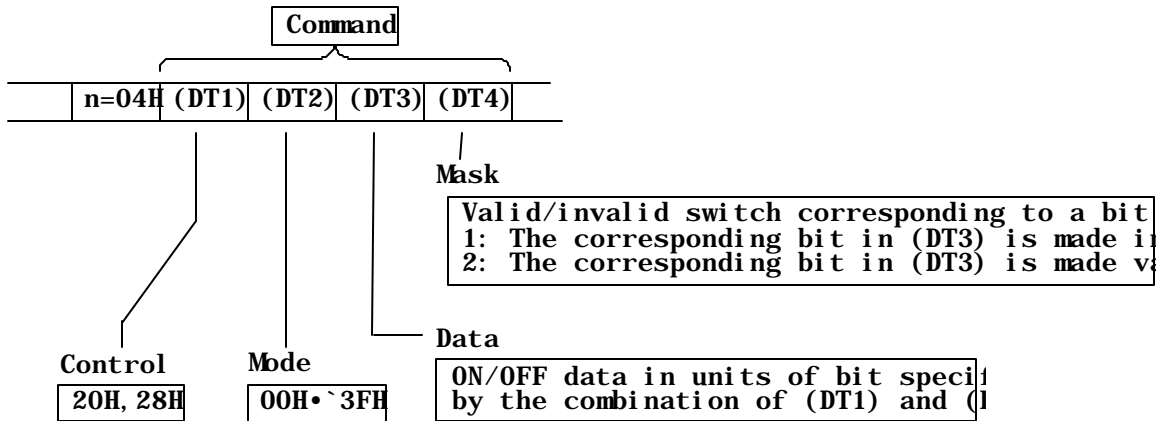
5. Configuration of command

Note: For details, see the command list for each camera.

5.1 ON/OFF control commands

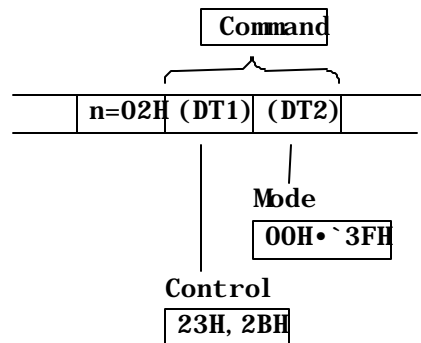
(Setting command of each function, response request commands, response commands)

(1) Setting commands



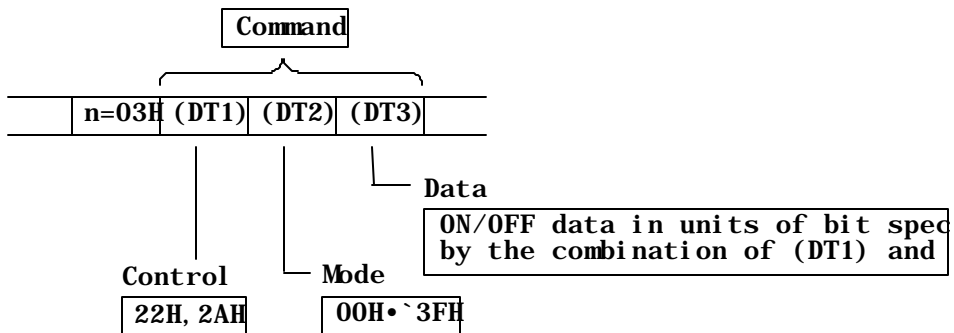
(2) Response request commands

Request the data specified by the mode of setting commands.



(3) Response commands

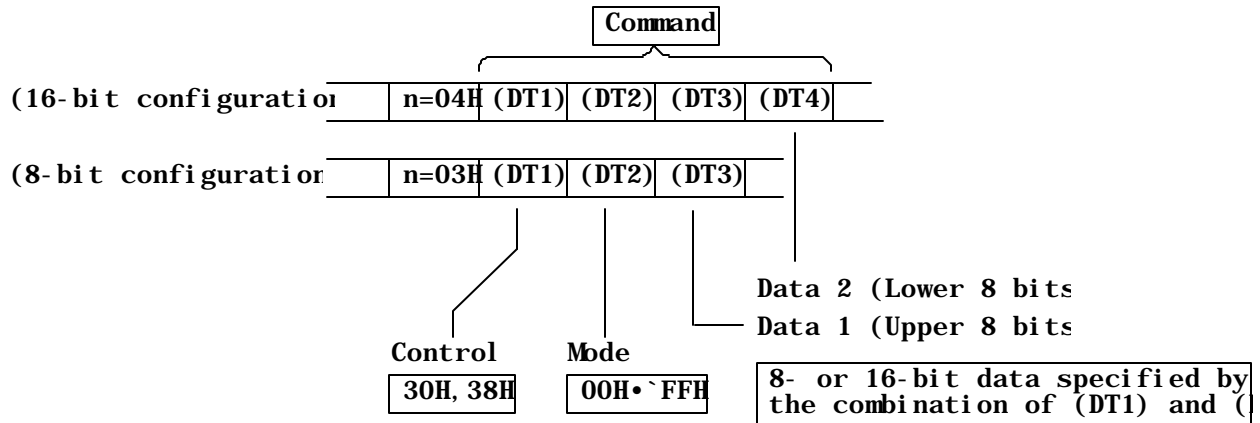
Response the data specified by the mode of setting commands.



