

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.

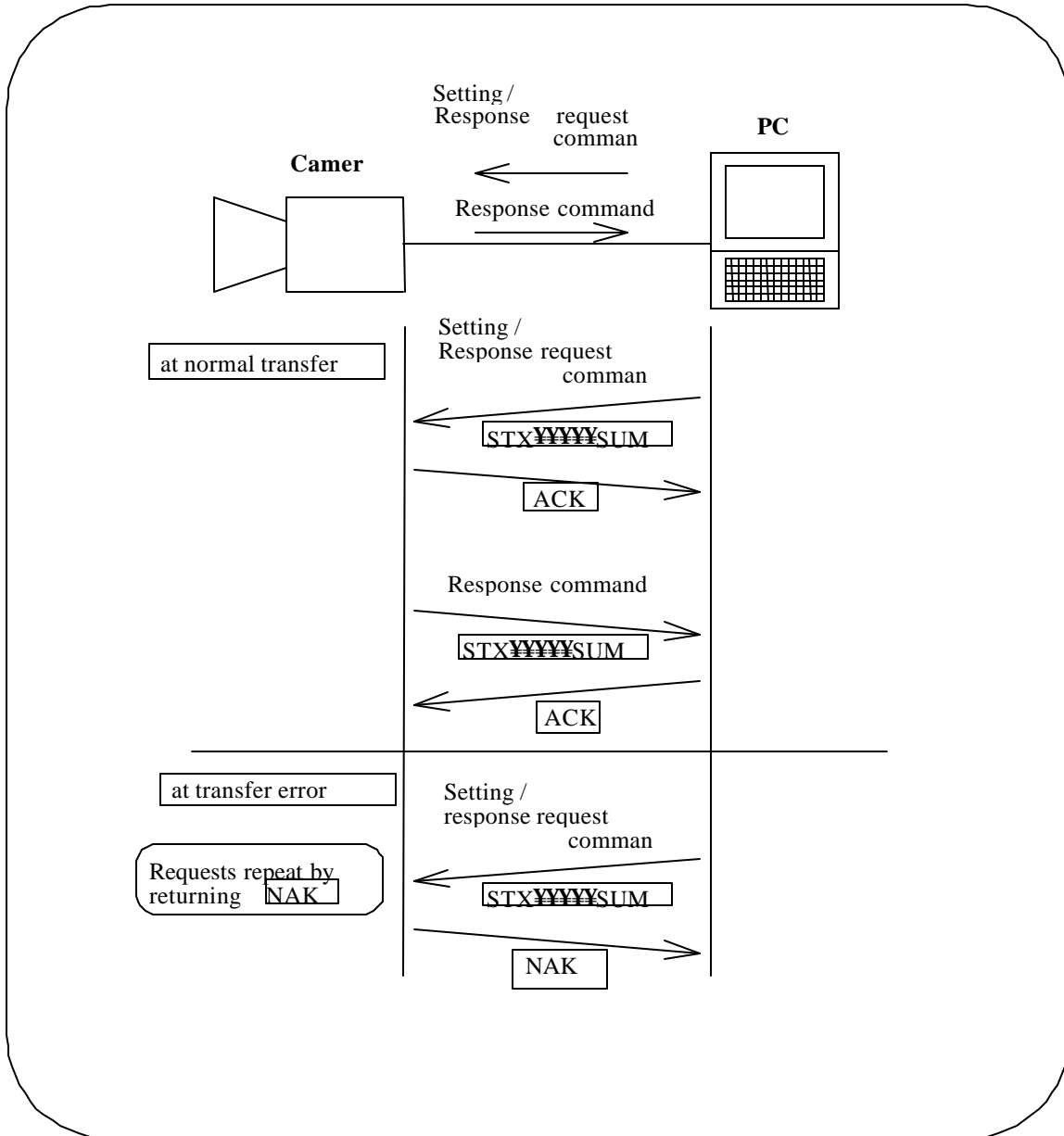
Though the processing time for a command is normally approx. 20ms, the processing time for a response request command, the auto white balance (AWB) command, the auto shading control (ASC) command, the auto black balance (A. BLACK) command, etc. is in units of second. When setting commands are being transmitted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

