PE1005S Command Communication Specification

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Precautions

Since the definitions of features in this specification are in progress, the contents of this document may change without prior notice.

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APPENDIX.A   Command Error Code List

APPENDIX.B   Initial value of parameters

1 Abstract

Host system and PE1005S communicates via GPIO and Serial interface (two wire system). In this document, above system communication is focused on Serial interface (two wire system).

Please refer to " PE1005S DATA SHEET " for the GPIO communication.

2 Electrical Specification

2.1 Terminal specification

- ISCL: Pin number 15
- ISDA: Pin number 16

2.2 Terminal description

ISCL: Input terminal for Serial interface (two wire system) bus clock

ISDA: input/output terminal for Serial interface (two wire system) data bus. 400kbps, 1.5kohm, need pull-up to 2.8V

2.3 D/C characteristics

Terminal	PRMeter	Value		Unit
		Min.	Max.	
ISCL,ISDA	VIH	1.96	3.1	V
	VIL	-0.3	0.56	V

2.4 Notice

PE1005S performs flow control for each byte, because the Serial interface (two wire system) communication is taken care by software. Therefore, ISCL that is driven by the master device is forced to low while PE1005S is processing the information. Be sure of connecting ISCL and ISDA as open drain. If ISCL and ISDA are not connected as open drain fashion, active low wired-OR logic, the flow control is not proceeding properly.

3 Serial interface (two wire system) communication specification

3.1 Slave address

8-bit address consists of 7-bit address and 1-bit direction pacifier. PE1005S uses address of 0x72 for write and 0x73 for read. PE1005S does not take care of general call.

3.2 Communication sequence

The communication between PE1005S and host system is performed in the way of one command to one response. Retry sequence is not included.

1 packet consists of 44 bytes fixed size is used for Serial interface (two wire system) communication. The details of data format and communication protocol will be discussed in the later chapters.

Host system send 1 packet of command data following specifying the write address to PE1005S and then send necessary amount of clocks to PE1005S to be able to obtain 1 packet of data from PE1005S.
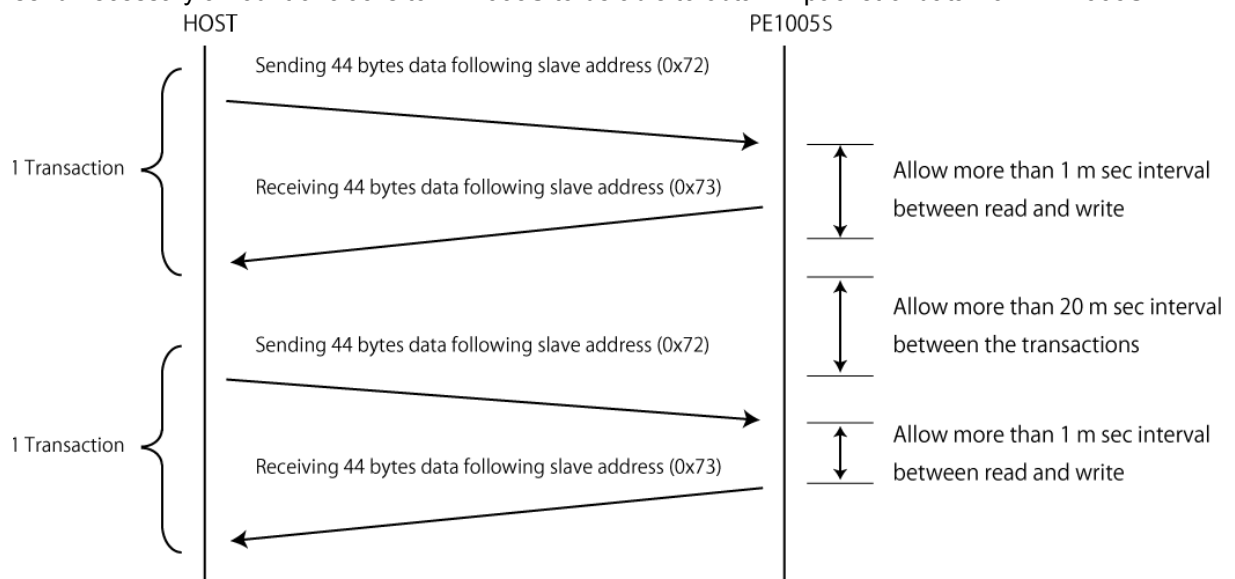
<Caution>
- Allow more than 1m sec of interval between write operation and read operation.
- Be sure to have more than 20 m sec interval between transactions.
- 44 byte of data is needed to be sent consecutively during transmission or reception.
- Data cannot be split when transmission or reception is performed.
- Recursive start is not supported.

3.3 Retry sequence

Basically, host and PE1005S communicate such that 1 response for 1 command. However, if read data returns as retry status, host should repeat read sequence until normal response is achieved.

<Caution>
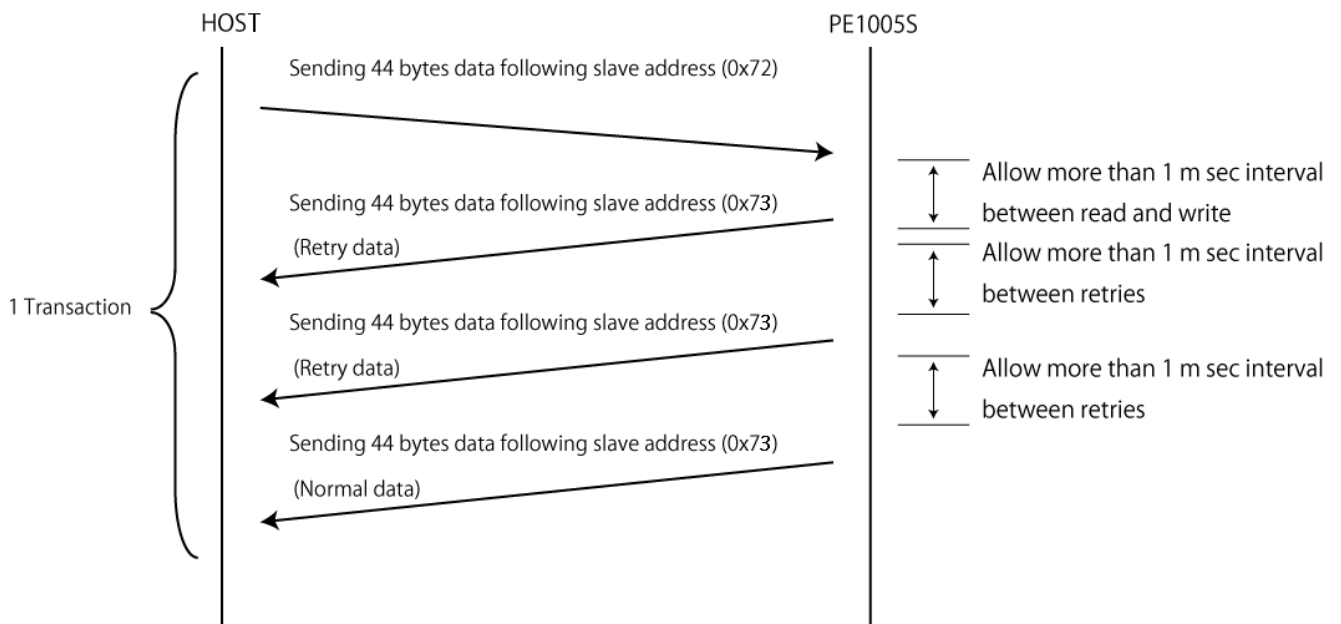
- Be sure allowing more than 1 m sec interval between write operation and read operation.
- Be sure allowing more than 1 m sec between each retry operation.
- In the retry sequence, the inversion of ALT bit does not occur.

3.4 Communication wave form

The following shows the wave forms of ISCL and ISDA at SERIAL INTERFACE (DOUBLE WIRE
SYSTEM) communication, read and write.


```
ISCL ⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍//⎍⎍⎍

ISDA  0 1 1 1 0 0 1 0      DATA0      DATA1 // DATA43

START ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾ ACK   Write DATA0 by HOST  ACK        ACK   STOP
COND.  Slave address 0x72 (write) from                       from     from   COND.
 by HOST                       CLIENT                        CLIENT  CLIENT by HOST
```
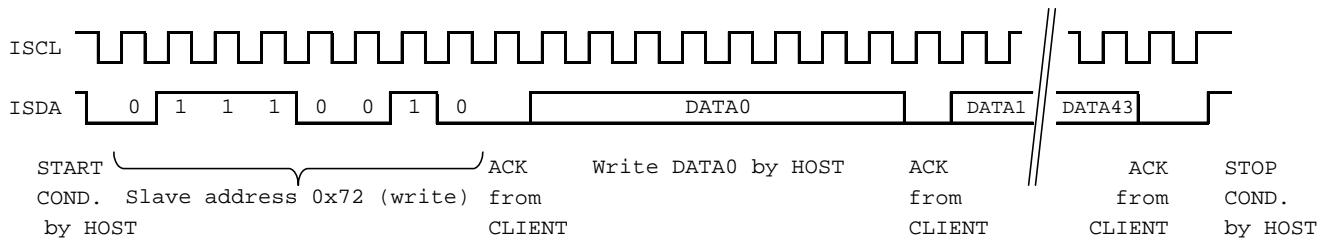
Diagram 1 Transmission sequence


```
ISCL ⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍⎍//⎍⎍⎍

ISDA  0 1 1 1 0 0 1 1        DATA0        DATA1 // DATA43

START ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾ ACK   Read DATA0 from CLIENT  ACK      NACK   STOP
COND.   Slave address 0x73 (read) from                       from     from   COND.
 by HOST                      CLIENT                         HOST     HOST  by HOST
```
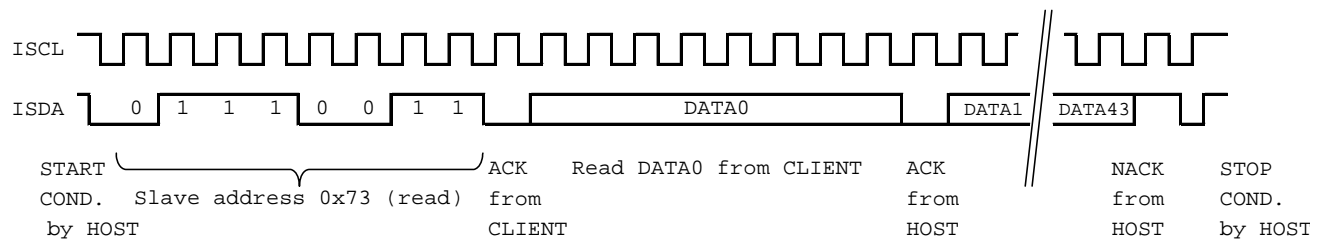
Diagram 2 Reception sequence