5.2 Analog control commands

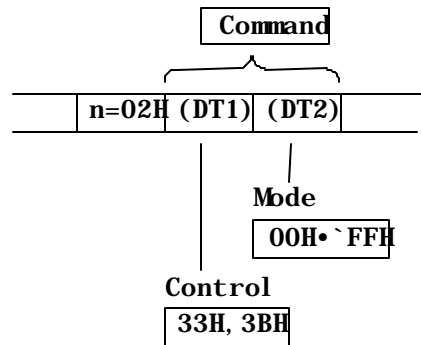
(Setting commands of each analog data, response request command, response commands)

(1) Setting commands



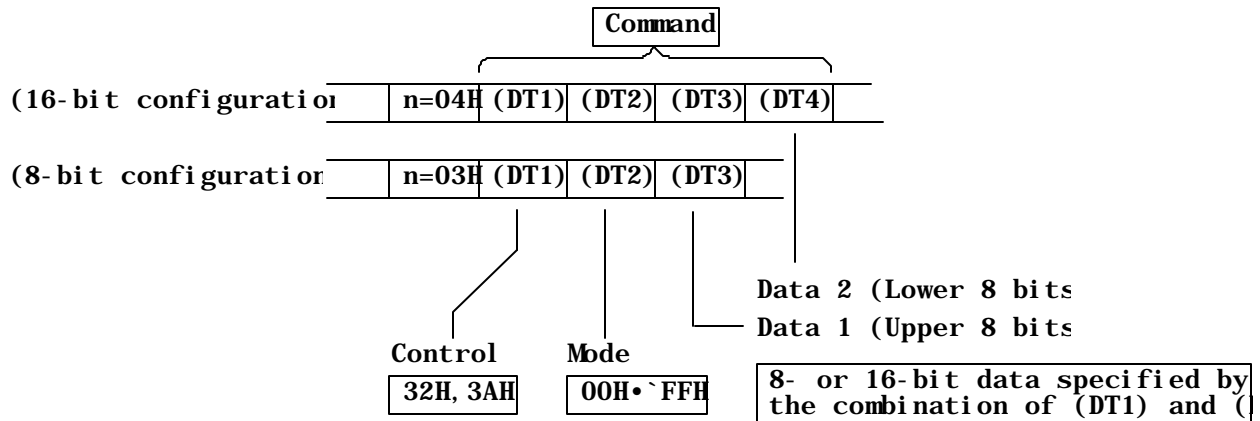
(2) Response request commands

Request the data specified in the mode of setting commands.



(3) Response commands

Response the data specified in the mode of setting commands.

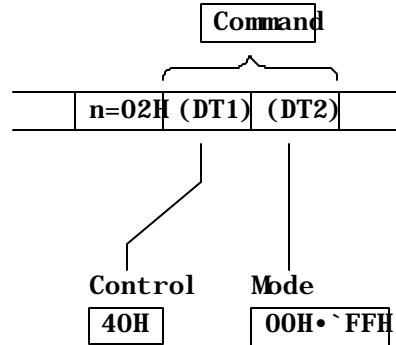


5.3 Auto function control commands

(Setting (execution) commands of each auto function,
response (result of execution) commands)

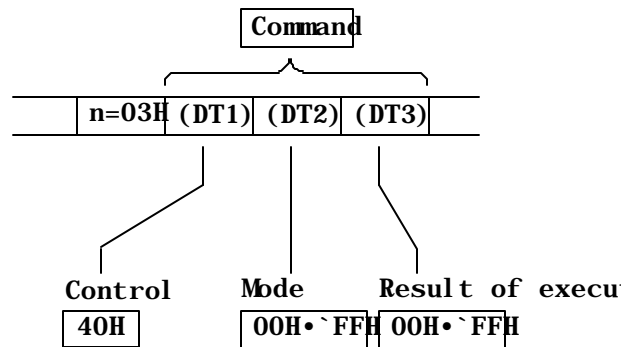
(1) Setting commands

Execute the auto functions including auto white balance and auto black balance.



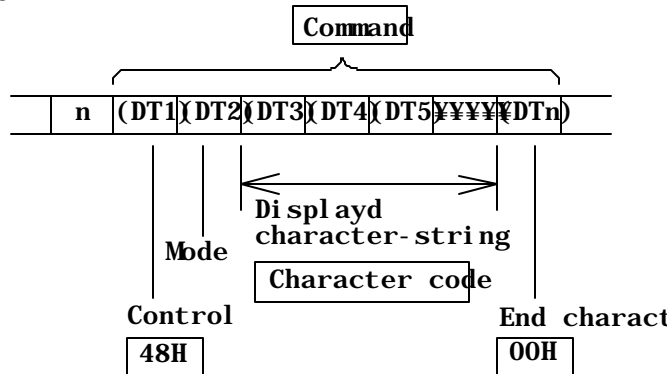
(2) Response commands

Return the result after executing the auto functions including auto white balance and auto black balance.