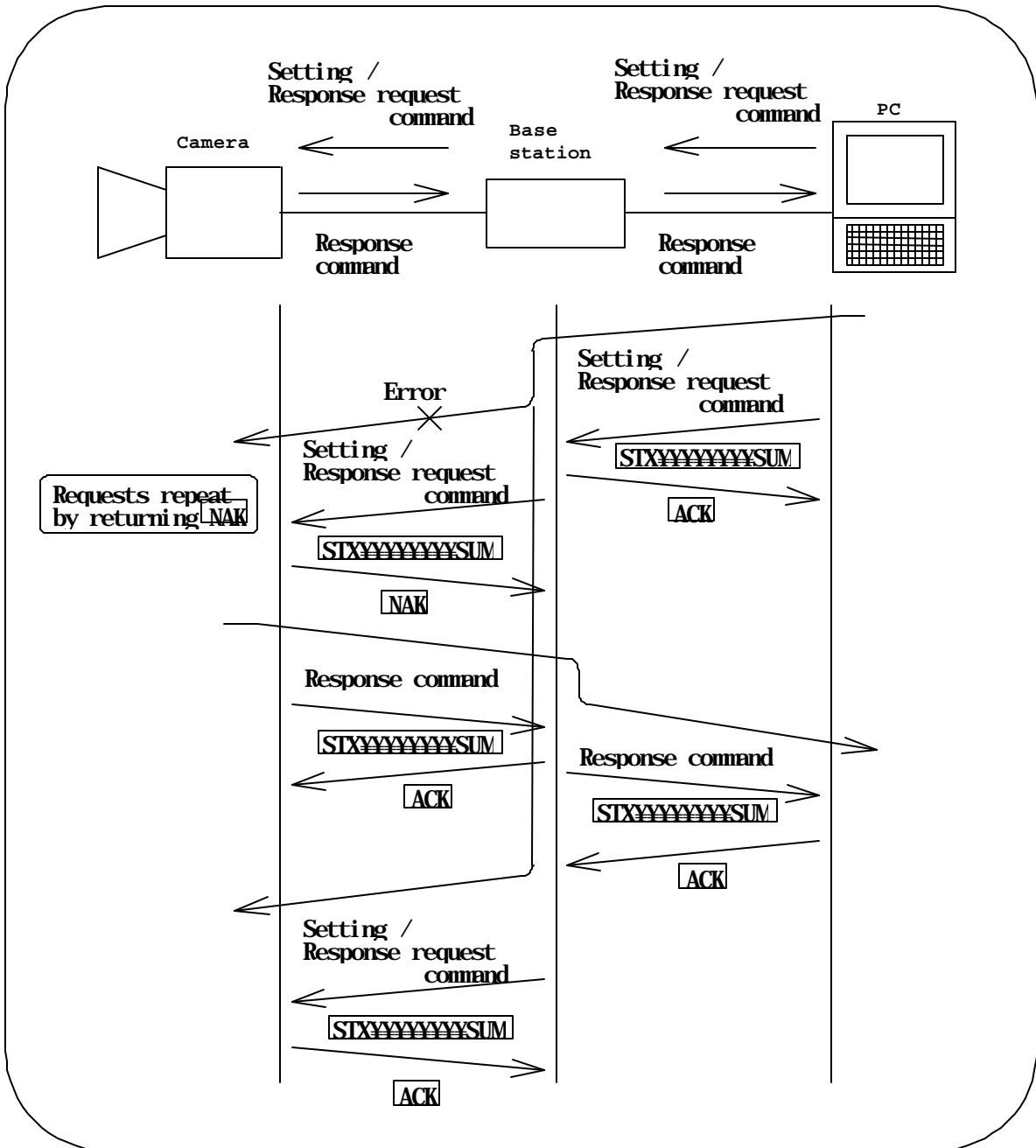


2.2 System via the base station

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

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

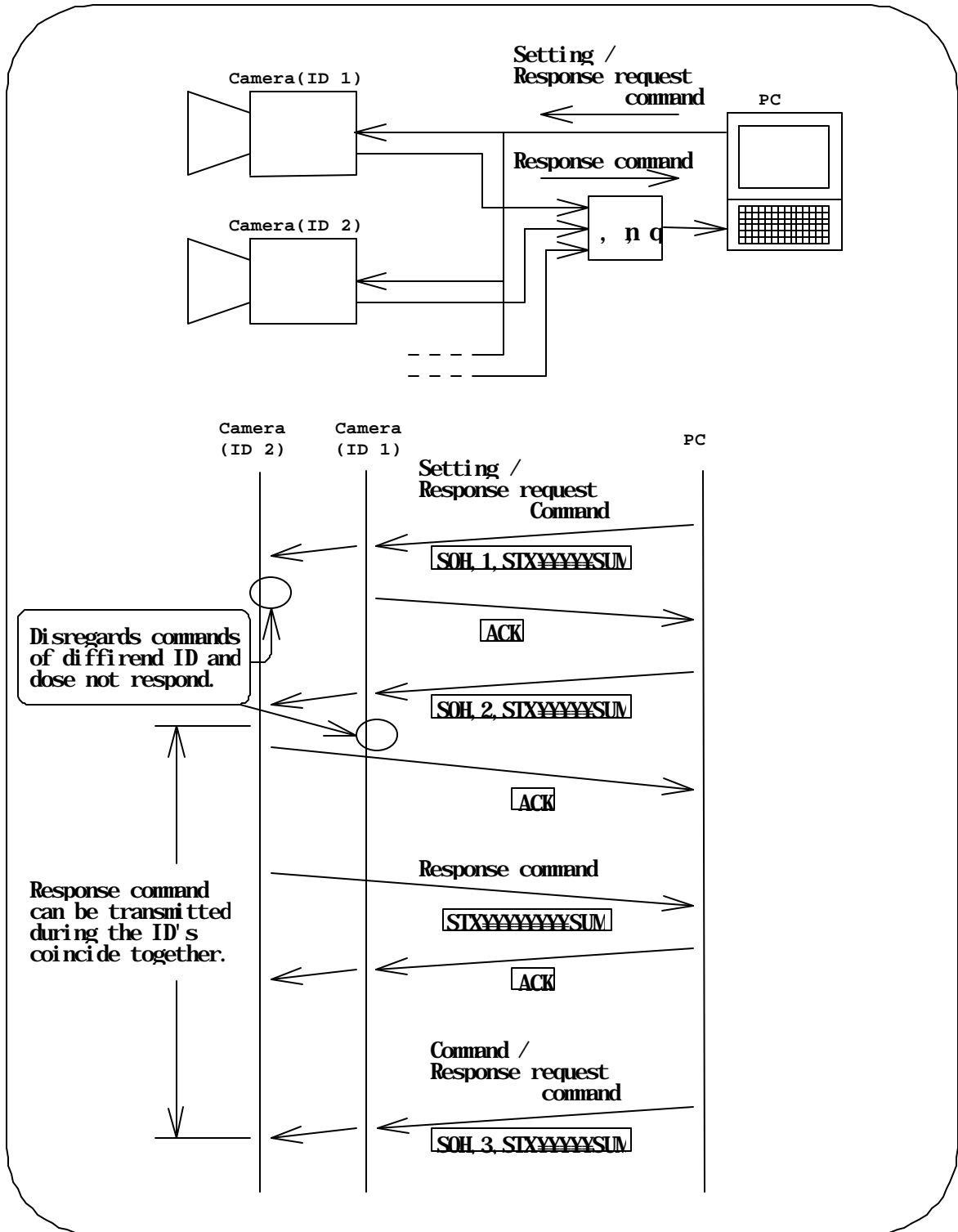
The cameras cannot transmit the setting command during receiving response command or response request command.



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 initial.

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).

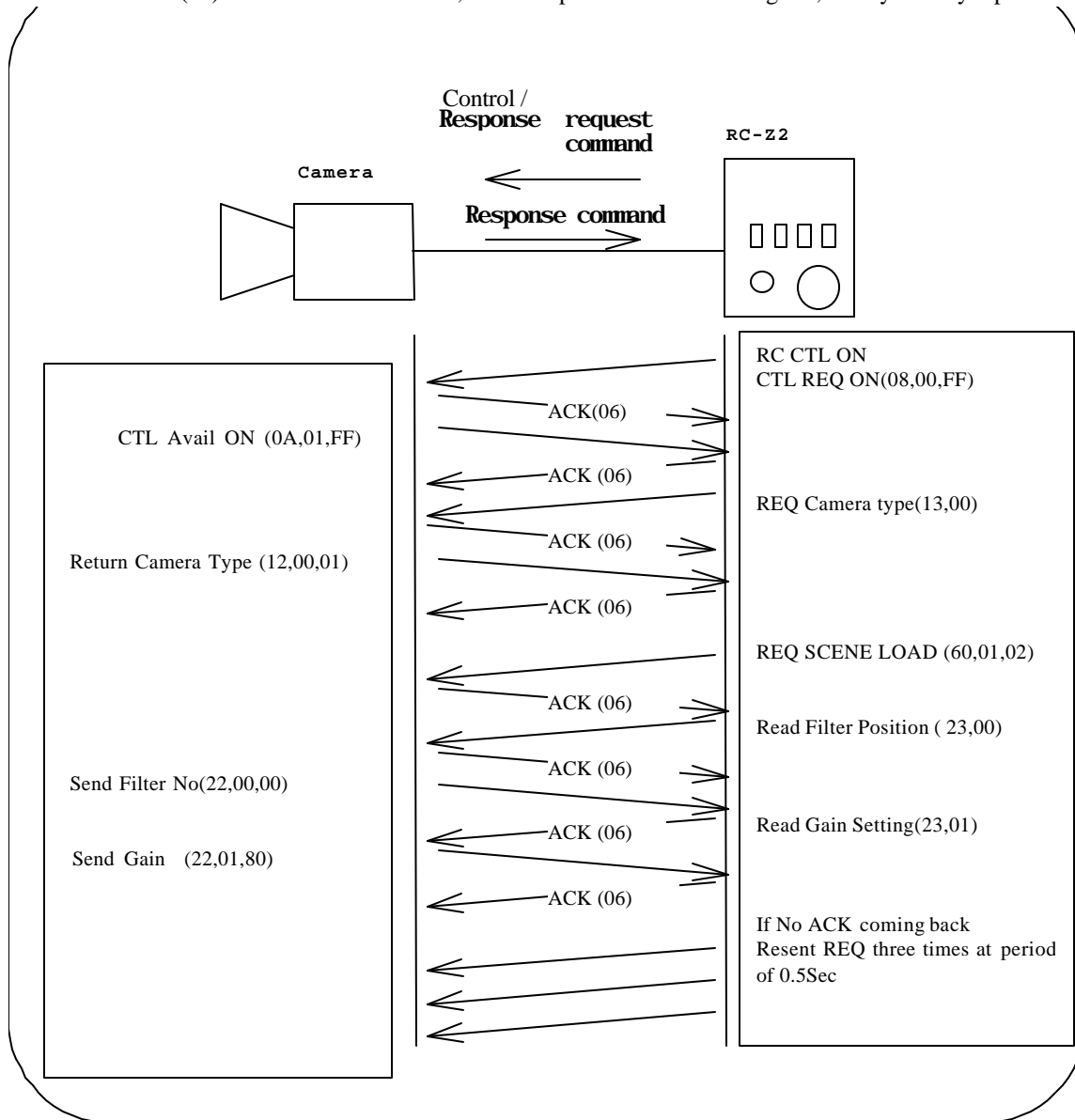
3:After receive ACK(06), Ask camera type from RC-Z2 (13,00), Camera return ACK (06) then send Camera type (12,00,01).ACK (06) from RC-Z2

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

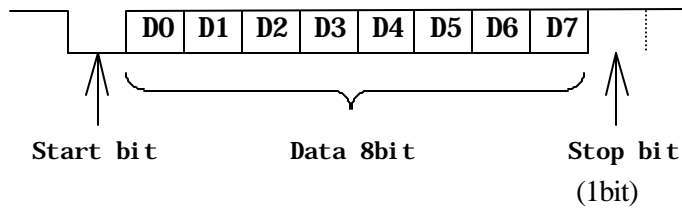
5:RC-Z2 Ask Filter position Data(23,00), ACK(06) then Camera return filter position Data (22,00,00). ACK (06)

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.