<Caution>

· ISCL is possibly forced to low while PE1005S performs low control where PE1005S responds
   ACK and ACK by CLIENT in the above diagram.

· At the last of Reception sequence, Host   should be replied with NACK.

4 Command protocol specification

4.1 Communication and the notation

Bit order of each byte for communication is MSB first. The byte order is treated as network byte order, big endian, for more than two byte data.

4.2 Packet format

44 byte packet data consists of two blocks, layer; protocol layer that takes care of data transmission protocol and command layer that defines the control command.

	Protocol layer			Command layer			Protocol layer		
Byte	0	1	2	3	4	· · ·	39	40	41	42	43
Name	PakHead		RTY	RSV	CommandLayer			RSV(=0)		PCS	

Reserved (Always 0)

RTRY (Retry)
0x00 Normal data
0x01 Retry data

PCS (Packet checksum)
Use to detect protocol error
Generation formula will be
discussed in the later chapter

Reserved (Always 0)

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Name	ALT	SR	RSV(=0)		PRS				RSV(=0)							

Reserved (Always 0)

Reserved (Always 0)

PRS (Packet receive status)
0x00   NOE (No Error)
0x01   CSE（PCS Error）
0x02   Reserved
0x03   RAE (Recovered ALT Bit Error)
Others Reserve

SR (Status reset)
0x00 NOP
0x01 Executing ALT Reset and
        shift ALT value in packet
        to ALT

ALT (Alternate bit)
Determine the completion of command transfer.

4.2.1   The details of protocol layer

4.2.1.1   ALT (Alternative bit)

ALT bit is used to confirm whether or not the communication between host system and PE1005S is completed correctly by alternating this bit at each transaction and then compare its status between host system and PE1005S. Please initialize ALT bit to 0.

While the communication between host system and PE1005S is normal, ALT bit is alternated at each transaction. PE1005S does not alternate ALT bit when PRS is NOE or other than PAE with such packet error or packet lost is detected.

4.2.1.2   SR (Status reset)

SR is used to reset protocol layer and then synchronize the status of ALT bit between host system and PE1005S.

SR bit is used when such as PE1005S turned on switching IPL to camera system to perform protocol reset.

A field is valid only when host system sends packet data. PE1005S send packet with this SR bit always 0.

4.2.1.3   PRS (Packet receive status)

PE1005S contains the status of data as a result of evaluating packet data from the host system.

The host system detects error by checking PRS bit from PE1005S.

The following table shows meaning of the error status

Code	Error Name	Causing factor
0x00	NOE	No Error
0x01	CSE	PCS mismatch
0x03	RAE	Recover ALT bit mismatch. This is not Error. Same as NOE

This field does not care a setting from host system. PE1005S ignores PRS field from the host system

4.2.1.4   RTY (Retry request)

If PE1005S is not ready to return requested data when host system issues read access, PE1005S returns RTY=1 repeatedly until the data will be ready to return to the host system.

Host system repeats Serial interface (two wire system) read access to complete command and then ready to receive the normal data.
   * Host system should allow more than 1 m sec interval before issue the next read access.

4.2.1.5 PCS (Packet checksum)

PCS is used to confirm correct data within the packet.

Checksum is generated by taking the bits from entire packet data except PCS itself.

PCS is generated by using the following formula

PCS = 0xffff - <Sum of byte from the target data>

   * Overflow due to the summation is ignored

4.3 Protocol sequence

Protocol sequence is discussed in this chapter

Let's call the packet data that are sent by the host system as H-Packet while the packet data that are sent by PE1005S (Client) as C-Packet.

4.3.1 Normal sequence
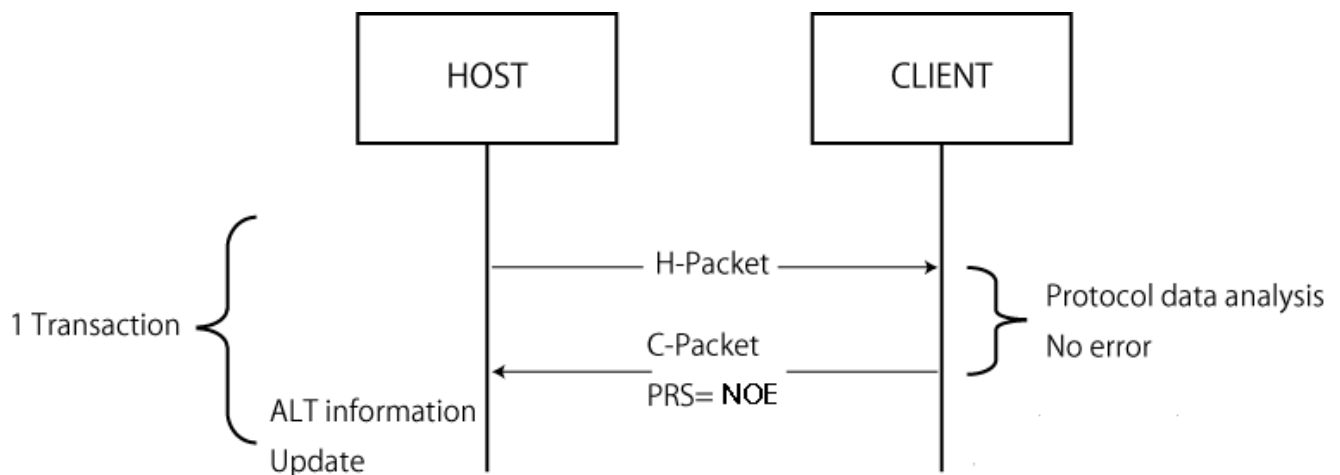
Diagram 3 Normal sequence

PE1005S returns the response as a result of analyzing command that is sent from the host system, when PE1005S receive the command. We call the event from issuing command to receiving the above response as a transaction.

- ・ Both PE1005S and the host system maintain the ALT bit information. ALT is initialized as 0.
- ・ Host system its copies ALT information to the packet data and then please send to PE1005S.
- ・ PE1005S compares its ALT state to received ALT state.
- ・ PE1005S takes the following actions if confirm both ALT bits status matches
    1. Returns the response
    2. Invert the ATL bit
    3. Execute the command
- ・ Host system compares its ALT as well, and invert the ATL bit if confirm both ALT bits status matches

4.3.2 ALT Reset sequence

As a result of executing this sequence, mismatched ALT bits between host system and PE1005S are both reset to synchronize by copying ALT bit state from host system to PE1005S.

(Execution of this ALT Reset sequence does not provide any bad influence to the communication.)
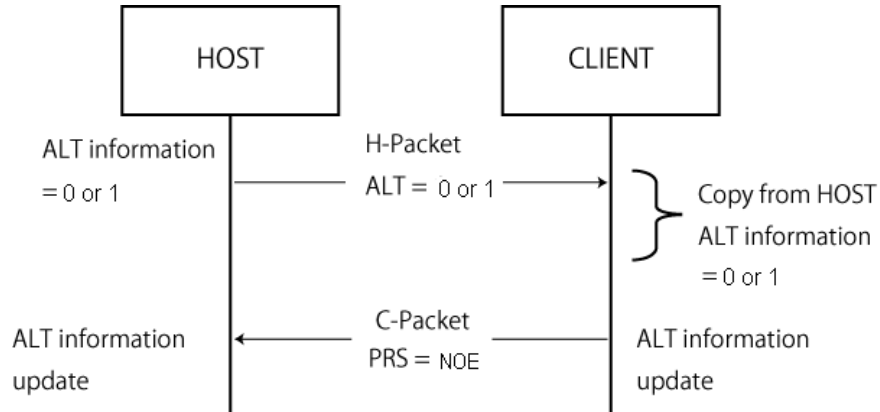
Diagram 4 ALT Reset Sequence

Host system send the packet with SR=1 in the " PakHead" field to PE1005S.

PE1005S copies ALT bit information from received packet data, if no error is detected as a result of packet transmission. After that PE1005S resend PRS= NOE response.

PE1005S update its ALT information when complete to send PRS=NOE response.

Host needs update its ALT information when receive PRS=NOE response.

4.3.3 HOST detect Error

Describe protocol error detect from HOST.