5.4 Character-string display control commands

(1) Setting commands



Note: Response request commands and response commands are not included in the character string display control commands.

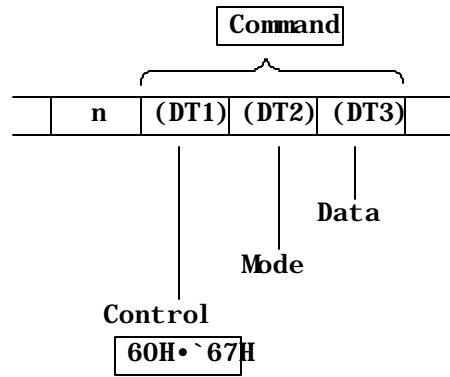
5.5 File control commands

(1) Setting commands

Load, save and clear the specified files in a batch.

The number of bytes and function of a command differ from camera to camera.

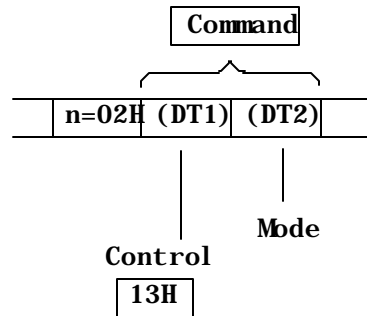
For details, see the command list for each camera.



5.6 Status read commands (Read the model designation, version, etc. of a camera.)

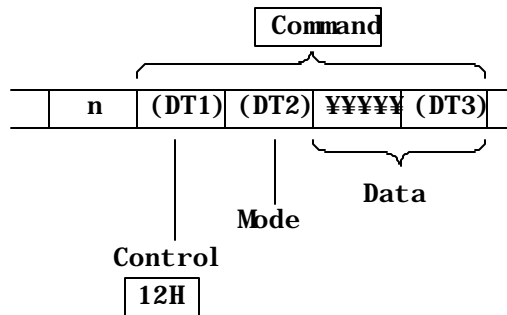
(1) Response request commands

Request the data specified by mode.



(2) Response commands

Response the data corresponding to mode.



Technical information: Command List for HV-HD30 Remote Control

1.Oct.2007

The Hitachi HV-HD30 series color cameras are provided with the functions which can be controlled from a PC. This information is prepared to explain the commands corresponding respective control items. For remote control procedure, see Technical Information entitled Protocol for remote control.

1. ON/OFF control commands (Setting commands, response request commands, response commands)

Note 1. Set character S listed in the (DT4) column to 0 to control a camera, and 1 not to control it.

2. Setting data can be backed up to the EEPROM by the command MEMORY BACK UP.

In the case of the last of the name of the column of (DT3) is described as ON or OFF, (DT3) becomes ON or OFF as the name in case of 1 and (DT3) becomes the opposite condition in case of 0.

(Example)

KNEE OFF : Bit 2 of (DT3)

OFF : (20,02,04,FB) / ON : (20,02,00,FB)

(DT1)	(DT2)	(DT3)		(DT4)	
CTL	MODE	Bit	Item	MASK	
20H 23H 22H	00H	0	PRESET 3200K/5600K	S	
		1		1	
		2		1	
		3		1	
		4		1	
		5		1	
		6		1	
		7	CAP ON	S	
	01H	0	GAIN +3dB	0	S
		1	+6dB	1	S
		2	+12dB	2	S
		3	(+24dB)	3	S
		4	+1dB	4	S
		5	+2dB	5	S
6			1		
7		1			
02H	0		1		
	1	GAMMA OFF	S		
	2	KNEE OFF	S		
	3	WHITE CLIP OFF	S		
	4		1		
	5	M.SHAD OFF	S		
	6	MASKING ON	S		
	7		1		

PRESET 3200K/5600K

PRESET 3200K	PRESET5600K	(DT4)
0	1	FEH

If WHITE BAL MODE:PRESET(20,04,00,F3), this item is enable.

CAP ON(Set only,not memory)

IRIS closes when it is "CAP ON".

GAIN

if AGC MODE:PRESET(20,04,00,CF).