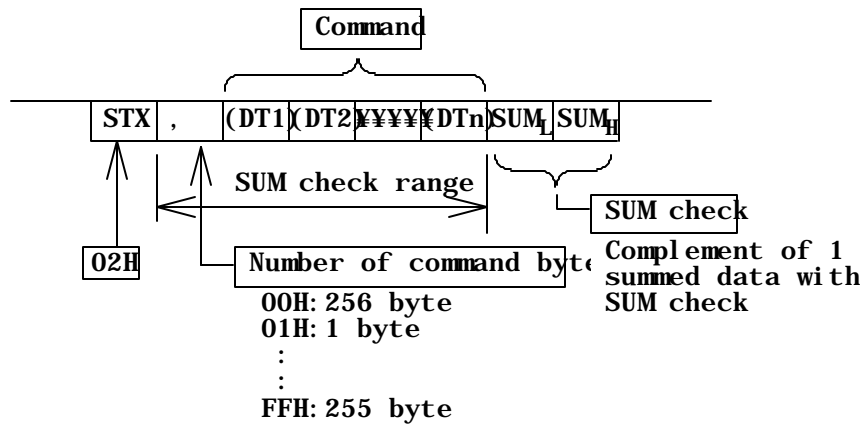
3. Character (1 byte) bit composition



4. Message composition

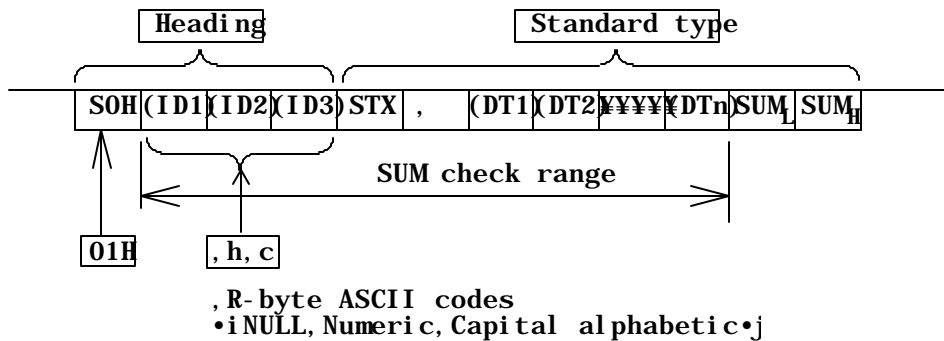
4.1 Standard type

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



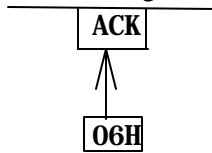
4.2 Extended type with heading

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

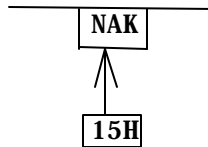
Returns ACK when the received message has no transfer errors.



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

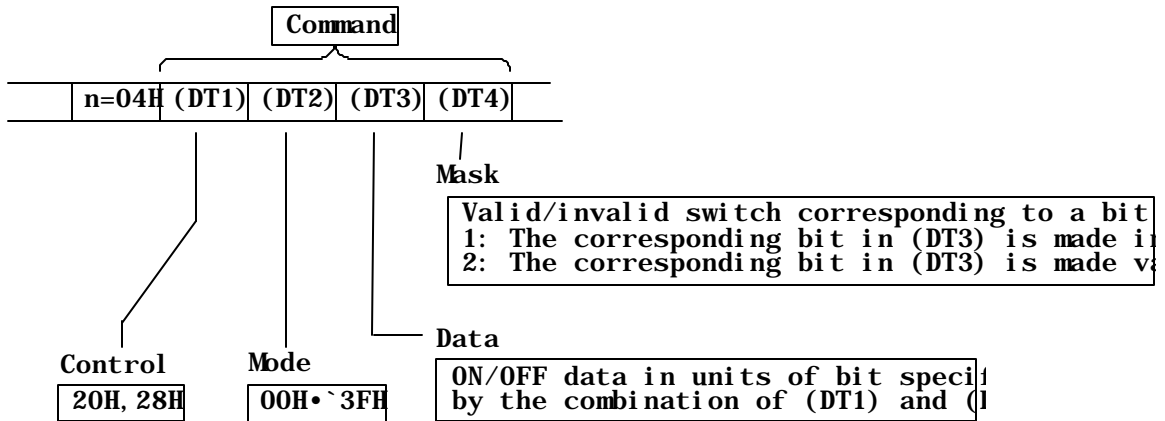
5. Configuration of command

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

5.1 ON/OFF control commands

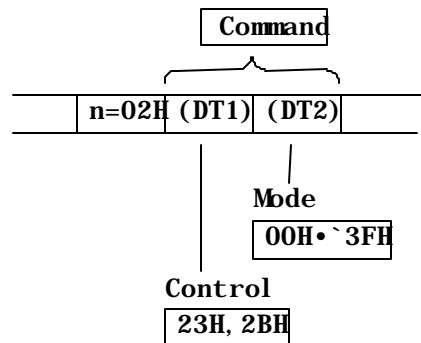
(Setting command of each function, response request commands, response commands)

(1) Setting commands



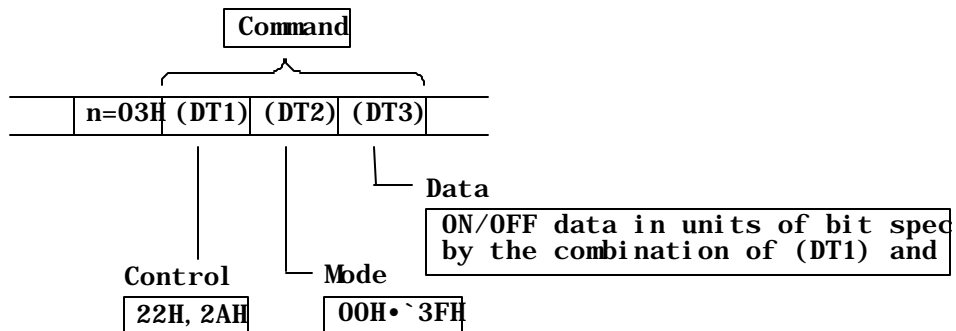
(2) Response request commands

Request the data specified by the mode of setting commands.



(3) Response commands

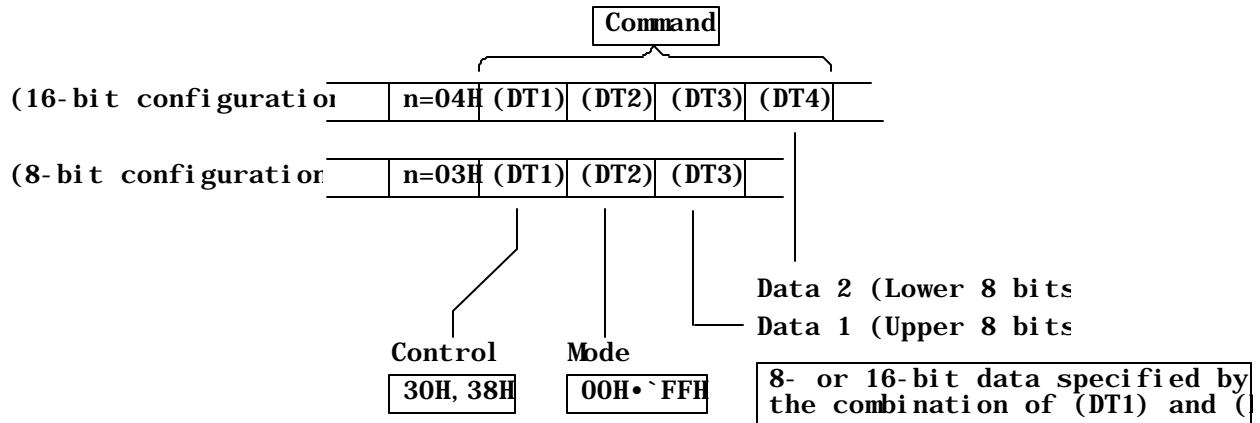
Response the data specified by the mode of setting commands.