Type of Error		Description	Recover from Errors
Major division	Small division		
send Errors from PE1005S	PRS = 0x01 (PCS Error)	Mismatching calculated result PCS which received from PE1005S with PCS in the packet.	Execute Error recover sequence
HOST detect Errors	Mismatching PCS	Mismatching calculated result PCS which received from the HOST with PCS in the packet.	Execute Error recover sequence
	Reception time out	PE1005S does not response more than uniformity in time. Recommended time for Timeout is over **500ms.** This Error is arbitrarily implementation.	

4.3.4 Error Recover sequences

When HOST detect protocol error, try to recover error from recover sequence
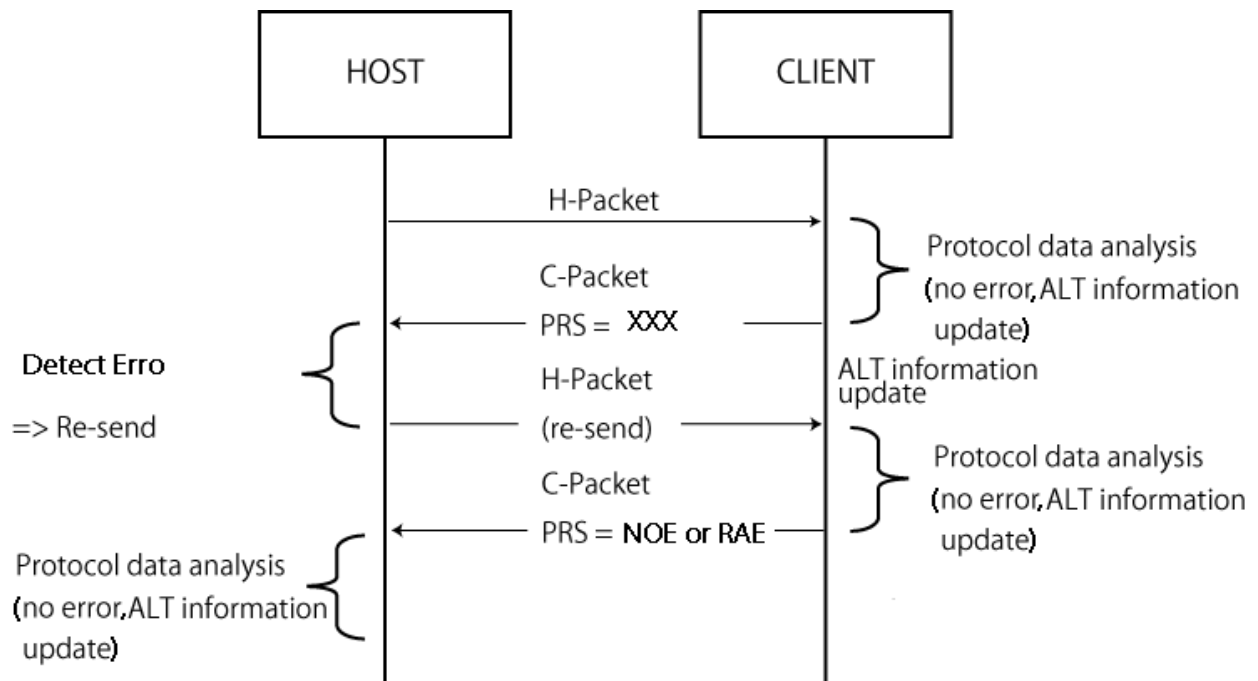
Diagram 5 Error recover sequence

Re-send the packet until receive PRS= NOE or RAE response (*) from CLIENT.

* Recommended number of retry is about 5 times. If retry out occurs, the host system should concludes it as an abnormal termination of transaction. In case of detecting abnormal transaction termination, please check whether or not PE1005S has problem or transmission system has problem.

5 Command layer specification

5.1 Command layer format

In this chapter, command layer format is discussed.

Command layer consists of 36 bytes data.

The structure depends on commands from HOST to Client or responses from CLIENT to HOST.

5.1.1 Commands from HOST to CLIENT

Byte	0	1	2	3	4	5	6	7	8	···	35
Field	CMD_ID		PRM_SZ		PRM						

5.1.1.1 CMD_ID

CMD_ID is command ID. Command ID consists from 0x0000 to 0x7fff in the range.

5.1.1.2 PRM_SZ (Parameter size)

Indicates valid number of parameter byte size.

Parameter size may different depending on the command.

5.1.1.3 PRM (Command parameter)

PRM indicates parameter value. Valid data length in 32 dyes fixed-length defines by PRM_SZ in that.

See the details in Chapter 6 command definition.

5.1.2 Responses from CLIENT to HOST

Byte	0	1	2	3	4	5	6	7	8	···	35
Field	Error Code		0		PRM						

Save error code in Error Code Field. Error code consist from 0x8000 to 0xffffin the range

See the details in *APPENDIX.A*

5.1.2.1 PRM (Command parameter)

PRM indicates parameter value. Valid data length in 32 bytes fixed-length defines by PRM_SZ in that.

See the details in Chapter 6 command definition.

6 Command definition

6.1 List of control commands

Command	CMD_ID	PRM_SZ
System startup	0x0008	0
Interrupt response setup	0x0018	2
Custom preset setup	0x0100	2
Camera status setup at once (unused)	0x0200	32
Camera mode setup	0x0202	2
Captor action setup	0x0204	2
AF range setup	0x020A	2
Focus preset setup	0x020C	2
AF evaluation windows setup	0x020E	4
AF Near Limit setup	0x0212	4
AF interval setup	0x0214	2
One Push AF Trigger setup	0x0220	0
AE lock setup	0x0228	2
Focus lock setup	0x022A	2
Back light correction setup	0x022E	2
AWB convergent　speed setup	0x0230	2
AE convergent speed setup	0x0232	2
Camera status setup at once	0x0300	32
Scene mode setup	0x0400	4
Metering mode setup	0x0402	2
Exposure mode setup	0x0404	6
EV correction setup	0x0406	4
ISO sensitivity setup	0x040A	4
Flicker reduction setup	0x040C	2
Optical zoom set up	0x040E	4
Focus mode setup	0x0410	2
White balance set up	0x0412	6
Zoom tracking setup	0x041C	2
Focus motion setup	0x041E	4
Digital effect setup	0x0606	2
Sharpness setup	0x0608	2
Noise reduction setup	0x060A	2
Chroma setup	0x060C	4
Hue setup	0x060E	4
Output test pattern setup	0x0610	2
Still drive mode setup	0x0804	2
Continuous image capture setup	0x0806	2
Still image capture size setup	0x0808	8
AEB setup	0x080E	4
Still image preview mode setup	0x0810	2
Motion image stabilizer mode setup	0x0A00	2
Frame format setup	0x0A04	16
Auto slow shutter setup	0x0A06	2

6.2 List of Sense commands

Command	CMD_ID	PRM_SZ	Response Data Size
Serial number request	0x0013	0	4
F/W version request	0x0015	0	8
Interrupt response request	0x0019	0	2
IPL version request	0x001D	0	8
Custom preset request	0x0100	0	2
Camera status request at once (unused)	0x0201	0	32
Camera mode request	0x0203	0	2
WaveDet window information request	0x0207	4	AE,AWB=16 AF=28
AF range request	0x020B	0	2
AF evaluation window request	0x020F	0	4
AF Near Limit request	0x0213	0	4
AF interval request	0x0215	0	2
AE lock setup status request	0x0229	0	2
Focus lock setup status request	0x022B	0	2
Back light correction request	0x022F	0	2
AWB convergent speed request	0x0231	0	2
AE convergent speed request	0x0233	0	2
Camera status request at once	0x0301	0	32
Scene mode request	0x0401	0	4
Metering mode request	0x0403	0	2
Exposure mode request	0x0405	0	6
EV setup request	0x0407	0	4
ISO sensitivity request	0x040B	0	4
Flicker reduction request	0x040D	0	2
Optical zoom request	0x040F	0	6
Focus mode request	0x0411	0	2
White balance request	0x0413	0	4
Zoom tracking request	0x041D	0	2
Focus motion request	0x041F	0	6
Digital effect request	0x0607	0	2
Sharpness request	0x0609	0	2
Noise reduction request	0x060B	0	2
Chroma request	0x060D	0	4
Hue request	0x060F	0	4
Output test pattern request	0x0611	0	2
Still image drive mode request	0x0805	0	2
Continuous shooting speed request	0x0807	0	2
Still image size request	0x0809	0	8
AEB request	0x080F	0	4
Still image preview mode request	0x0811	0	2
Motion image stabilizer mode request	0x0A01	0	2
Frame format request	0x0A05	0	16
Auto slow shutter request	0x0A07	0	2

6.3 Data type for command definition

In this chapter, data type for command parameter will be described

Network byte order, Big Endian, is applied to form the command string that is bigger than two bytes.

- ● UI_08:

    Unsigned 8-bit integer

- ● ASCII:

    One byte is needed to encode the 7-bit ASCII code

    The last byte of string is NULL

    The string length includes NULL

- ● UI_16:

    Unsigned 16-bit, 2 bytes, integer

- ● UI_32:

    Unsigned 32-bit, 4 byte, integer

- ● SI_08:

    Signed 8-bit integer, Two's complement

- ● SI_16:

    Signed 16-bit, 2 byte, integer, Two's complement

- ● SI_32:

    Signed 32-bit, 4 byte, integer, Two's complement

- ● SQ_16:

    Signed 16-bit, 2 byte, fixed decimal point number, s7.8

- ● UNDEFINED:

    The subtype of data which is excepting above.

    Describe each command definition.