Refer to 3 pages for the details of the GAIN command. (MAX:+12dB)

(DT1)	(DT2)	(DT3)		(DT4)
CTL	MODE	Bit	Item	MASK
20H 23H 22H	04H	0	IRIS MODE	0 S
		1		1 S
		2	WHITE BAL MODE	0 S
		3		1 S
		4	AGC MODE	0 S
		5		1 S
		6		1
	7	AUTO KNEE OFF		S
	05H	0	SHUTTER ON	0 S
		1	SHUTTER MODE	1 S
		2		2 S
		3	SHUTTER PRESET	3 S
		4	MODE	4 S
		5		5 S
		6		6 S
	7		7 S	
	06H	0	COLOR DTL ON	S
		1		1
		2	HI CHROMA ON	S
		3		1
		4		1
5			1	
6			1	
7	FLARE OFF	S		

IRIS MODE

	MANUAL	REMOTE	AUTO	-	(DT4)
0	0	1	0	1	FCH
1	0	0	1	1	

MANUAL : Manual iris of the camera is done effectively.

REMOTE : The iris is controlled by "IRIS (302EH)" command.

AUTO : AUTO IRIS. Iris level is adjusted by "OVER RIDE(3039H)" command.

WHITE BAL MODE

	PRESET	MEMORY	AUTO	-	(DT4)
0	0	1	0	1	F3H
1	0	0	1	1	

AGC MODE

	PRESET	-	AUTO	-	(DT4)
0	0	1	0	1	CFH
1	0	0	1	1	

PRESET : The setting of NORMAL/HIGH/MAX by "GAIN(2001H)" command is enable.

AUTO : AGC ON

SHUTTER

Refer to 3 pages for the details of the SHUTTER command.

GAIN command

(DT1)	(DT2)	(DT3)														(DT4)
		bit	0dB	1dB	2dB	3dB	4dB	5dB	6dB	7dB	8dB	9dB	10dB	11dB	12dB	
20H	01H	0	0	0	0	1	1	1	0	0	0	1	1	1	0	C0H
		1	0	0	0	0	0	0	1	1	1	1	1	1	0	
		2	0	0	0	0	0	0	0	0	0	0	0	0	1	
		3	0	0	0	0	0	0	0	0	0	0	0	0	0	
		4	0	1	0	0	1	0	0	1	0	0	1	0	0	
		5	0	0	1	0	0	1	0	0	1	0	0	1	0	

SHUTTER command

(DT1)	(DT2)	(DT3)										
		bit	OFF	SHUTTER PRESET						VAR.	AES	
				1/100	1/250	1/500	1/1000	1/2000	1/4000			
20H	05H	0	0	1	1	1	1	1	1	1	1	1
		1	-	0	0	0	0	0	0	0	1	0
		2	-	0	0	0	0	0	0	0	0	1
		3	-	1	0	1	0	1	0	-	-	-
		4	-	0	1	1	0	0	1	-	-	-
		5	-	0	0	0	1	1	1	-	-	-
		6	-	0	0	0	0	0	0	-	-	-
		7	-	0	0	0	0	0	0	-	-	
(DT4)		FEH	00H	00H	00H	00H	00H	00H	00H	F8H	F8H	

VARIABLE : The setting of variable shutter by "SHUTTER VARIABLE(3038H)" command is enabled.

AES : AES ON

(DT1)	(DT2)	(DT3)		(DT4)	
CTL	MODE	Bit	Item	MASK	
20H 23H 22H	07H	0		1	
		1		1	
		2		1	
		3		1	
		4	ALC PEAK/AVE	0	S
		5		1	S
		6			1
		7			1
	08H	0	BAR/CAM		S
		1			1
		2			1
		3			1
		4			1
		5			1
		6			1
		7	MESSAGE RTN ON		S
	0AH	0			1
		1			1
		2			1
		3			1
		4			1
		5			1
		6	COLOR DTL IND ON		S
		7			1
	0BH	0			1
		1			1
		2			1
		3			1
4				1	
5				1	
6				1	
7		PAINT ENABLE ON		S	

ALC PEAK/AVE

	50/50	25/75	15/85	0/100	(DT4)
0	0	1	0	1	CFH
1	0	0	1	1	

BAR/CAM

CAM	BAR	(DT4)
0	1	FEH

MESSAGE RTN

ON :The executive message of AWB and ASC is indicated.

OFF: The executive message of AWB and ASC isn't indicated.

COLOR DTL IND(Set Only,No Memory)

When the following function is adjusted, the color of the establishment point disappears.

COLOR DTL PHASE(3059H,306BH),
COLOR DTL WIDTH(305AH,306CH)

PAINT ENABLE ON

if PAINT ENABLE ON(20,0B,80,7F),R/B Paint GAIN (3018H,301AH), R/B Paint BLACK(3021H,3023H) adjustment become effective.