5.2 Analog control commands

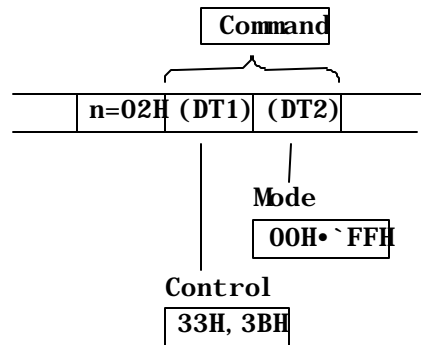
(Setting commands of each analog data, response request command, response commands)

(1) Setting commands



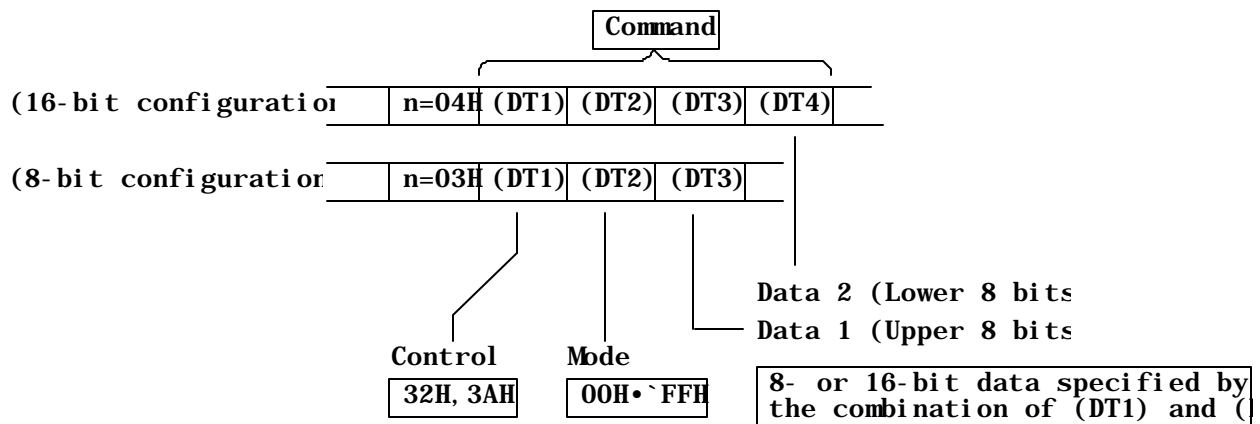
(2) Response request commands

Request the data specified in the mode of setting commands.



(3) Response commands

Response the data specified in the mode of setting commands.

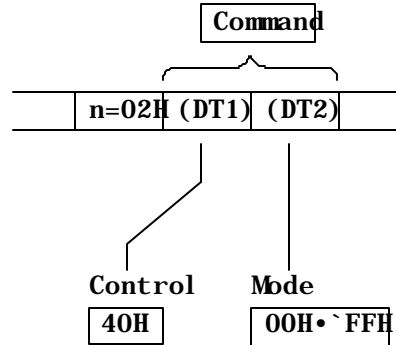


5.3 Auto function control commands

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

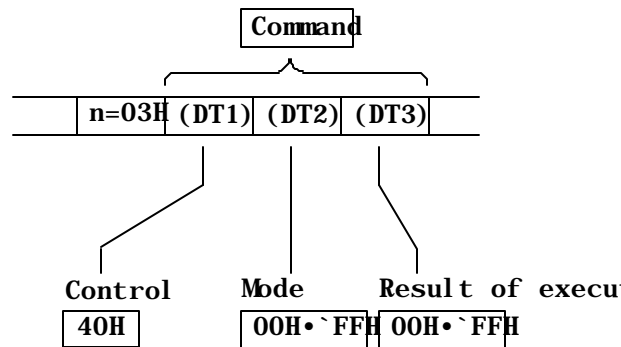
(1) Setting commands

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



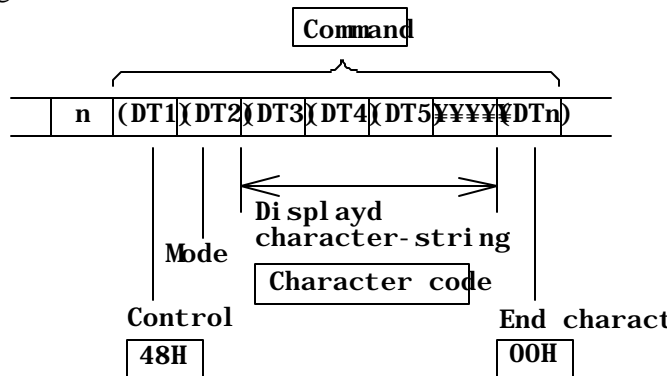
(2) Response commands

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.

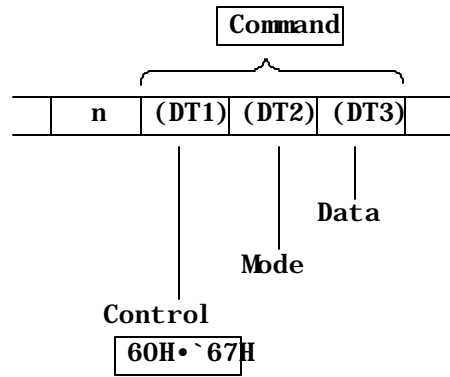
5.5 File control commands

(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.

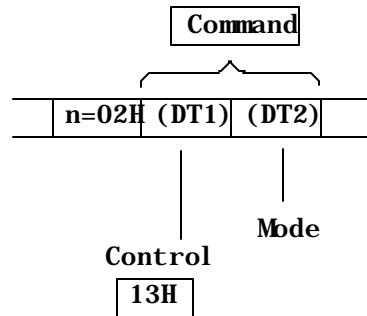
For details, see the command list for each camera.



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

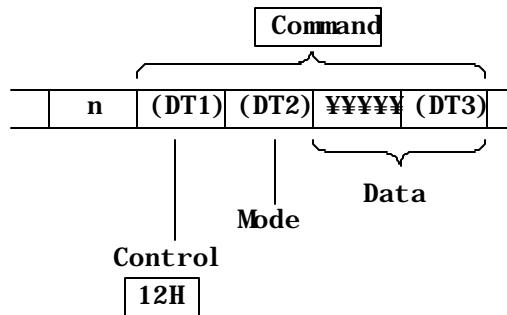
(1) Response request commands

Request the data specified by mode.



(2) Response commands

Response the data corresponding to mode.



Technical information: Command List for HV-D30 **MODE 1** Remote Control
 (The same commands which are used by the HV-C20/D15)

16.May.2002

The Hitachi HV-D30 series color cameras are provided with functions which can be controlled from a PC. This information is prepared to explain the commands corresponding to the respective control items. For remote control procedure, see Technical Information entitled Protocol for remote control.

To control the HV-D30 camera using remote control commands that are the same as those used for the HV-D25 or HV-C20, set the "REMOTE TYPE" item in "MODE 1" in the "OTHER FUNC" menu screen.

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 to 1 to disable control.

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

When the name of the item in column (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			1
		1			1
		2			1
		3			1
		4			1
		5	GAIN	0	S
		6		1	S
		7			1
	02H	0			1
		1	GAMMA OFF		S
		2	KNEE OFF		S
		3	WHITE CLIP OFF		S
		4	DETAIL OFF		S
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 enabled.

CAP ON(Set only,not memory)

IRIS closes when it is "CAP ON".

GAIN

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

	NORM 0dB	HIGH 1-12dB	MAX 13-24dB	-	(DT4)
0	0	1	0	1	9FH
1	0	0	1	1	

NORM:0dB

HIGH: (1 to 12dB) It becomes the GAIN level set up by the 2806H command.

MAX: (13 to 24dB) It becomes the GAIN level set up by the 2807H command.

(DT1)	(DT2)	(DT3)			(DT4)
CTL	MODE	Bit	Item		MASK
20H	04H	0	IRIS MODE	0	S
		1		1	S
23H	04H	2	WHITE BAL MODE	0	S
22H		3		1	S
	04H	4	AGC MODE	0	S
		5		1	S
		6			
		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	SOFT DTL ON (Always Hi)	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 control of the lens.

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	F3H
1	0	0	1	1	

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

AUTO : AGC ON

SHUTTER command

(DT1)	(DT2)	(DT3)																	
		bit	OFF	SHUTTER PRESET										VAR.	AES	EXT			
				1/100 (1/60)	1/250	1/500	1/1000	1/2000	1/4000	1/10000	1/20000	1/40000	1/100000						
20H	05H	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
		1	-	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
		2	-	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
		3	-	1	0	1	0	1	0	1	0	1	0	1	0	-	-	-	
		4	-	0	1	1	0	0	1	1	0	0	1	0	1	-	-	-	
		5	-	0	0	0	1	1	1	1	1	0	0	0	0	-	-	-	
		6	-	0	0	0	0	0	0	0	0	1	1	1	1	-	-	-	
		7	-	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	
(DT4)		FEH	00H	00H	00H	00H	00H	00H	00H	00H	00H	00H	00H	00H	F8H	F8H	F8H		

1/100 become 1/60 in PAL.

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

AES : AES ON

EXT : External trigger mode

(DT1)	(DT2)	(DT3)		(DT4)
CTL	MODE	Bit	Item	MASK
20H 23H 22H	07H	0		1
		1		1
		2	DTL	0 S
		3		1 S
		4	ALC PEAK/AVE	0 S
		5		1 S
		6		1
		7		1
	08H	0	BAR/CAM	S
		1	CONTRAST	0 S
		2		1 S
		3	MONO ON	S
		4	NEGA ON	1
		5		1
		6	SETUP OFF	S
	7	MESSAGE RTN ON	S	
	09H	0		1
		1		1
		2		1
		3	DIGITAL TEST ON	S
		4	TEST SAW ON	S
		5		1
		6		1
	7		1	
	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	

DTL

If DETAIL ON (20.02.00.EF).