6.4 Detail of commands

6.4.1 System startup command

6.4.1.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0008		0x0000	

● Function

This command does not need to use but when this command is send as compatibility with

PE1005S, just return only normal response

● Details of parameter: None

6.4.1.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None
● RES (Error code)
  − RET_CMDEXEC_OK   :Normal response

6.4.2 Serial number request command

6.4.2.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0013		0x0000	

● Function

　　Obtain serial number of PE1005S

● Details of parameter: none

6.4.2.2 Response (Received by the host system)

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	RES		0x0000		SERIAL			

● Parameter length: 4byte

● Details of parameter

　　– Serial number: UNDEFIND type

　　　Containing serial number of PE1005S

● RES (Error code)

　　– RET_CMDEXEC_OK　　　　　　　: Normal response

● SERIAL

Big Endian, Packed Decimal

byte	4		5		6		7	
bit	31 - 28	27 - 24	23 - 20	19 - 16	15 - 12	11 - 8	7 - 4	3 - 0
Field	10^7 digit	10^6 digit	10^5 digit	10^4 digit	10^3 digit	10^2 digit	10^1 digit	10^0 digit
	1	2	3	4	5	6	7	8

Example: No.12345678

6.4.3 F/W version command

6.4.3.1 Sense command

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0015		0x0000	

● Function:

   Obtain firmware version of PE1005S

● Details of parameter: None

6.4.3.2 Response (Received by the host system)

byte	0	1	2	3	4	5	6	7	8	9	10	11
Field	CMD		PRM_SZ		PRM							
	RES		0x0000		TYP		VER		YEAR		DATE	

● Parameter length:8byte
● Details of parameter
    − TYP: UNDEFINED type
    − VER: UNDEFINED type
      F/W version
    − YEAR: UNDEFINED type
      Build year of F/W
    − DATE: UNDEFINED type
      Build date of F/W
● RES (Error code)
    − RET_CMDEXEC_OK: Normal response

6.4.3.3 F/W version

6.4.3.3.1 TYP

Byte = 4								
7	6	5	4	3	2	1	0	
								Reserved
								Reserved
								Reserved
								Reserved
								Reserved
								Reserved
								Reserved
								Reserved

Byte = 5								
7	6	5	4	3	2	1	0	
								Reserved
								Reserved
								0:Gyro unavailable model 1:Gyroa available model
								Reserved
								Reserved
								Reserved
								Reserved
								Reserved
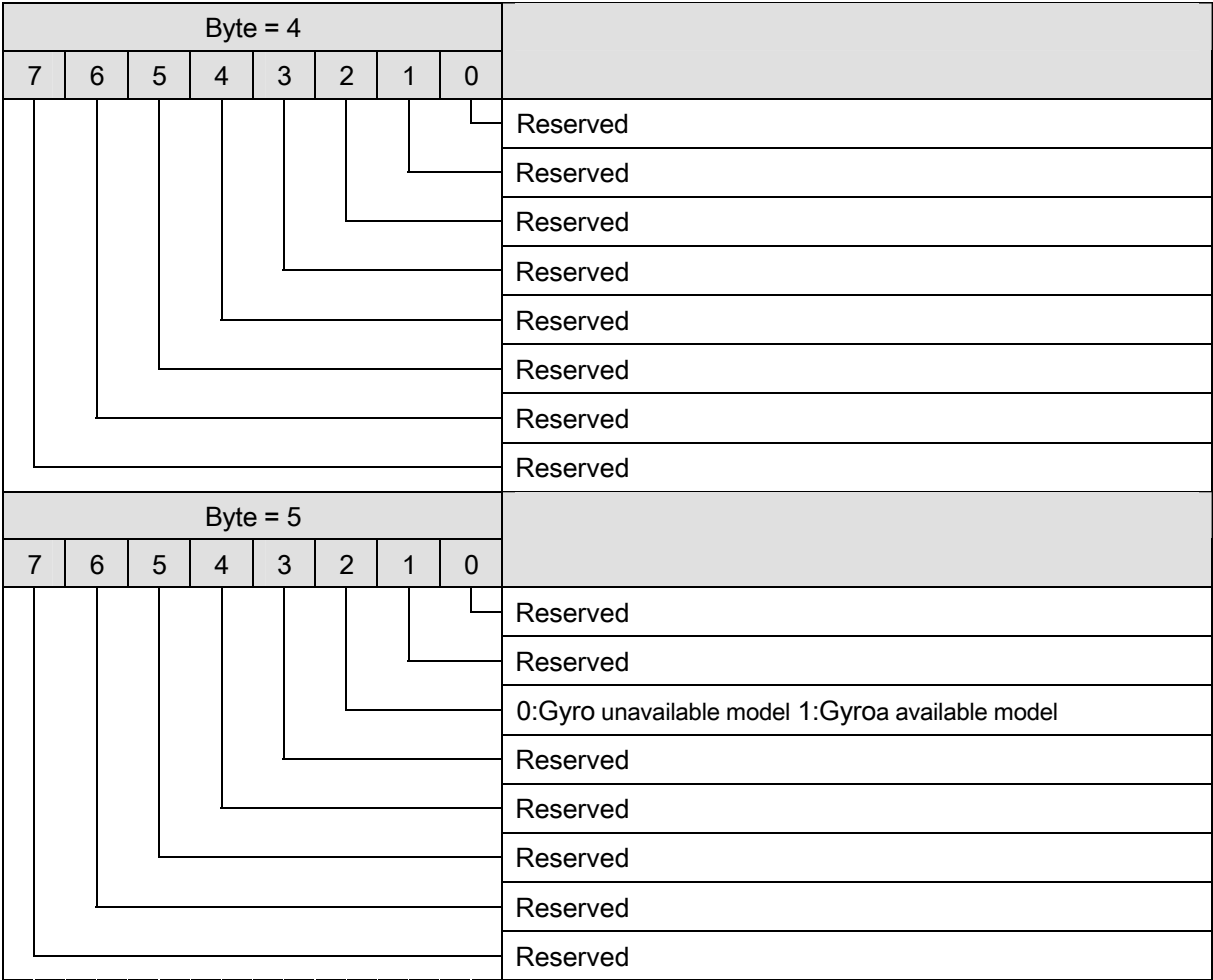
6.4.3.3.2 VER

Big Endian, Packed Decimal

Byte=6		Byte=7	
10^3Place	10^2Place	10^1Place	10^0Place
1	3	0	2

Example: Version 1.3.02

6.4.3.3.3 YEAR

Big Endian, Packed Decimal

Byte=8		Byte=9	
10^3Place	10^2Place	10^1Place	10^0Place
2	0	0	7

Example: Year 2007

6.4.3.3.4 DATE

Big Endian, Packed Decimal

Byte=10		Byte=11	
Month 10^1Place	Month 10^0Place	Day 10^1Place	Day 10^0Place
1	2	2	4

Example: December 24

6.4.4 Interrupt response setup command

6.4.4.1 Command from HOST

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x0018		0x0002		INT	

● Function:

  Specifies the process that will be executed triggered by interrupt with INT_IN

● Details of parameter

  − Definition of interrupt by INT: UI_16 type

    ・ 0x0000: Invalid

    ・ 0x0001: Mode change

    ・ 0x0002: Still image full shutter (Valid in DSC mode only)

6.4.4.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

  − RET_CMDEXEC_OK   : Normal response

  − RET_CMDEXEC_PRMERROR   : INT specified range error

6.4.5 Interrupt response request command

6.4.5.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0019		0x0000	

● Function: Obtain the definition of interrupt

● Details of parameter: None

6.4.5.2 Response (Received the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		INT	

● Parameter length: 2byte

● Details of parameter

   Definition of field is the same as Interrupt response setup command

● RES (Error code)

   − RET_CMDEXEC_OK   : Normal response

6.4.6 IPL Version request command

6.4.6.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x001D		0x0000	

● Function:

　　Obtain IPL version of PE1005S

● Details of parameter: None

6.4.6.2 Response (Received by the host system)

byte	0	1	2	3	4	5	6	7	8	9	10	11
Field	CMD_ID		PRM_SZ		PRM							
	RES		0x0000		TYP		VER		YEAR		DATE	

● Parameter length: 8byte

● Details of parameter:

　　－ TYP: UNDEFINED type

　　Contain IPL build type

　　－ VER: UNDEFINED type

　　Contain F/W version

　　－ YEAR: UNDEFINED type

　　Contain build year of F/W

　　－ DATE: UNDEFINED type

　　Contain build date of F/W

　　About TYP is nondisclosure

　　Please see Chapter 6.4.3 F/W request command about other details.

● RES (Error code):

　　－ RET_CMDEXEC_OK　　　　　　　: normal response

6.4.7 Custom preset setup command

6.4.7.1 Command from HOST

byte	0	1	2	3	4	5
Field	**CMD_ID**		**PRM_SZ**		**PRM**	
	0x0100		0x0002		PSTMD	

● Function:

    Obtain custom preset value to nonvolatile memory.

    This command setting will be valid after restart.

    In this regarding, Zoom and focus position preset keep position information as device value at the

preset, those move from home position to hold value after initialization.

● Details of parameter:

    – PSTMD (Setup preset): UI_16 type

        ・ 0x0000 : OFF invalid custom preset

        ・ 0x0001 : ON valid custom preset and saving current setup value

        ・ 0x0002 : ReCall valid custom preset not rewriting setup value

6.4.7.2 Response (Received by the host system)

byte	0	1	2	3
Field	**CMD_ID**		**PRM_SZ**	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

    – RET_CMDEXEC_OK   : Normal response

    – RET_CMDEXEC_PRMERROR   : PSTMD specified range error

6.4.8 Custom preset request command

6.4.8.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0101		0x0000	

● Function:

  Obtain status of saving execution of custom preset.