(DT1)	(DT2)	(DT3)		(DT4)
CTL	MODE	Bit	Item	MASK
20H 23H 22H	10H	0		1
		1	MENU ON	S
		2		1
		3		1
		4	UP ON	S
		5	DOWN ON	S
		6	RIGHT ON	S
	7	LEFT ON	S	
	11H	0		1
		1	OUTPUT SEL	0 S
		2		1 S
		3		1
		4	OUTPUT SYNC	S
		5	SYNC ON G ON	S
		6	GL MODE SYNC/HD·	S
	7	GL IN 75Ω/HIGH	S	
	15H	0	D.N.R. ON	S
		1		1
		2		1
		3		1
		4		1
		5		1
		6		1
	7		1	
	16H	0	DYNA CHROMA ON	S
		1		1
		2		1
		3		1
4			1	
5			1	
6			1	
7		1		
17H	0		1	
	1		1	
	2	INDICATOR DISPLAY	0 S	
	3		1 S	
	4		1	
	5		1	
	6		1	
7		1		

MENU SET UP COMMAND

In the same way as sw of the rear control panel of the camera which a menu screen can operate.

(Note)Be sure to set it up again in Low when you set up each bit in Hi.

OUTPUT SEL

	RGB	Y/R-Y/B-Y	-	-	(DT4)
0	0	1	0	1	F9H
1	0	0	1	1	

OUTPUT SYNC

SYNC	HD	(DT4)
0	1	BFH

GL MODE VBS/HD·VD

SYNC	HD·VD	(DT4)
0	1	BFH

GL IN 75Ω/HIGH

75Ω	HIGH	(DT4)
0	1	7FH

INDICATOR DISPLAY

The indication mode of each detection area is chosen.

	OFF	WHT	ALC	COLOR DTL	(DT4)
0	0	1	0	1	F3H
1	0	0	1	1	

WHT : The detection indicator of WHT is displayed normally.

(DT1)	(DT2)	(DT3)		(DT4)
CTL	MODE	Bit	Item	MASK
20H 23H 22H	18H	0	GAMMA TABLE	0 S
		1		1 S
		2		1
		3		1
		4		1
		5		1
		6		1
	7		1	
	20H	0	COLOR DTL	0 S
		1	PHASE ch1	1 S
		2		2 S
		3		1
		4		1
		5		1
		6		1
	7		1	
	21H	0	COLOR DTL	0 S
		1	PHASE ch2	1 S
		2		2 S
		3		1
		4		1
		5		1
		6		1
	7		1	
	24H	0	FIELD FREQ	S
		1		1
		2		1
		3		1
4			1	
5			1	
6			1	
7		1		
25H	0	SCAN MODE	S	
	1		1	
	2		1	
	3		1	
	4		1	
	5		1	
	6		1	
7		1		

GAMMA TABLE

If GAMMA:ON(20,02,00,FD).

	LOW	STANDARD	HIGH	-	(DT4)
0	0	1	0	1	FCH
1	0	0	1	1	

COLOR DTL PHASE ch1

	R-Mg	Mg-B	B-Cy	Cy-G	G-Ye	Ye-R	-(R-Mg)	-(R-Mg)	(DT4)
0	0	1	0	1	0	1	0	1	F8H
1	0	0	1	1	0	0	1	1	
2	0	0	0	0	1	1	1	1	

This command is used with COLOR DTL PHASE (3059H).

COLOR DTL PHASE ch2

	R-Mg	Mg-B	B-Cy	Cy-G	G-Ye	Ye-R	-(R-Mg)	-(R-Mg)	(DT4)
0	0	1	0	1	0	1	0	1	F8H
1	0	0	1	1	0	0	1	1	
2	0	0	0	0	1	1	1	1	

This command is used with COLOR DTL PHASE (306BH).

FILED FREQ.

59.94Hz	50Hz	(DT4)
0	1	FEH

SCAN MODE

720p	1080i	(DT4)
0	1	FEH

(DT1)	(DT2)	(DT3)		(DT4)
CTL	MODE	Bit	Item	MASK
20H 23H 22H	29H	0	DTL BOOST FREQ	0 S
		1		1 S
		2		1
		3		1
		4		1
		5		1
		6		1
		7		1
	35H	0	COLOR DTL IND. SEL	S
		1		1
		2		1
		3		1
		4		1
		5		1
		6		1
		7		1
	3BH	0	COLOR DTL IND. SEL	S
		1		1
		2		1
		3		1
		4	AES (1/00) ON	S
5			1	
6			1	
7			1	

DTL BOOST FREQ

	LOW	MID	HIGH	---	(DT4)
0	0	1	0	1	3FH
1	0	0	1	1	

COLOR DTL IND. SEL

	ch1	ch2	(DT4)
0	0	1	FEH

(DT1)	(DT2)	(DT3)		(DT4)
CTL	MODE	Bit	Item	MASK
28H 2BH 2AH	00H	0	ID DISPLAY ON	S
		1		1
		2	TITLE DISPLAY ON	S
		3		1
		4	IRIS OPEN LIMIT ADJ	S
		5	IRIS CLOSE LIMIT ADJ	S
		6		1
	7	ALC GATE ON	S	
	01H	0	LENS TYPE	S
		1		1
		2		1
		3		1
		4		1
		5		1
		6		1
	7	CAM MODE	S	
	08H	0	AGC LIMIT	S
		1	06H(+6dB) ~	S
		2	0CH(+12dB)	S
		3		S
		4		S
5			1	
6			1	
7		1		

IRIS OPEN LIMIT ADJ

If IRIS OPEN LIMIT ADJ : ON(28,00,10,EF), the setting of iris open limit is adjusted by "AUTO IRIS OPEN LIMIT(303CH)" command.