	VARIABLE	LOW	NORMAL	HIGH	(DT4)
0	0	1	0	1	F3H
1	0	0	1	1	

VARIABLE : The setting of variable DTL by

"DETAIL (302CH)" command is enabled.

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

CONTRAST

	OFF	MIDDLE	HIGH	-	(DT4)
0	0	1	1	0	F9H
1	0	0	1	1	

SETUP OFF

The 7.5 IRE SETUP is added to the video signal in case of "SETUP ON".

MESSAGE RTN

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

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

COLOR DTL IND (Set Only, No Memory)

When the following function is adjusted, the detail in the selected color can be changed.

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 becomes 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 VBS/HD VD	S
	7	GL IN 75 / HIGH	S	
	15H	0	D.N.R. MODE	0 S
		1		1 S
		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

Allows remote control of the camera by simulating the menu switches on the rear of the camera.

(Note) Be sure to switch the bit back to Low when you set up each bit in Hi.

OUTPUT SEL

	RGB	Y/R-Y/B-Y	Y/C,VBS	-	(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

VBS	HD / VD	(DT4)
0	1	BFH

GL IN 75 /HIGH

75	HIGH	(DT4)
0	1	7FH

D.N.R. MODE

	OFF	MODE1	MODE2	-	(DT4)
0	0	1	1	0	FCH
1	0	0	1	1	

INDICATOR DISPLAY

The indication mode of each detection area is chosen.

	OFF	WHT / BLK	-----	FOCUS GATE	(DT4)
0	0	1	0	1	F3H
1	0	0	1	1	

WHT/BLK : The detection indicator of WHT is displayed normally.

Detection indicator of ABB is displayed if ABB ON .

FOCUS GATE : The indicator of FOCUS GATE is displayed.

(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	
	1CH	0	D.GAIN UP	0	S
		1		1	S
		2			1
		3			1
		4			1
		5			1
		6			1
	7			1	
	20H	0	COLOR DTL PHASE ch1	0	S
		1		1	S
		2	2	S	
		3			1
		4			1
5				1	
6				1	
7			1		
21H	0	COLOR DTL PHASE ch2	0	S	
	1		1	S	
	2	2	S		
	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	

D.GAIN UP

	OFF	+6dB	+12dB	-	(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	FCH
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	FCH
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).

(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
	33H	0	Pixel correct ON		S
		1			1
		2			1
		3			1
		4			1
		5			1
		6			1
		7			1
	35H	0	COLOR DTL CH SEL		S
		1			1
		2			1
		3			1
		4			1
		5			1
		6			1
		7			1
	36H	0	EXT TRIGGER MODE	0	S
		1		1	S
		2			1
		3			1
4				1	
5		TRIGGER POLARITY		S	
6		WRITE ENABLE		S	
7				1	

DTL BOOST FREQ

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

COLOR DTL CH SEL

	ch1	ch2	(DT4)
0	0	1	FEH

EXT TRIGGER MODE

	MODE1	MODE2	---	---	(DT4)
0	0	1	0	1	FCH
1	0	0	1	1	

TRIGGER POLARITY

	NEGATIVE	POSITIVE	(DT4)
0	0	1	DFH

(EXT TRIG) WRITE ENABLE

	NEGATIVE	POSITIVE	(DT4)
0	0	1	BFH

(DT1)	(DT2)	(DT3)		(DT4)	
CTL	MODE	Bit	Item	MASK	
20H 23H 22H	37H	0	EXT TRIGGER	0	
		1	DELAY TIME	0	
		2	02H (2H count)	0	
		3	14H (20H count)	0	
		4		0	
		5		1	
		6		1	
	7		1		
	38H	0		0	S
		1	FOCUS SIGNAL	1	S
		2	SELECT	2	S
		3			1
		4	FOCUS DETECT FIELD		S
		5			1
		6			1
	7	FOCUS LEVEL DEP. ON		S	
	39H	0	COMB FILTER ON		S
		1			1
		2			1
		3			1
		4			1
5				1	
7				1	

EXT TRIGGER DELAY TIME

00H, 01H :don't care

Selection of FOCUS signal resource

	DTL SUM	H-DTL	V-DTL	H-DTLL (LOW)	H-DTLM (MIDDLE)	(DT4)
0	0	1	0	1	0	F8H
1	0	0	1	1	0	
2	0	0	0	0	1	

FOCUS DETECT FIELD

	ODD	ODD & EVEN	(DT4)
0	0	1	EFH

For Normal use, Please use the ODD mode.

(DT1)	(DT2)	(DT3)		(DT4)	
CTL	MODE	Bit	Item	MASK	
28H 2BH 2AH	00H	0	ID DISPLAY	0	S
		1		1	S
		2	TITLE DISPLAY	0	S
		3		1	S
		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	SHADING MODE	0	S
		3		1	S
		4	FLD/FRM		S
		5	ALC GATE SEL2	0	1
		6		1	1
	7	CAMERA MODE		S	
	06H	0	GAIN HIGH		0
		1	01H (+1dB) /		0
		2	0CH (+12dB)		0
		3			0
		4			1
		5			1
		6			1
	07H	0	GAIN MAX		0
		1	0DH (+13dB) /		0
		2	18H (+24dB)		0
		3			0
		4			0
5				1	
6				1	
08H	0	AGC LIMIT		0	
	1	06H (+6dB) /		0	
	2	18H		0	
	3	(+24dB)		0	
	4			0	
	5			1	
	6			1	
7			1		

ID DISPLAY

	OFF	TOP	BOTTOM	-	(DT4)
0	0	1	0	1	FCH
1	0	0	1	1	

TITLE DISPLAY

	OFF	TOP	BOTTOM	-	(DT4)
0	0	1	0	1	F3H
1	0	0	1	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

SHADING MODE

	LUMINANCE	COLOR	FLAT	-	(DT4)
0	0	1	0	1	F3H
1	0	0	1	1	

FLD/FRM

FLD	FRM	(DT4)
0	1	EFH

ALC GATE SEL2

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

	GATE1	GATE2	GATE3	GATE4	(DT4)
0	0	1	0	1	9FH
1	0	0	1	1	

(Note) This command can do the setting of 4 patterns of "ALC GATE" out of 6 total patterns.

Use a 2828H (ALC GATE SEL1) command when the setting of 6 patterns is required.

CAMERA 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	LENS SELECTION		S
		3			1
		4			1
		5			1
		6			1
		7			1
	28	0	ALC GATE SEL1	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 SEL1

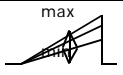

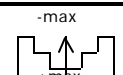
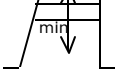
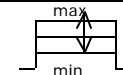


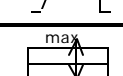
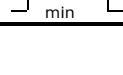
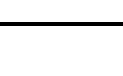
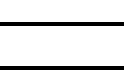


If ALC GATE:ON (28,00,80,7F).

	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)

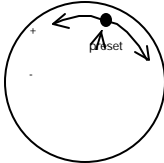
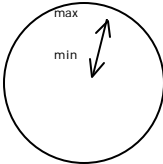
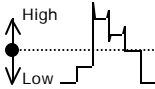
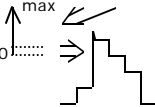
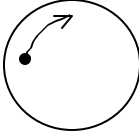
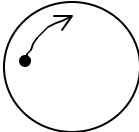
Note 1. X in the DATA column is undefined.

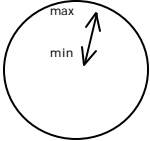
2. Setting data can be backed up to the EEPROM by the command MEMORY BACK UP.