● Details of parameter: None

6.4.8.2 Response (Received by the host system)

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	RES		0x0000		RSV		PSTST	

● Parameter length: 4byte

● Details of parameter:

  − PSTST (Preset status): UI_16 type

    ・ 0x0000 : OFF invalid custom preset

    ・ 0x0001 : ON valid custom preset

● RES (Error code):

  − RET_CMDEXEC_OK   : normal response

6.4.9 Camera status setup command at once   (unused for PE1005S)

6.4.9.1 Command from HOST

byte	0	1	2	3	4	5						35
Field	CMD_ID		PRM_SZ		PRM							
	0x0200		0x0020		CAM_STAT							

● Function:

　　Setup camera at once

　　Mode change process is needed to validate the mode change.

　　About mode change, Please refer to Chapter 6.4.10.3 CAM_STAT structure for the details of

　　data type

　　This command is for compatibility between PE1005 and PE1005S

　　Please use " CMD_ID = 0x0300" for PE1005S

● Details of parameter:

　　－　CAM_STAT (Setup once data): UNDEFINED type

　　　　Please refer to Chapter 6.4.10.3 CAM_STAT structure for the details of data type

6.4.9.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code):

　　－　RET_CMDEXEC_OK　　　　　　　: Normal response

　　－　RET_CMDEXEC_PRMERROR　　　: Once setup data incorrect

6.4.10   Camera statue request Command at once (unused for PE1005S)

6.4.10.1   Command for HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0201		0x0000	

● Function:

  Obtain the status of the camera at once

  This command is for compatibility between PE1005 and PE1005S.

  Please use " CMD_ID = 0x0301" for PE1005S

  <u><Caution></u>

  <u>While PE1005S in IDEL mode which means stopping picture, Command is valid (not error),</u>

  <u>However that is no definition about obtained the data (CAM_STAT).</u>

● Details of parameter: None

6.4.10.2   Response (Received by the host system)

byte	0	1	2	3	4	5						35
Field	CMD_ID		PRM_SZ		PRM							
	RES		0x0000		CAM_STAT							

● Parameter length: 32byte

● Details of parameter:

  − CAM_STAT (Setup once data): UNDEFINED type

     Please refer to Chapter 6.4.10.3 CAM_STAT structure for the details of data

● RES (Error code) :

  − RET_CMDEXEC_OK   : Normal response

6.4.10.3 Details of CAM_STAT structure

Upper significant 4 bytes of CAM_STAT have a different structure depending on the DVC mode, DSC mode. For request only, it needs to find DVC or DSC CAM_STAT structure at the beginning from the first byte (P0) of 7-6 bit information

For the at once setup / request, you find indication of R/W in R/W column.

For request only, you find indication of R in R/W column.

PE1005S ignores items indicated R for the at once setup.

Also when items indicated W in R/W column for the request only, the request value becomes invalid.

Items that requires mode change to validate at once setup

● CAM_STAT structure of DVC mode

byte	P0								P1							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R/W		R/W			R/W			R/W	R/W	R/W		R/W	R/W	RSV	
Field	CAMMD		FRMSZ			FRMRT			HR	HS	FRMALN		ISS	FLR	indetermination	

byte	P2								P3							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R/W	R/W	R/W	RSV		R/W			RSV							
Field	ZTG	ISE	ASS	indetermination		FLRM			indetermination							

○ CAMMD (camera mode)

  0x0 fixed for the DVC mode

○ FRMSZ (frame size)

  – 0 : 640x480 / 2 : 720x480 / 3 : 720x576

  – 4 : 1680x720 / 5 : 1280x720 / 6 : 1920x1080

○ FRMRT (frame rate)

  – 0 : 10 FPS / 1 : 15 FPS / 2 : 24 FPS /

    3 : 25 FPS / 4 : 30 FPS / 5 : 60 FPS / 6 : 50 FPS

○ HR (High Resolution mode)

  – 0:ON / 1: OFF

○ HS (High Sensitivity mode)

  – 0:ON / 1: OFF

○ FRMALN(output frame align)

  – 0: 1 byte align / 1: 8 byte align / 2: 16 byte align /

    3: 32 byte align

○ ISS (Image Stabilizer Support mode)

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- 0: Support active / 1: No support

○ FLR (Flicker reduction)

- 0:ON / 1: OFF

○ FLRM (Flicker reduction)

- 0:AUTO / 2: 50Hz / 3: 60Hz

<Note> This `parameter` is valid only when `FLR` is set to `ON`（"0"）.

○ ZTG (Zoom Tracking)

- 0:ON / 1: OFF

○ ISE (Motion Image Stabilizer setup)

- 0:OFF / 1: ON

○ ASS (Auto slow shutter)

- 0:ON / 1: OFF

● CAM_STAT structure of DSC mode

byte	P0								P1							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R/W		R/W			R/W			R/W	R/W	R/W	R/W		R/W		R
Field	CAMMD		STLSZ			AEBST			PRT	HS	AEBC	STLDRV		CNTSPD		ISWRN

byte	P2								P3							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R									RSV					R/W	R
Field	AFRSLT									0					AFLCK	AFS
	R0	R1	R2	R3	R4	R5	R6	R7	R8							

○ CAMMD (camera mode)

0x1 fixed for DSC mode

○ STLSZ (frame size)

- 0：L(1600 x 1200) / 1：WL(1920x1080) / 2：M(1280x960) /

3：MS(800x600) / 4：S(640x480)

○ AEBST (AEB step)

- 0：0.33EV / 1：0.66EV / 2：1.00EV

3：1.33EV / 4：1.66EV / 5：2.00EV

○ PRT (Preview mode)

- 0:30 FPS / 1: 15 FPS

○ HS (High sensitivity mode)

- 0:OFF / 1: ON

○ AEBC (AEB capture number)

- 0 : 3pieces / 1 : 5pieces

○ STLDRV (Still image drive mode)

− 0: Single shoot / 1: Continuous shoot / 2 :   AEB

○ CNTSPD (Continuous shooting speed)

− 0: High speed / 1: Medium speed / 2: Slow speed

○ ISWRN (Alert of shaking)

− 0: Activate alarm / 1: Disable alarm

○ AFRSLT (Each area of AF result)

Rx is index of AF evaluation windows

− 0: not achieve the focus / 1: achieve the focus

○ AFLCK (Focus lock)

− 0:ON / 1: OFF

○ AFS (AF status)

− 0: In progress / 1: Completed

● CAM_STAT structure of common for both DVC and DSC

byte	P4								P5						
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	RSV					R/W	R/W	RSV	R/W			R/W				
Field	0					HMR	HMR	0	AVIDX			TVIDX				

byte	P6								P7						
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R/W	R/W	R/W			R/W			R/W	R/W	RSV	R/W			
Field	AEMD	ISOMD	ISOIDX			METMD			BLC	AELCK	0	EVIDX			

○ VMR (Vertical mirroring)

- 0: No mirroring / 1: Mirroring

○ HMR (Horizontal mirroring)

- 0: No mirroring / 1: Mirroring

○ AVIDX (diaphragm setup)

- 0 : F1.8 / 1 : F2.0 / 2 : F2.8 / 3 : F4.0 / 4 : F5.6 / 5 : F8.0 / 6 : F11

○ TVIDX (Shutter speed setup)

- 0:1/5 1:1/6 2: 1/7.5 3: 1/10 4: 1/12   5: 1/15   6: 1/24   7: 1/25   8: 1/30   9: 1/48   10: 1/50
  11:1/60 12: 1/100 13: 1/120 14: 1/250 / 15: 1/500 / 16: 1/1000、 17: 1/2000 18:1/4000

  <Note> Actually valid shutter speeds vary by camera mode and the combination of flame rate.
  Please refer to chapter 6.4.42. 3 " Setup of camera mode with flame rate and shutter
  speed."

○ AEMD (AE mode)

- 0: manual / 1: Program AE / 2: Aperture priority / 3: Shutter speed priority

○ ISOMD (ISO sensitivity mode)

- 0: auto / 1: manual

○ ISOIDX (manual setup for ISO sensitivity)

- 0 : ISO 80 / 1 : ISO 100 / 2 : ISO 200 / 3 : ISO 400 / 4 : ISO 800 / 5 : ISO 1200

○ METMD (metering mode)

- 0: center weighted / 1: spot / 2: evaluation metering

○ BLC (Back light correction)

- 0 : ON / 1 : OFF

○ AELCK (AE lock)

- 0 : ON / 1 : OFF

○ EVIDX (EV correction)

- 0 : -2.0   1 : -1.66   2 : -1.33   3 : -1.0   4 : -0.66   5 : -0.33   6 : 0.0   7 : 0.33   8 : 0.66
  9 : 1.0   10 : 1.33   11 : 1.66   12 : 2.0

byte	P8								P9							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R/W		R/W				RSV		R/W	R/W	R/W	R/W				
Field	WBMD		WBMDIDX				0		AFRNG	FMD	AFWD	AFWDIDX				

byte	P10								P11							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R				R				R							
Field	FCSPOS				WBCS				ZOOMPOS							

○ WBMD (White balance mode)

− 0: Operating setup / 1: custom / 2: manual

<Caution> Setting is disable other than 0 by the once setup. Reading will be executed setting mode by individual setting

○ WBMDIDX (White balance index)