IRIS CLOSE LIMIT ADJ

If IRIS CLOSE LIMIT ADJ : ON(28,00,20,DF), the setting of iris close limit is adjusted by "AUTO IRIS CLOSE LIMIT(303BH)" command.

LENS TYPE

VIDEO	DC	(DT4)
0	1	FEH

CAM MODE

MANUAL	AUTO	(DT4)
0	1	7FH

(DT1)	(DT2)	(DT3)		(DT4)	
CTL	MODE	Bit	Item	MASK	
28H 2BH 2AH	10H	0	WHITE GATE ON	S	
		1		1	
		2		1	
		3		1	
		4		1	
		5		1	
		6		1	
	7	ATW SPEED		S	
	11H	0	ALC SPEED	0	S
		1		1	S
		2			1
		3			1
		4			1
		5			1
		6			1
	28	0	ALC GATE SEL	0	S
		1		1	S
		2		2	S
		3			1
		4			1
		5			1
		6			1
	7			1	

ATW SPEED

Sets real-time auto white balance response speed.

SLOW	STANDARD	(DT4)
0	1	BFH

ALC SPEED

It sets up it with the action speed of AGC and AES.

	SLOW	STANDARD	FAST	-	(DT4)
0	0	1	0	1	FCH
1	0	0	1	1	

LENS SELECTION

COSMICAR	OTHHERS	(DT4)
0	1	FBH

ALC GATE SEL

If ALC GATE:ON(28,00,80,7F).

	GATE 1	GATE 2	GATE 3	GATE 4	GATE 5	GATE 6	(DT4)
0	0	1	0	1	0	1	F8H
1	0	0	1	1	0	0	
2	0	0	0	0	1	1	

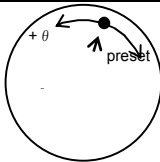
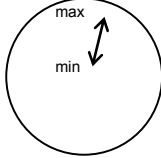
2. Analog control commands (Setting commands, response request commands, response commands)

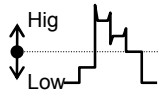
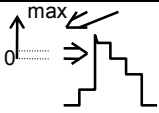
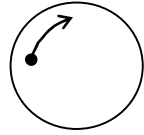
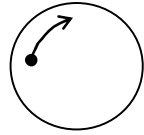
Note 1. X in the DATA column is undefined.

2. Setting data can be backed up to the EEPROM by the command MEMORY BACK UP.

Item	(DT1)	(DT2)	(DT3) _U , (DT4) _D		
	CTL	MODE	DATA		
R GAIN	30H	00H	min	preset max	
B GAIN		02H	80XXH~00XXH~7FXXH (SINGED)		
R GAMMA	33H	03H	min	preset max	
B GAMMA	32H	05H	80XXH~00XXH~7FXXH (SINGED)		
FLARE		07H	-max	FLARE off +max	
			80XXH~00XXH~7FXXH (SINGED)		
W.CLIP		13H	min	preset max	
			80XXH~00XXH~7FXXH (SINGED)		
R paint GAIN		18H	min	preset max	
B paint GAIN		1AH	80XXH~00XXH~7FXXH (SINGED)		
R paint BLACK		21H	min	preset max	
B paint BLACK		23H	80XXH~00XXH~7FXXH (SINGED)		
TOTAL GAMMA		27H	min	preset max	
			80XXH~00XXH~7FXXH (SINGED)		
KNEE POINT		28H	min	preset max	
			80XXH~00XXH~7FXXH (SINGED)		
MASTER BLACK		2BH	min	preset max	
			80XXH~00XXH~7FXXH (SINGED)		
DETAIL		2CH	min	preset max	
			80XXH~00XXH~7FXXH (SINGED)		
IRIS		2EH	CLOSE	OPEN	
			80XXH~00XXH~7FXXH (SINGED)		

Item	(DT1)	(DT2)	(DT3)u , (DT4)d
	CTL	MODE	DATA
H.PHASE	30H 33H	34H	-128 0 +127 80XXH~00XXH~7FXXH (SINGED)
SHUTTER VARIABLE		38H	(FIELED FRQ.:59.94Hz) Shutter speed = (744-(data x 4)) / 59.94 [sec] ----- 1/60.74s ~ 1/5619 s 0001H 00B8H
			(FIELED FRQ.:50 Hz) Shutter speed = (744-(data x 4)) / 50 [sec] ----- 1/50.67s ~ 1/4687 s 0001H 00B8H
OVER RIDE		39H	-128 0 +127 80XXH~00XXH~7FXXH (SINGED)
IRIS SPEED		3AH	1 +15 01XXH~0FXXH (SINGED)
AUTO IRIS CLOSE LIMIT		3BH	CLOSE OPEN 80XXH~FFXXH (SINGED)
AUTO IRIS OPEN LIMIT		3CH	CLOSE OPEN 00XXH~7FXXH (SINGED)
AUTO KNEE TRIM		3FH	LOW HIGH 80XXH~00XXH~7FXXH (SINGED) (KNEE LEVEL of the "AUTO KNEE" condition is adjusted.)