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			
W.CLIP		13H	min	preset max		
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		
KNEE POINT		28H	min	preset max		
MASTER BLACK		2BH	min	preset max		
DETAIL		2CH	min preset max			
IRIS		2EH	CLOSE OPEN			
SC PHASE		33H	Under table reference			

SC PHASE									
SC COARSE	SC FINE	(DT3)		(DT4)					
0°	-128	00	00	00	00	00	XX	XX	XX
	0	00	10	00	00	00	XX	XX	XX
	+127	00	11	11	11	11	XX	XX	XX
90°	-128	01	00	00	00	00	XX	XX	XX
	0	01	10	00	00	00	XX	XX	XX
	+127	01	11	11	11	11	XX	XX	XX
180°	-128	10	00	00	00	00	XX	XX	XX
	0	10	10	00	00	00	XX	XX	XX
	+127	10	11	11	11	11	XX	XX	XX
270°	-128	11	00	00	00	00	XX	XX	XX
	0	11	10	00	00	00	XX	XX	XX
	+127	11	11	11	11	11	XX	XX	XX

Item	(DT1)	(DT2)	(DT3)U , (DT4)D
	CTL	MODE	DATA
H.PHASE	30H	34H	-128 0 +127
	33H		80XXH / 00XXH / 7FXXH / SINGED
SHUTTER VARIABLE	32H	38H	<u>NTSC:CCD MODE:FLD</u>
			| INTEGRATION | | LOCK SCAN |
			4s 1/30s , 1/59.94s 1/124144s
			FF88H FFFFH, 0000H 0126H
			<u>NTSC:CCD MODE:FRM</u>
			| INTEGRATION | | LOCK SCAN |
			8s 1/30s , 1/59.94s 1/124144s
			FF10H FFFFH, 0000H 0126H
			<u>PAL:CCD MODE:FLD</u>
			| INTEGRATION | | LOCK SCAN |
			4s 1/25s , 1/50.00s 1/123517s
			FF9CH FFFFH, 0000H 0158H
			<u>PAL:CCD MODE:FRM</u>
			| INTEGRATION | | LOCK SCAN |
			8s 1/25s , 1/50.00s 1/123517s
			FF38H FFFFH, 0000H 0158H
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	+ preset - 	
G HUE CROMA COMPEN		41H	80XXH / 00XXH / 7FXXH / 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	80XXH / 00XXH / 7FXXH / SINGED	
B SAT CROMA COMPEN		48H		
Y SAT CROMA COMPEN		49H		
C SAT CROMA COMPEN		4AH		
M SAT CROMA COMPEN		4BH		
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 (Color Detail 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 (Color Detail PHASE)		59H	Sets color detail phase -128 0 127 80XXH / 00XXH / 7CXXH 	
COLOR DTL ch1 WIDTH (Color Detail WIDTH)		5AH	Selects color phase range for setting -128 (-120°) 0 (0°) 127 (+120°) 80XXH / 00XXH / 7FXXH / SINGED	
COLOR DTL ch2 LEVEL (Color Detail GAIN)		6AH	Sets color detail level 0 1 2 (magnification) 80XXH / 00XXH / 7EXXH SINGED: Upper 7 bits are effective. 128 steps.	
COLOR DTL ch2 PHASE (Color Detail PHASE)		6BH	Sets color detail phase -128 0 127 80XXH / 00XXH / 7CXXH 	
COLOR DTL ch2 WIDTH (Color Detail 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 AA00H 0000H AC00H 0000H	RIGHT 5600H (NTSC) 5300H (PAL)
WHITE GATE V POSI	32H	A3	UP CA00H 0000H C200H 0000H	DOWN 3600H (NTSC) 3D00H (PAL)
CHROMA GAIN		A4	min 80XXH / 00XXH / 7FXXH	max 
IRIS GAIN		A5	min -10 F6XXH / 00XXH / 0AXXH	max 0 10
AES LIMIT		B0	NTSC: 1/514.6s 1/124144s 00E8H 0126H	PAL: 1/511.3s 1/123517s 011AH 0158H
FOCUS DETECT GATE H START ADDRESS		B1H	0 740 (NTSC), 0000H 02E4H,	724 (PAL) 02D4H
FOCUS DETECT GATE V START ADDRESS		B2H	0 230(NTSC) , 0000H 00E6H,	274(PAL) 0112H
FOCUS DETECT GATE H WIDTH		B3H	10 750(NTSC) , 000AH 02EEH,	734(PAL) 02DEH
FOCUS DETECT GATE V WIDTH		B4H	10 240(NTSC) , 000AH 00F0H ,	284(PAL) 011CH
FOCUS DETECT LEVEL DEPEND UPPER DATA		B5H	30% 001EH	200% 00C8H
FOCUS DETECT LEVEL DEPEND LOWER DATA		B6H	0% 0000H	50% 0032H
FOCUS DETECT CRISP		B7H	0% 0000H	12.5% (1024 STEP) 03FFH

Item	(DT1)	(DT2)	(DT3) , (DT4), (DT5), (DT6)	
	CTL	MODE	DATA	
FOCUS DETECT DATA (READ ONLY)	33H 32H	B8H	MIN 00000000H	MAX FFFFFFFH

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

Note: After executing the command, 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" 24H: "NG", "LONG SHUTTER MODE", "CHANGE SHUTTER MODE" 25H: "NG", "EXT TRIGGER", "CHANGE SHUTTER MODE" 07H: When a menu screen is indicated, "auto function" doesn't move.
AUTO BLACK	40H	20H	40H	00H	00H: "OK" 11H: "NG", "CHANGE TO CAM" 18H: "NG", "???" 07H: When a menu screen is indicated, "auto function" doesn't move.
AUTO SHADING	40H	30H	40H	00H	00H: "OK" 11H: "NG", "CHANGE TO CAM" 13H: "NG", "LOW LIGHT" 14H: "NG", "HIGH LIGHT" 24H: "NG", "LONG SHUTTER MODE", "CHANGE SHUTTER MODE" 25H: "NG", "EXT TRIGGER", "CHANGE SHUTTER MODE"

4. SCENE file select

Note: 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)
	CTL
MEMORY BACK UP1	61H

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)	
	CTL	CTL	CTL	
MEMORY BACK UP2	65H	20H	XXH	ON /OFF Command
		28H	XXH	ON /OFF Command
		30H	XXH	Analog Command

The memory command starts with 65H (DT1) and is the same data as the set command except code 65H is added to the head. The command codes are relocated in the memory backup mode. DT1 becomes 65H, former DT1 is now DT2, former DT2 is now DT3, etc.

Example:

Set Command.

DT1	DT2	DT3	DT4	
20H	08H	01H	FEH	(BAR)
20H	08H	00H	FEH	(CAM)

Memory Backup Command

DT1	DT2	DT3
65H	20H	08H

Note:

The memory backup writes data to the address of memory IC which was assigned in the unit by a command. The rewriting guarantee number to the same address of the memory IC used in the HV-D30 camera is 100,000 times. Therefore, please pay attention in the case that a memory backup command is used.

6. Camera state read: response request, commands, response commands

Item	(DT1)	(DT2)	(DT3),(DT4),(DT5)
	CTL	MODE	RESULT
CAMERA TYPE	13H	00H	(DT3) 65H: HV-D30
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
NTSC/PAL		05H	(DT3) 00H:NTSC,FFH:PAL

7. TITLE CHARACTER SET COMMANDS

Item	(DT1)	(DT2)	(DT3), (DT4),..., (DT14)
	CTL	MODE	RESULT
TITLE CHARA SET1	10H	06H	(DT3), (DT4),..., (DT14) ASCII code (12 characters)
TITLE CHARA SET2	48H	00H	(DT3), (DT4),..., (DT14) ASCII code (12 characters)

8 INITIALIZE COMMANDS

Item	(DT1)	(DT2)	(DT3)
	CTL	CTL	CTL
FACTORY INITIALIZE	90H	00H	FFH
ALL INITIALIZE			00H
LEVEL MENU INITIALIZE			02H
MASKING MENU INITIALIZE			03H
DTL MENU INITIALIZE			04H
DTL SUB MENU INITIALIZE			05H
GAMMA MENU INITIALIZE			06H

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

**Technical information: Command List for HV-D30 MODE 2 Remote Control
(Same as the commands used by the remote control box RC-Z3)**

16.May.2002

The Hitachi HV-D30 series color cameras are provided with functions that can be controlled from a PC. This information is prepared to explain the commands corresponding to the respective control items. For remote control procedure, see Technical Information entitled Protocol for remote control.

**To control the HV-D30 camera using remote control commands that are the same as those used by the remote control box RC-Z3,
Set the "REMOTE TYPE" item in "MODE 2" using the "OTHER FUNC" menu screen.**

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 to disable control.

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	DETAIL OFF	S
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 enabled.

CAP ON (Set only, not memory)

IRIS closes when it is "CAP ON".

GAIN

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

Refer to page 3 for the details of the GAIN command.