− 0: Auto / 1: custom / 2: manual / 3: day light / 4: cloudy / 5: shade / 6: fluorescent W /

7: fluorescent N / 8: fluorescent D / 9: tungsten

○ AFRNG (AF range)

− 0: full range / 1: normal range / macro range

○ FMD (focus mode)

− 0:auto / 1: manual

○ AFWD (AF evaluation window mode)

− 0: auto / 1: manual

○ AFWDIDX (AF evaluation window index)

− 0 : top left/ 1 : top center / 2 : top right /

3 : middle left/ 4 : middle center / 5 : middle right /

6 : bottom left/ 7 : bottom center / 8 : bottom right /

○ FCSPOS (Current focus position)

− 0:0.01m / 1 : 0.04m / 2 : 0.06m / 3 : 0.13m / 4 : 0.2m / 5 : 0.5m /

6 : 0.7m / 7 : 1m / 8 : 2m / 9 : 4.5m / 10 : 12m / 11 : 25m / 12 : INF

○ WBCS (custom white balance status)

− 0 : before processing / 1 : processing in progress / 2: normal completion / 3 : error

termination

○ ZOOMPOS (zoom position)

− 0 : Wide end - 1023: Tele end

byte	P12								P13						
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R														
Field	FOCALLEN (Integer portion)														

byte	P14								P15						
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R								R/W	R/W				RSV	R/W
Field	FOCALLEN (fractional portion)								SCNMD	SCNIDX				0	NR

- ○ FOCALLEN (actual focusing length)
  - – 16.8 fixed decimal point type, Unit: mm
- ○ SCNMD (Scene mode)
  - – 0 : ON / 1 : OFF
- ○ SCNIDX (Scene mode index)
  - 2: night (with auto change) / 3: night   (without auto change) /13: auto /
  - 14: WDR / 15: High color temperature

- ○ NR (noise reduction)
  - – 0 : High / 1 : Middle / 2 : Low / 3 : Off

byte	P16								P17						
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R/W	R/W		R/W			R/W	R/W		R/W			
Field	SHARP	HUECR		HUECB			CRMCR	CRMCB		EFFCT			

byte	P18								P19						
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	RSV								RSV						
Field	0								0						

- ○ SHARP (sharpness)
  - – 0 : High / 1 : Middle / 2 : Low
- ○ HUECR (hue CR setup)
  - – 0 : -2 / 1 : -1 / 2 : 0 / 3 : +1 / 4 : +2
- ○ HUECB (hue CB setup)
  - – 0 : -2 / 1 : -1 / 2 : 0 / 3 : +1 / 4 : +2
- ○ CRMCR (chroma CR setup)
  - – 0 : High / 1 : Middle / 2 : Low

○ CRMCB (chroma CB setup)

  – 0 : High / 1 : Middle / 2 : Low

○ EFFECT (digital effect setup)

  – 0: normal / 1: sepia / 2: monochrome / 3: pasteurization / 4: solarization / 5: negative / 6:custam

byte	P20								P21							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R								R							
Field	EV (integer portion)								EV(fractional portion)							

byte	P22								P23							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R								R							
Field	TV (integer portion)								TV(fractional portion)							

○ EV (exposure value)

  – APEX value with S7.8 fixed decimal point number

○ TV (Exposure time)

  – APEX value with S7.8 fixed decimal point number

byte	P24								P25							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R								R							
Field	AV (integer portion)								AV(fractional portion)							

byte	P26								P27							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R								R							
Field	SV (integer portion)								SV(fractional portion)							

○ AV (Aperture Value)

  – APEX value with S7.8 fixed decimal point number

○ SV (Film Speed Value)

  – APEX value with S7.8 fixed decimal point number

Reserve bit see below

byte	P28								P29							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	RSV								RSV							
Field	0								0							

byte	P30								P31							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	RSV								RSV							
Field	0								0							

6.4.11 Camera mode setup command

6.4.11.1 Command from HOST

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x0202		0x0002		CAMMD	

● Function:

Setup camera mode

This command requires mode change to validate

Camera will be shutdown when mode change is executed after IDLE mode setup is operated. Please see example of command sequence at chapter 7   for mode change sequence and shutdown sequence.

● Details of parameter:

- CAMMD(camera mode): UI_16 type
  - ・ 0x0000 : IDLE mode
  - ・ 0x0001 : DVC mode (Movie capture mode)
  - ・ 0x0002 : DSC mode (Still capture mode)

6.4.11.2 Response (received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code):

- RET_CMDEXEC_OK   : Normal response
- RET_CMDEXEC_PRMERROR   :CAMMD pacifier out of range error

6.4.12 Camera mode request command

6.4.12.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0203		0x0000	

● Function: Obtain camera mode information

● Details of parameter: None

6.4.12.2 Response (received by the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		CAMMD	

● Details of parameter:

   Definition of field is the same as Camera mode setup command

● Parameter length: 2byte

● RES (Error code)

   − RET_CMDEXEC_OK   : Normal response

6.4.13 Capture action command

6.4.13.1 Control command

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x0204		0x0002		ACT	

● Function:

   Specify start/stop half shutter

● Details of parameter:

   − ACT (specify action) : UI_16 type

   ・ 0x0000-0x0001 : Reserved

   ・ 0x0002 : Start half shutter

   ・ 0x0003 : Stop half shutter

6.4.13.2 Response (received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code):

   − RET_CMDEXEC_OK   : Normal response

   − RET_CMDEXEC_PRMERROR   : ACT pacifier out of range error

6.4.14   Obtain WaveDet information request command

6.4.14.1   Command from HOST

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	0x0207		0x0004		TYP	0x00	IDX	

● Function:

  Obtain coordinate and size of WaveDet area

  This command is valid for DSC mode. Requested value is non-guaranteed on DVC mode.

● Details of parameter:

  – TYP (WaveDet type)：UI_08 type

   ・ 0x00:AE/AWB WaveDet area

   ・ 0x01:AF WaveDet area

  – IDX (WaveDet index)：UI_16type

   ・ TYP ＝ 0x00

    Invalid

   ・ TYP ＝ 0x01

    0x0000： Obtain information of upper WaveDet window

    0x0001： Obtain information of middle WaveDet window

    0x0002： Obtain information of lower WaveDet window

    * Find the details in Chapter 6.4.14.4" AF WaveDet window"

6.4.14.2   Response (received by the host system) Packet structure

6.4.14.2.1   AE/AWB Wave detect area (TYP =0x00)

byte	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Field	CMD_ID		PRM_SZ		PRM											
	RES		0x0000		TYP	STAT	IDX		ST_X		ST_Y		CNT_X		CNT_Y	

byte	16	17	18	19
Field	PRM			
	SZ_X		SZ_Y	

● Parameter length: 16byte

● Details of parameter:

  – TYP：

   TYP that is specified by the command from the host system

  – STAT：

   ・ 0x00：normal

- ・ Other than 0x00 : TYP/IDX Illegal
- − IDX(Reference raw index) : UI_16 type

  TYP=0x00 No definition
- − ST_X(X coordinate of block start) : UI_16 type
- − ST_Y(Y coordinate of block start) : UI_16 type
- − CNT_X((# of blocks for the X direction) : UI_16 type
- − CNT_Y(# of blocks for the Y direction) : UI_16 type
- − SZ_X(X size) : UI_16 type
- − SZ_Y(Y size) : UI_16 type

  * Find the details in Chapter 6.4.14.3" AE/AWB WaveDet window"
- ● Error code
  - − RET_CMDEXEC_OK   : normal response
  - − RET_CMDEXEC_PRMERROR   : Error TYP or IDX specified area

6.4.14.2.2 AF WaveDet area TYP = 0x01

byte	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Field	CMD_ID		PRM_SZ		PRM											
	RES		0x0000		TYP	STAT	IDX		AF0STX		AF0STY		AF0SZX		AF0SZY	

byte	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Field	PRM															
	AF1STX		AF1STY		AF1SZX		AF1SZY		AF2STX		AF2STY		AF2SZX		AF2SZY	

- ● Parameter length: 28byte
- ● Details of parameter:
  - − TYP :

    TYP that is specified by the command from the host system
  - − STAT :
    - ・ 0x00 : normal
    - ・ Other than 0x00 : TYP/IDX Illegal
  - − IDX(Reference raw index) : UI_16 type
  - − AFxSTX(block x starting X coordinate) : UI_16 type
  - − AFxSTY(block x starting Y coordinate) : UI_16 type
  - − AFxSZX(block x X size) : UI_16 type
  - − AFxSZY(block x Y size) : UI_16 type

    * Find the details in Chapter 6.4.14.4" AF WaveDet window"
- ● Error code
  - − RET_CMDEXEC_OK   : normal
  - − RET_CMDEXEC_PRMERROR   : Error TYP or IDX specified area