Item	(DT1)	(DT2)	(DT3)u , (DT4)d	
	CTL	MODE	DATA	
R HUE CROMA COMPEN	30H	40H	+ θ preset - θ 	
G HUE CROMA COMPEN		41H	E0XXH~00XXH~1FXXH (SINGED)	
B HUE CROMA COMPEN		33H	42H	
Y HUE CROMA COMPEN		32H	43H	
C HUE CROMA COMPEN		44H		
M HUE CROMA COMPEN		45H		
R SAT CROMA COMPEN	30H	46H	min max 	
G SAT CROMA COMPEN		47H	C0XXH~00XXH~3FXXH (SINGED)	
B SAT CROMA COMPEN		48H		
Y SAT CROMA COMPEN		49H		
C SAT CROMA COMPEN		4AH		
M SAT CROMA COMPEN		4BH		
RG LIN CROMA COMPEN	30H	4CH	min max	
GB LIN CROMA COMPEN		4DH	C0XXH~00XXH~3FXXH (SINGED)	
BR LIN CROMA COMPEN		4EH		
GR LIN CROMA COMPEN		4FH		
BG LIN CROMA COMPEN		50H		
RB SAT CROMA COMPEN		51H		
MASTER SAT CROMA		52H	min max C0XXH~00XXH~3FXXH (SINGED)	

Item	(DT1)	(DT2)	(DT3)u , (DT4)d
	CTL	MODE	DATA
DTL LEVEL DEPEND		53H	Dependent level setting Low High 80XXH~00XXH~7FXXH (SINGED) 
DTL CRISP		54H	Crispness level setting 0 max 80XXH~00XXH~7FXXH (SINGED) 
DTL HV BALANCE		55H	Balance setting for horizontal and vertical detail amount H<V H=V H>V 80XXH~00XXH~7FXXH (SINGED)
COLOR DTL ch1 LEVEL (FRESH GAIN)		58H	Sets color detail level 0 1 2(magnification) 80XXH~00XXH~7EXXH (SINGED: Upper 7 bits are effective. 128 steps.)
COLOR DTL ch1 PHASE (FRESH PHASE)		59H	Sets color detail phase -128 0 127 80XXH~00XXH~7CXXH (SINGED) 
COLOR DTL ch1 WIDTH (FRESH WIDTH)		5AH	Selects color phase range for setting -128(-120°) 0(0°) 127(+120°) 80XXH ~ 00XXH ~ 7FXXH (SINGED)
SOFT DTL WHITE		5B	-128 0 127 80XXH~00XXH~7CXXH (SINGED)
SOFT DTL BLACK		5C	-128 0 127 80XXH~00XXH~7CXXH (SINGED)
COLOR DTL ch2 LEVEL (FRESH GAIN)		6AH	Sets color detail level 0 1 2(magnification) 80XXH~00XXH~7EXXH (SINGED) (SINGED: Upper 7 bits are effective. 128 steps.)
COLOR DTL ch2 PHASE (FRESH PHASE)		6BH	Sets color detail phase -128 0 127 80XXH~00XXH~7CXXH (SINGED) 
COLOR DTL ch2 WIDTH (FRESH WIDTH)		6CH	Selects color phase range for setting -128(-120°) 0(0°) 127(+120°) 80XXH ~ 00XXH ~ 7FXXH (SINGED)

Item	(DT1)	(DT2)	(DT3)u , (DT4)d	
	CTL	MODE	DATA	
WHITE GATE H POSI	30H 33H	A2	LEFT 00XXH	RIGHT ~ 08XXH
WHITE GATE V POSI	32H	A3	UP 00XXH	DOWN ~04XXH
IRIS GAIN		A5	min -128	max 0 127 80XXH~00XXH~7FXXH (SINGED)
AES LIMIT		B0	(FIELED FRQ.:59.94Hz) Shutter speed = (744-(data x 4)) / 59.94 [sec] 1/60.74s ~ 1/2247s 0001H 00B5H	
			(FIELED FRQ.:50 Hz) Shutter speed = (744-(data x 4)) / 50 [sec] 1/50.67s ~ 1/1875 s 0001H 00B5H	
ATW HIGH LIMIT		C8H	2,000K 94XXH	~ 15,000K ~ 1600H (SINGED)
ATW LOW LIMIT	C9H	2,000K 14XXH	~ 15,000K ~ 9600H (SINGED)	

3. Auto function control commands (Setting commands, response commands)

(Note) As for the executive result, a memory is done.