(DT1)	(DT2)	(DT3)	(DT4)
-------	-------	-------	-------

CTL	MODE	Bit	Item	MASK	
20H	04H	0	IRIS MODE	0	S
		1		1	S
23H	04H	2	WHITE BAL MODE	0	S
22H		3		1	S
	04H	4	AGC MODE	0	S
		5		1	S
		6			
		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	SOFT DTL ON (Always Hi)		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	F3H
1	0	0	1	1	

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

AUTO : AGC ON

SHUTTER

Refer to page 3 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	COH	
		1	0	0	0	0	0	0	0	1	1	1	1	1	0		
		2	0	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		0
		4	0	1	0	0	1	0	0	1	0	0	1	0	0		0
5	0	0	1	0	0	0	1	0	0	1	0	0	1	0	0		

(DT1)	(DT2)		(DT3)												(DT4)
		bit	13dB	14dB	15dB	16dB	17dB	18dB	19dB	20dB	21dB	22dB	23dB	24dB	
20H	01H	0	0	0	1	1	1	0	0	0	1	1	1	0	COH
		1	0	0	0	0	0	1	1	1	1	1	1	0	
		2	1	1	1	1	1	1	1	1	1	1	1	0	
		3	0	0	0	0	0	0	0	0	0	0	0	1	
		4	1	0	0	1	0	0	1	0	0	1	0	0	
5	0	1	0	0	1	0	0	0	1	0	0	1	0	0	

SHUTTER command

(DT1)	(DT2)	(DT3)														(DT4)		
		bit	OFF	SHUTTER PRESET										VAR.	AES		EXT	
				1/100 (1/60)	1/250	1/500	1/1000	1/2000	1/4000	1/10000	1/20000	1/40000	1/100000					
20H	05H	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		1	-	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
		2	-	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
		3	-	1	0	1	0	1	0	1	0	1	0	1	0	-	-	-
		4	-	0	1	1	0	0	1	1	0	0	0	1	-	-	-	
		5	-	0	0	0	1	1	1	1	0	0	0	-	-	-		
		6	-	0	0	0	0	0	0	0	1	1	1	-	-	-		
7	-	0	0	0	0	0	0	0	0	0	0	-	-	-				
(DT4)		FEH	00H	00H	00H	00H	00H	00H	00H	00H	00H	00H	00H	F8H	F8H	F8H		

1/100 become 1/60 in PAL.

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

AES : AES ON

EXT : External trigger mod

(DT1)	(DT2)	(DT3)		(DT4)
CTL	MODE	Bit	Item	MASK
20H 23H 22H	07H	0		1
		1		1
		2	DTL	0 S
		3		1 S
		4	ALC PEAK/AVE	0 S
		5		1 S
		6		1
	7		1	
	08H	0	BAR/CAM	S
		1	CONTRAST	0 S
		2		1 S
		3	MONO ON	S
		4	NEGA ON	1
		5		1
		6	SETUP OFF	S
	7	MESSAGE RTN ON	S	
	09H	0		1
		1		1
		2		1
		3	DIGITAL TEST ON	S
		4	TEST SAW ON	S
		5		1
		6		1
	7		1	
	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		

DTL

If DETAIL ON (20.02.00.EF).

	VARIABLE	LOW	NORMAL	HIGH	(DT4)
0	0	1	0	1	F3H
1	0	0	1	1	

VARIABLE : The setting of variable DTL by

"DETAIL (302CH)" command is enabled.

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

CONTRAST

	OFF	MIDDLE	HIGH	-	(DT4)
0	0	1	1	0	F9H
1	0	0	1	1	

SETUP OFF

The 7.5 IRE SETUP is added to the video signal in case of "SETUP ON".

MESSAGE RTN

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

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

COLOR DTL IND (Set Only, No Memory)

When the following function is adjusted, the detail in the Selected color can be changed.

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 VBS/HD/VD	S	
		7	GL IN 75 /HIGH	S	
	15H	0	D.N.R. MODE	0	S
		1		1	S
		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

Allows remote control of the camera by simulating the menu switches on the rear of the camera.

(Note) Be sure to switch the bit back to Low when you set up each bit in Hi.

OUTPUT SEL

	RGB	Y/R-Y/B-Y	Y/C, VBS	-	(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

VBS	HD / VD	(DT4)
0	1	BFH

GL IN 75 /HIGH

75	HIGH	(DT4)
0	1	7FH

D.N.R. MODE

	OFF	MODE1	MODE2	-	(DT4)
0	0	1	1	0	FCH
1	0	0	1	1	

INDICATOR DISPLAY

The indication mode of each detection area is chosen.

	OFF	WHT / BLK	-----	FOCUS GATE	(DT4)
0	0	1	0	1	F3H
1	0	0	1	1	

WHT/BLK : The detection indicator of WHT is displayed normally.

Detection indicator of ABB is displayed if ABB ON .

FOCUS GATE : The indicator of FOCUS GATE is displayed.

(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
	1CH	0	D.GAIN UP	0	S
		1		1	S
		2			1
		3			1
		4			1
		5			1
		6			1
		7			1
	20H	0	COLOR DTL PHASE ch1	0	S
		1		1	S
		2		2	S
		3			1
		4			1
		5			1
		6			1
		7			1
	21H	0	COLOR DTL PHASE ch2	0	S
		1		1	S
		2		2	S
		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	

D.GAIN UP

	OFF	+6dB	+12dB	-	(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	FCH
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	FCH
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).

(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	
	33H	0	Pixel correct ON		S
		1			1
		2			1
		3			1
		4			1
		5			1
		6			1
	7			1	
	35H	0	COLOR DTL CH SEL		S
		1			1
		2			1
		3			1
		4			1
		5			1
		6			1
	7			1	
	36H	0	EXT TRIGGER MODE	0	S
		1		1	S
		2			1
		3			1
4				1	
5		TRIGGER POLARITY		S	
6		WRITE ENABLE		S	
7			1		

DTL BOOST FREQ

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

COLOR DTL CH SEL

	ch1	ch2	(DT4)
0	0	1	FEH

EXT TRIGGER MODE

	MODE1	MODE2	---	---	(DT4)
0	0	1	0	1	FCH
1	0	0	1	1	

TRIGGER POLARITY

	NEGATIVE	POSITIVE	(DT4)
0	0	1	DFH

(EXT TRIG) WRITE ENABLE

	NEGATIVE	POSITIVE	(DT4)
0	0	1	BFH

(DT1)	(DT2)	(DT3)		(DT4)	
CTL	MODE	Bit	Item	MASK	
20H 23H 22H	37H	0	EXT TRIGGER	0	
		1	DELAY TIME	0	
		2	02H (2Hcount)	0	
		3	14H (20Hcount)	0	
		4		0	
		5		1	
		6		1	
		7		1	
	38H	0	FOCUS SIGNAL	0	S
		1		1	S
		2	SELECT	2	S
		3			1
		4	FOCUS DETECT FIELD		S
		5			1
		6			1
		7	FOCUS LEVEL DEP. ON		S
	39H	0	COMB FILTER ON		S
		1			1
		2			1
		3			1
		4			1
5				1	
7				1	

EXT TRIGGER DELAY TIME

00H, 01H: don't care

Selection of FOCUS signal source

	DTL SUM	H-DTL	V-DTL	H-DTLL (LOW)	H-DTLM (MIDDLE)	(DT4)
0	0	1	0	1	0	F8H
1	0	0	1	1	0	
2	0	0	0	0	1	

FOCUS DETECT FIELD

	ODD	ODD & EVEN	(DT4)
0	0	1	EFH

For normal use, Please use the ODD mode.

(DT1)	(DT2)	(DT3)		(DT4)	
CTL	MODE	Bit	Item	MASK	
28H 2BH 2AH	00H	0	ID DISPLAY	0	S
		1		1	S
		2	TITLE DISPLAY	0	S
		3		1	S
		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	SHADING MODE	0	S
		3		1	S
		4	FLD/FRM		S
		5			1
		6			1
	7	CAMERA MODE		S	
	08H	0	AGC LIMIT		S
		1	06H (+6dB)		S
		2	18H (+24dB)		S
		3			S
		4			S
5				1	
6				1	
7			1		

ID DISPLAY

	OFF	TOP	BOTTOM	-	(DT4)
0	0	1	0	1	FCH
1	0	0	1	1	

TITLE DISPLAY

	OFF	TOP	BOTTOM	-	(DT4)
0	0	1	0	1	F3H
1	0	0	1	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

SHADING MODE

	LUMINANCE	COLOR	FLAT	-	(DT4)
0	0	1	0	1	F3H
1	0	0	1	1	

FLD/FRM

FLD	FRM	(DT4)
0	1	EFH

CAMERA 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	LENS SELECTION		S
		3			1
		4			1
		5			1
		6			1
		7			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

Combines 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

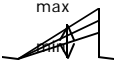

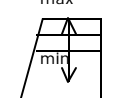

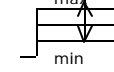

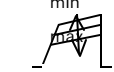
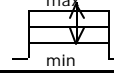

If ALC GATE:ON (28,00,80,7F).