6.4.14.3 AE/AWB WaveDet window
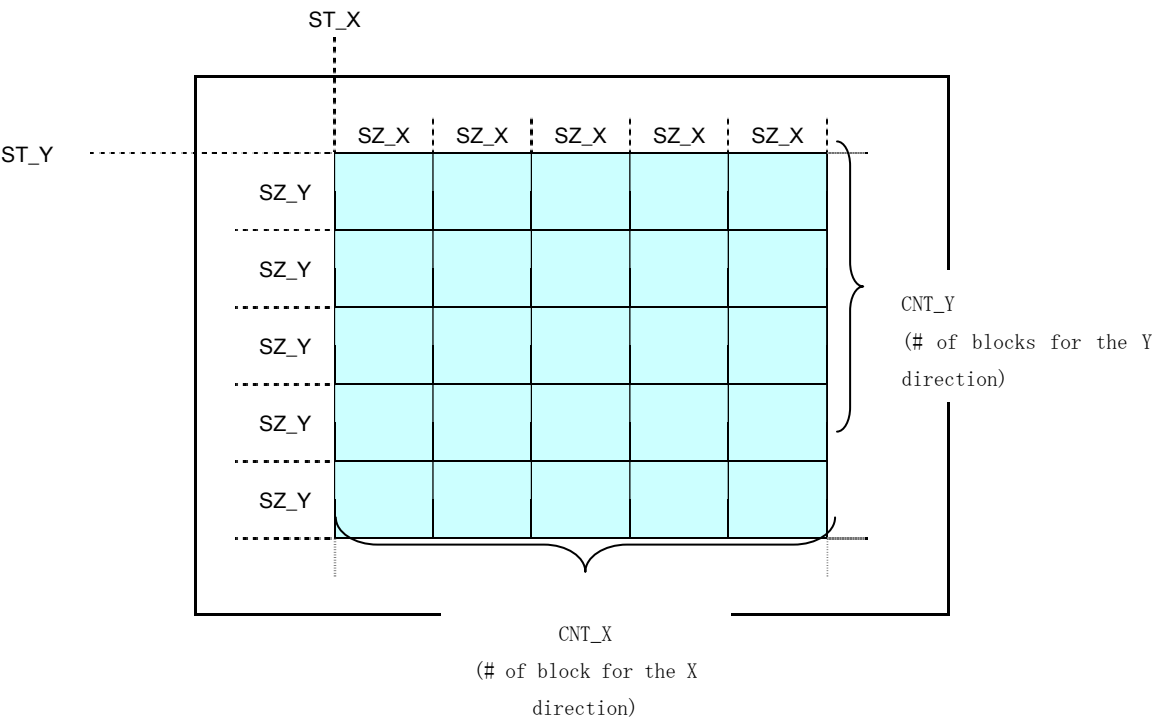
6.4.14.4 AF WaveDet window
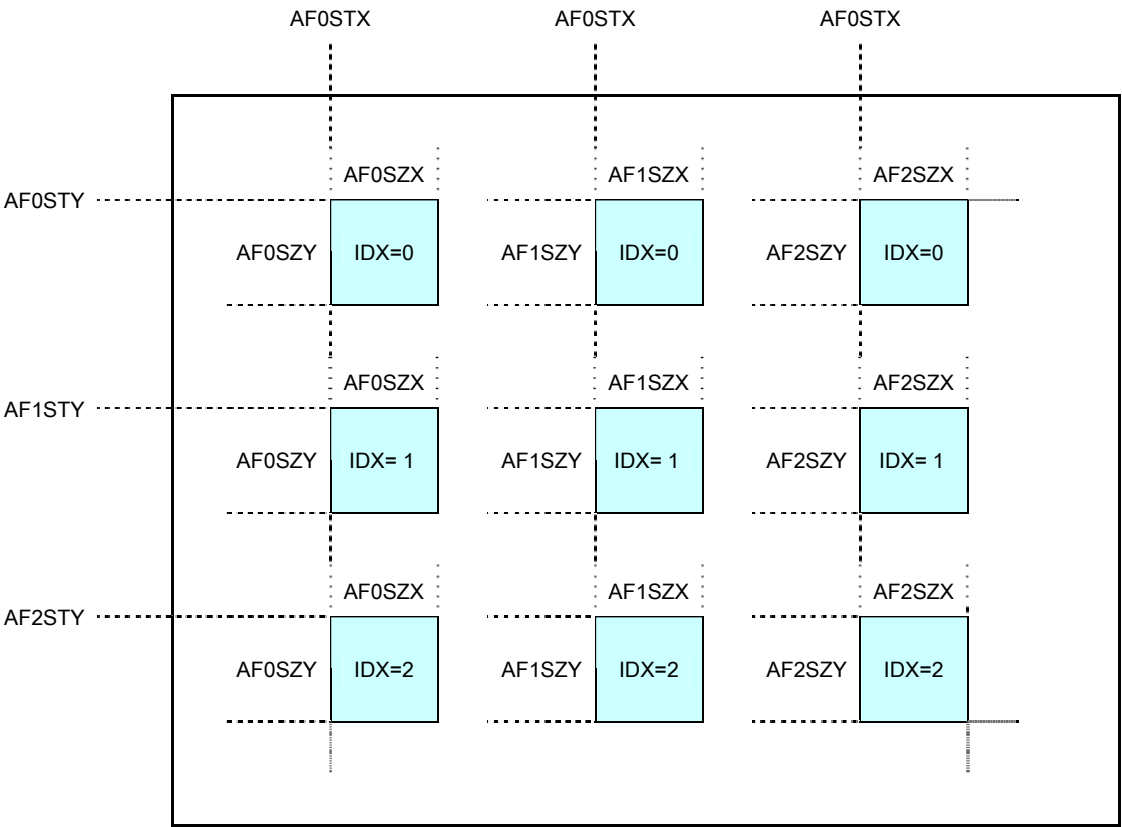
6.4.15 AF range setup command

6.4.15.1 Command from HOST

Byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x020A		0x0002		RNG	

● Function:

   This command is valid on DSC mode. When this command sent on DVC mode, setup value is held but it is not in execution and return normal response.

   Please use the "AF Near Limit setup command" chapter 6.4.20 about AF range setup on DVC mode

● Details of parameter:

  − RNG(AF scan range) : UI_16 type

    ・ 0x0000 : full range

    ・ 0x0001 : normal range

    ・ 0x0002 : macro range

6.4.15.2 Response (received by the host system)

Byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code):

  − RET_CMDEXEC_OK   : normal

  − RET_CMDEXEC_PRMERROR   : Specify RNG range error

6.4.16 AF range request command

6.4.16.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x020B		0x0000	

● Function:

This command is valid on DSC mode. When this command sent on DVC mode, return held value but the value is invalid.

Please use the " AF Near Limit setup command" chapter 6.4.20 about AF Near Limit setup command.

● Details of parameter: None

6.4.16.2 Response (received by the host system) data structure

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		RNG	

● Parameter length: 2byte

● Details of parameter:

・ Definition of the command is as same as AF range setup command

● RES(Error code):

－ RET_CMDEXEC_OK   : normal response

6.4.17 Focus preset setup command

6.4.17.1 Command from HOST

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x020C		0x0002		PRST	

● Function:

Move the focus lens to the specified distance. This command is valid only when the focus mode is set to manual mode. (When focus mode is set to auto, this command is ignored).

● Command (sent by the host system) data structure

● Details of parameter:

   – PRST(Preset position) : UI_16 type

     ・ 0x0000 : infinity

     ・ 0x0001 : Pan focus

     ・ 0x0002 : nearest normal

     ・ 0x0003 : nearest macro

6.4.17.2 Response (received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

   – RET_CMDEXEC_OK   :normal response

   – RET_CMDEXEC_PRMERROR   :Specify PRST range error

6.4.18 AF evaluation window setup command

6.4.18.1 Command from HOST

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	0x020E		0x0004		AFWD		AFWDIDX	

● Function:

   Setup AF evaluation window

● Details of parameter:

     − AFWD(AF evaluation window) : UI_16 type

       ・ 0x0000 : Auto

       ・ 0x0001 : Manual

     − AFWDIDX (Specify AF evaluation window) : UI_16type

       ・ 0x0000-0x0008: Valid only at manual AF mode

6.4.18.2 Response (received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

     − RET_CMDEXEC_OK   : normal response

     − RET_CMDEXEC_PRMERROR   :Specify AFWD/AFWDIDX range error

6.4.19   AF evaluation window request command

6.4.19.1   Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x020F		0x0000	

- ● Function: Obtain AF evaluation index
- ● Details of parameter: None

6.4.19.2   Response (receive by the host) data structure

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	RES		0x0000		AFWD		AFWDIDX	

- ● Parameter length: 4byte
- ● Details of parameter:
  - ・ Definition of the command is as same as AF evaluation window setup command
- ● Error code
  - – RET_CMDEXEC_OK   : normal

6.4.19.3   Index for AF evaluation window

The following diagram shows index number for each AF evaluation window.