Item	Setting commands		Response commands		
	(DT1)	(DT2)	(DT1)	(DT2)	(DT3)
	CTL	MODE	CTL	MODE	RESULT
AUTO WHITE	40H	10H	40H	00H	00H:"OK" 11H:"NG","CHANGE TO CAM" 12H:"NG","CHANGE TO MEMORY MODE" 13H:"NG","LOW LIGHT" 14H:"NG","HIGH LIGHT" 15H:"NG","C.TEMP.HIGH" 16H:"NG","C.TEMP.LOW" 18H:"NG","???" 23H:"CAM MODE:AUTO", "CHANGE TO MANUAL"
AUTO SHADING	40H	30H	40H	00H	00H:"OK" 11H:"NG","CHANGE TO CAM" 13H:"NG","LOW LIGHT" 14H:"NG","HIGH LIGHT"

4. SCENE file select

(NOote) Every time "SCENE FILE NO." is changed, "SCENE FILE NO." does a memory.

Item	(DT1)	(DT2)	(DT3)
	CTL	CTL	CTL
FILE-1	60H	01H	01H
FILE-2			02H
FILE-3			03H
FILE-4			04H
PRESET			FFH

5. Memory backup

The change setting data can be backed up to the EEPROM.

(1) In a bundle memory backup

Item	(DT1)	(DT2)
	CTL	CTL
MEMORY BACK UP1	61H	02H

A memory supports all the data of "ADJUST FILE", "COMMON FILE" and "SCENE FILE 1,2,3,4".

(2) One item memory backup

Item	(DT1)	(DT2)	(DT3)	Note
	CTL	CTL	CTL	
MEMORY BACK UP2	65H	20H	XXH	ON/OFF Command
		28H	XXH	ON/OFF Command
		30H	XXH	Analog Command

The same value as DT1 and DT2 of when that command to, DT2, DT3 setting are set up.

(3) Only an optional scene file, memory backup.

(Note)The item of the menu screen that "FILE SEL" is indicated is the item of the scene file.

Item	(DT1)	(DT2)	(DT3)
	CTL	CTL	CTL
FILE-1	61H	01H	01H
FILE-2			02H
FILE-3			03H
FILE-4			04H
PRESET			FFH

Note

The memory backup writes data to the address of memory IC which was assigned in the unit of a command. The rewriting guarantee number to the same address of memory IC that is using with the HV-HD30 camera is becoming 100,000 times. Therefore, please pay attention in the case that a memory backup command is used.

6.States read (Response request commands, response commands)

Item	(DT1)	(DT2)	(DT3),(DT4),(DT5)
	CTL	MODE	RESULT
CAMERA TYPE	13H	00H	(DT3) A0H: HV-HD30
CAMERA VERSION	12H	01H	Ver.(DT3).(DT4)....ASCII code
CAMERA ID		02H	(DT3),(DT4),(DT5)....ASCII code
FILE No.		04H	(DT3) 01H:FILE-1,02H:FILE-2,03H:FILE-3,04H:FILE-4,FFH:PRESET

7.TITLTE CHARACTER SET COMMANDS

Item	(DT1)	(DT2)	(DT3),(DT4),...,(DT14)
	CTL	MODE	RESULT
ID CHARA SET	10H	02	(DT3),(DT4),....(DT14) ASCII code(3 characters)
TITLE CHARA SET		06H	(DT3),(DT4),....(DT14) ASCII code(12 characters)

8. INITIALIZE COMMANDS

Item	(DT1)	(DT2)	(DT3)
	CTL	CTL	CTL
FACTORY INITIALIZE	90H	00H	FFH
ALL INITIALIZE(without SYSTEM data)			00H

9. ID code chart

CHR.	ASCII code	CHR.	ASCII code	CHR.	ASCII code
SPACE	20H	A	41H	N	4EH
0	30H	B	42H	O	4FH
1	31H	C	43H	P	50H
2	32H	D	44H	Q	51H
3	33H	E	45H	R	52H
4	34H	F	46H	S	53H
5	35H	G	47H	T	54H
6	36H	H	48H	U	55H
7	37H	I	49H	V	56H
8	38H	J	4AH	W	57H
9	39H	K	4BH	X	58H
		L	4CH	Y	59H
		M	4DH	Z	5AH

10. TITLE code chart

CHR.	ASCII code	CHR.	ASCII code	CHR.	ASCII code	CHR.	ASCII code
SPACE	20H	4	34H	A	41H	N	4EH
.	28H	5	35H	B	42H	O	4FH
.	29H	6	36H	C	43H	P	50H
.	2AH	7	37H	D	44H	Q	51H
.	2BH	8	38H	E	45H	R	52H
.	2CH	9	39H	F	46H	S	53H
.	2DH	□	3AH	G	47H	T	54H
~	2EH	□	3BH	H	48H	U	55H
~	2FH	□	3FH	I	49H	V	56H
0	30H			J	4AH	W	57H
1	31H			K	4BH	X	58H
2	32H			L	4CH	Y	59H
3	33H			M	4DH	Z	5AH