	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)

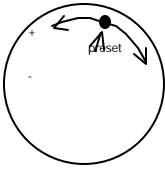
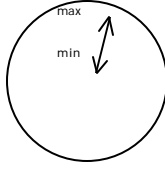
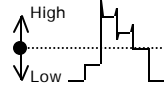
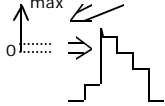
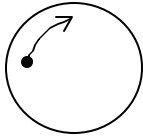
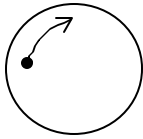
Note 1. X in the DATA column is undefined.

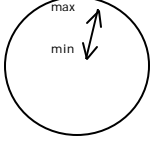
2. Setting data can be backed up to the EEPROM by the command MEMORY BACK UP.

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		03H	min	preset max		
B GAMMA		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				
SC PHASE	33H	Under table reference				

SC PHASE		(DT3)	(DT4)
SC COARSE	SC FINE		
0°	-128	00 00 00 00	00 XX XX XX
	0	00 10 00 00	00 XX XX XX
	+127	00 11 11 11	11 XX XX XX
90°	-128	01 00 00 00	00 XX XX XX
	0	01 10 00 00	00 XX XX XX
	+127	01 11 11 11	11 XX XX XX
180°	-128	10 00 00 00	00 XX XX XX
	0	10 10 00 00	00 XX XX XX
	+127	10 11 11 11	11 XX XX XX
270°	-128	11 00 00 00	00 XX XX XX
	0	11 10 00 00	00 XX XX XX
	+127	11 11 11 11	11 XX XX XX

Item	(DT1)	(DT2)	(DT3)u , (DT4)d
	CTL	MODE	DATA
H.PHASE	30H	34H	-128 0 +127
SHUTTER VARIABLE	33H		80XXH / 00XXH / 7FXXH / SINGED
		38H	<u>NTSC: CCD MODE: FLD</u> | INTEGRATION | | LOCK SCAN | 4s 1/30s , 1/59.94s 1/124144s FF88H FFFFH, 0000H 0126H
			<u>NTSC: CCD MODE: FRM</u> | INTEGRATION | | LOCK SCAN | 8s 1/30s , 1/59.94s 1/124144s FF10H FFFFH, 0000H 0126H
			<u>PAL: CCD MODE: FLD</u> | INTEGRATION | | LOCK SCAN | 4s 1/25s , 1/50.00s 1/123517s FF9CH FFFFH, 0000H 0158H
			<u>PAL: CCD MODE: FRM</u> | INTEGRATION | | LOCK SCAN | 8s 1/25s , 1/50.00s 1/123517s FF38H FFFFH, 0000H 0158H
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	+ preset -	
G HUE CROMA COMPEN		41H	80XXH / 00XXH / 7FXXH / SINGED	
B HUE CROMA COMPEN		42H		
Y HUE CROMA COMPEN		43H		
C HUE CROMA COMPEN		44H		
M HUE CROMA COMPEN		45H		
R SAT CROMA COMPEN	32H	46H	min max	
G SAT CROMA COMPEN		47H	80XXH / 00XXH / 7FXXH / SINGED	
B SAT CROMA COMPEN		48H		
Y SAT CROMA COMPEN		49H		
C SAT CROMA COMPEN		4AH		
M SAT CROMA COMPEN		4BH		
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 (Color Detail 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 (Color Detail PHASE)		59H	Sets color detail phase -128 0 127 80XXH / 00XXH / 7CXXH	
COLOR DTL ch1 WIDTH (Color Detail WIDTH)		5AH	Selects color phase range for setting -128 (-120°) 0 (0°) 127 (+120°) 80XXH / 00XXH / 7FXXH / SINGED	
COLOR DTL ch2 LEVEL (Color Detail GAIN)		6AH	Sets color detail level 0 1 2 (magnification) 80XXH / 00XXH / 7EXXH SINGED: Upper 7 bits are effective. 128 steps.	
COLOR DTL ch2 PHASE (Color Detail PHASE)		6BH	Sets color detail phase -128 0 127 80XXH / 00XXH / 7CXXH	
COLOR DTL ch2 WIDTH (Color Detail 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	A2	LEFT	RIGHT
	33H		AA00H 0000H 5600H (NTSC)	
WHITE GATE V POSI	32H	A3	UP	DOWN
			CA00H 0000H 3600H (NTSC)	
CHROMA GAIN		A4	min	max
			80XXH / 00XXH / 7FXXH	
IRIS GAIN		A5	min	max
			-10 0 10	F6XXH / 00XXH / 0AXXH
AES LIMIT		B0	NTSC:	
			1/514.6s / 1/124144s	00E8H / 0126H
AES LIMIT		B0	PAL:	
			1/511.3s / 1/123517s	011AH / 0158H
FOCUS DETECT		B1H	0 / 740 (NTSC), 724 (PAL)	
GATE H START ADDRESS			0000H / 02E4H, 02D4H	
FOCUS DETECT		B2H	0 230 (NTSC) , 274 (PAL)	
GATE V START ADDRESS			0000H / 00E6H, 0112H	
FOCUS DETECT		B3H	10 / 750 (NTSC) , 734 (PAL)	
GATE H WIDTH			000AH / 02EEH, 02DEH	
FOCUS DETECT		B4H	10 / 240 (NTSC) , 284 (PAL)	
GATE V WIDTH			000AH / 00F0H , 011CH	
FOCUS DETECT		B5H	30% / 200%	
LEVEL DEPEND			001EH / 00C8H	
UPPER DATA				
FOCUS DETECT		B6H	0% / 50%	
LEVEL DEPEND			0000H / 0032H	
LOWER DATA				
FOCUS DETECT		B7H	0% / 12.5% (1024 STEP)	
CRISP			0000H / 03FFH	

Item	(DT1)	(DT2)	(DT3) , (DT4), (DT5), (DT6)	
	CTL	MODE	DATA	
FOCUS	33H	B8H	MIN	MAX
DETECT DATA	32H		00000000H / FFFFFFFFH	
(READ ONLY)				

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

Note: After executing the command, 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" 24H: "NG", "LONG SHUTTER MODE", "CHANGE SHUTTER MODE" 25H: "NG", "EXT TRIGGER", "CHANGE SHUTTER MODE" 07H: When a menu screen is indicated, "auto function" doesn't move.
AUTO BLACK	40H	20H	40H	00H	00H: "OK" 11H: "NG", "CHANGE TO CAM" 18H: "NG", "???" 07H: When a menu screen is indicated, "auto function" doesn't move.
AUTO SHADING	40H	30H	40H	00H	00H: "OK" 11H: "NG", "CHANGE TO CAM" 13H: "NG", "LOW LIGHT" 14H: "NG", "HIGH LIGHT" 24H: "NG", "LONG SHUTTER MODE", "CHANGE SHUTTER MODE" 25H: "NG", "EXT TRIGGER", "CHANGE SHUTTER MODE"

4. SCENE file select

Note: Every time the "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)
	CTL
MEMORY BACK UP1	61H

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)	
	CTL	CTL	CTL	
MEMORY BACK UP2	65H	20H	XXH	ON/OFF Command
		28H	XXH	ON/OFF Command
		30H	XXH	Analog Command

The memory command starts with 65H (DT1) and is the same data as the set command except code 65H is added to the head. The command codes are relocated in the memory backup mode. DT1 becomes 65H, former DT1 is now DT2, former DT2 is now DT3, etc.

Example:

Set Command.

DT1	DT2	DT3	DT4	
20H	08H	01H	FEH	(BAR)
20H	08H	00H	FEH	(CAM)

Memory Backup Command

DT1	DT2	DT3
65H	20H	08H

(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 by a command. The rewriting guarantee number to the same address of the memory IC used in the HV-D30 camera is 100,000 times. Therefore, please pay attention in the case that a memory backup command is used.

6. Camera state read: response request, commands, response commands

Item	(DT1)	(DT2)	(DT3), (DT4), (DT5)
	CTL	MODE	RESULT
CAMERA TYPE	13H	00H	(DT3) 65H: HV-D30
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
NTSC/PAL		05H	(DT3) 00H:NTSC,FFH:PAL

7. TITLE CHARACTER SET COMMANDS

Item	(DT1)	(DT2)	(DT3), (DT4),..., (DT14)
	CTL	MODE	RESULT
TITLE CHARA SET	10H	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			00H
LEVEL MENU INITIALIZE			02H
MASKING MENU INITIALIZE			03H
DTL MENU INITIALIZE			04H
DTL SUB MENU INITIALIZE			05H
GAMMA MENU INITIALIZE			06H

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