AF evaluation index

0	1	2
3	4	5
6	7	8
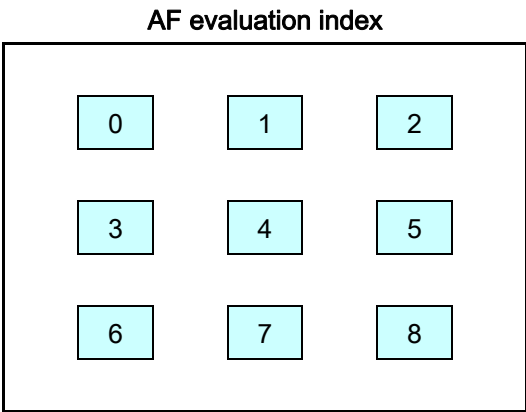
6.4.20 AF Near Limit setup command

6.4.20.1 Command from HOST

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x0212		0x0002		NLMT	

● Function:

　Setup AF Near Limit

　Only valid at DVC mode

● Details of parameter:

　In case of setting 0 (1cm), There is no ON/OFF setup parameter, because of same as invalid

　Near Limit

　　－　NLMT (AF scan range) : UI_16 type

　　　・　0x0000:10mm   0x0001:40mm   0x0002:60mm 0x0003:130mm

　　　　0x0004:200mm   0x0005:500mm   0x0006:700mm   0x0007:900mm

　　　　0x0008:1000mm   0x0009:2000mm   0x000A:4500mm

6.4.20.2 Response (receive by the host) data structure

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Parameter length: 0byte

● RES(Error code):

　　－　RET_CMDEXEC_OK　　　　　　　: normal response

　　－　RET_CMDEXEC_PRMERROR　　　: NLMT specified range error

6.4.21 AF Near Limit request command

6.4.21.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0213		0x0000	

● Function: Obtain AF Near Limit

● Details of parameter: None

6.4.21.2 Response (receive by the host) data structure

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		NLMT	

● Parameter length: 2byte

● Details of parameter:

       ・ Definition of the command is as same as AF Near Limit setup command

● RES(Error code):

    – RET_CMDEXEC_OK   : normal response

6.4.22 AF interval setup command

6.4.22.1 Command from HOST

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x0214		0x0002		AFITRVL	

● Function:

   Setup AF interval time

   Starting AF each set interval time, after focused AF is at a pause

● Details of parameter:

   − AFITRVL   (AF interval) : UI_16 type

   ・ 0x0005 to 0x0384:specified seconds   5sec to 900 sec (15min)

6.4.22.2 Response (receive by the host) data structure

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Parameter length: 0byte

● RES(Error code):

   − RET_CMDEXEC_OK   : normal response

   − RET_CMADEXEC_PRMERROR   : AFITRVLT specified range error

6.4.23   AF interval request command

6.4.23.1   Command from HOST

byte	0	1	2	3
Field	\multicolumn{2}{}{CMD_ID}		\multicolumn{2}{}{PRM_SZ}
	0x0215		0x0000	

● Function: Obtain AF interval time

● Details of parameter: None

6.4.23.2   Response (receive by the host) data structure

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		AFITRVL	

● Parameter length: 2byte

● Details of parameter:

　　　　・ Definition of the command is as same as AF interval setup command

● RES(Error code):

　　　－ RET_CMDEXEC_OK　　　　　　　: normal response

6.4.24   One Push AF Trigger setup command

6.4.24.1   Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0220		0x0000	

● Function: When it received this command, AF is staring.

　　　　　Then suspend after focusing

　　・ Valid Near Limit

　　・ Only Valid Auto(FMD=0x0000) and one push auction (AFMD=0x0002) at focus mode

● Details of parameter: None

6.4.24.2   Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None
● RES (Error code)
  – RET_CMDEXEC_OK   :   Normal response

6.4.25 AE lock setup command

6.4.25.1 Command from HOST

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x0228		0x0002		AELCK	

● Function

  Setup AE lock
● Details of parameter
  – AELCK (AE lock) : UI_16type
    ・ 0x0000 : AE lock
    ・ 0x0001 : AE unlock

6.4.25.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None
● RES (Error code)
  – RET_CMDEXEC_OK   : Normal response
  – RET_CMDEXEC_PRMERROR   : AELCK specified range error

6.4.26 AE lock request command

6.4.26.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0229		0x0000	

● Function: Obtain AE lock status

● Details of parameter: None

6.4.26.2 Response (Received by the host system) data structure

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		AELCK	

● Parameter length: 2byte

● Details of parameter

　　Definition of field is the same as AE lock setup command

● RES (Error code)

　　− RET_CMDEXEC_OK　　　　　　　: Normal response

6.4.27 Focus lock setup command

6.4.27.1 Command from HOST

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x022A		0x0002		AFLCK	

● Function:

   Setup AF lock

● Details of parameter

  – AFLCK(AFlock setup) : UI_16 type

    ・ 0x0000 : AF lock

    ・ 0x0001 : AF unlock

< Caution > This command is valid on DSC mode.

        It is normal response on DVC mode, but is not in execution focus lock

6.4.27.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code):

  – RET_CMDEXEC_OK   : Normal response

  – RET_CMDEXEC_PRMERROR   : AFLCK specified range error

6.4.28   Focus lock request command

6.4.28.1   Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x022B		0x0000	

● Function: Obtain the AF lock status

● Details of parameter: None

6.4.28.2   Response (Received by the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		AFLCK	

● Parameter length: 2byte

● Details of parameter

 Definition of field is the same as Focus lock setup command

● RES (Error code)

 − RET_CMDEXEC_OK   : Normal response

6.4.29 Back light correction setup command

6.4.29.1 Command from HOST

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x022E		0x0002		BLC	

● Function:

   Setup back light correction function

● Details of parameter

    − Definition of interrupt by INT: UI_16 type

       ・ 0x0000: Back light correction ON

       ・ 0x0001: Back light correction OFF

6.4.29.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

    − RET_CMDEXEC_OK   : Normal response

    − RET_CMDEXEC_PRMERROR   : BLK specified range error

6.4.30   Back light correction request command

6.4.30.1   Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x022F		0x0000	

● Function: Obtain the definition of interrupt

● Details of parameter: None

6.4.30.2   Response (Received by the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		BLC	

● Parameter length: 2byte

● Details of parameter

   – Definition of field is the same as Back light correction setup command

● Error code

   – RET_ RET_CMDEXEC_OK   : Normal response

6.4.31 AWB convergence speed setup command

6.4.31.1 Command from HOST

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x0230		0x0002		AWBSP	

● Function:

 Setup AWB convergence speed

● Details of parameter

  – AWBSP (AWB speed setup): UI_16 type

   ・ 0x0000: slow

   ・ 0x0001: middle

   ・ 0x0002: fast

6.4.31.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Parameter length: 0yte

● RES (Error code)

  – RET_CMDEXEC_OK   : Normal response

  – RET_CMDEXEC_PRMERROR : AWBSP specified range error

6.4.32   AWB convergence speed request command

6.4.32.1   Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0231		0x0000	

● Function: Obtain the AWB convergence speed setup values
● Details of parameter: None

6.4.32.2   Response (Received by the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		AWBSP	

● Parameter length: 2yte
● Details of parameter
    − Definition of field is the same as AWB convergence speed setup command
● Error code
    − RET_ RET_CMDEXEC_OK   : Normal response

6.4.33 AE convergence speed setup command

6.4.33.1 Command from HOST

byte	0	1	2	3	4	5
Field	**CMD_ID**		**PRM_SZ**		**PRM**	
	0x0232		0x0002		AESP	

● Function:

 Setup AE convergence speed

● Details of parameter

 − AEP (AE speed setup): UI_16 type

 ・ 0x0000: slow

 ・ 0x0001: middle

 ・ 0x0002: fast

6.4.33.2 Response (Received by the host system)

byte	0	1	2	3
Field	**CMD_ID**		**PRM_SZ**	
	RES		0x0000	

● Parameter length: 0yte

● RES (Error code)

 − RET_CMDEXEC_OK   : Normal response

 − RET_CMDEXEC_PRMERROR   : AESP specified range error

6.4.34 AE convergence speed request command

6.4.34.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0233		0x0000	

● Function: Obtain the AE convergence speed setup values

● Details of parameter: None

6.4.34.2 Response (Received by the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		AESP	

● Parameter length: 2byte

● Details of parameter

 – Definition of field is the same as AE convergence speed setup command

● Error code

 – RET_ RET_CMDEXEC_OK   : Normal response

6.4.35 Camera status setup command at once   –PE1005S only

6.4.35.1 Command from HOST

byte	0	1	2	3	4	5						35
Field	CMD_ID		PRM_SZ		PRM							
	0x0300		0x0020		CAM_STAT							

● Function:

Setup camera at once

Mode change process is needed to validate the mode change.

About mode change, Please refer to Chapter 6.4.35.3 CAM_STAT structure for the details of

data type

This command is for compatibility between PE1005 and PE1005S

Please use " CMD_ID = 0x0300" for PE1005S

● Details of parameter:

– CAM_STAT (Setup once data): UNDEFINED type

Please refer to Chapter 6.4.35.3 CAM_STAT structure for the details of data type

6.4.35.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None
● RES (Error code):
  – RET_CMDEXEC_OK   : Normal response
  – RET_CMDEXEC_PRMERROR   : Once setup data incorrect

6.4.36   Camera status request command at once –PE1005S only

6.4.36.1   Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0301		0x0000	

● Function:

   Obtain the status of the camera at once

<Caution>

While PE1005S in IDEL mode which means stopping picture, Command is valid (not error),

However that is no definition about obtained the data (CAM_STAT).

● Details of parameter: None

6.4.36.2   Response (Received by the host system)

byte	0	1	2	3	4	5						35
Field	CMD_ID		PRM_SZ		PRM							
	RES		0x0000		CAM_STAT							

● Parameter length: 32byte

● Details of parameter:

   − CAM_STAT (Setup once data): UNDEFINED type

      Please refer to Chapter 6.4.35.3 CAM_STAT structure for the details of data

● RES (Error code) :

   − RET_CMDEXEC_OK   : Normal response

6.4.36.3 Details of CAM_STAT structure –PE1005S only

Upper significant 4 bytes of CAM_STAT have a different structure depending on the DVC mode, DSC mode. For request only, it needs to find DVC or DSC CAM_STAT structure at the beginning from the first byte (P0) of 7-6 bit information

For the at once setup / request, you find indication of R/W in R/W column.

For request only, you find indication of R in R/W column.

PE1005S ignores items indicated R for the at once setup.

Also when items indicated W in R/W column for the request only, the request value becomes invalid.

Items that requires mode change to validate at once setup

● CAM_STAT structure of DVC mode

byte	P0								P1							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R/W		R/W			R/W			R/W	R/W	R/W		R/W	R/W	RSV	
Field	CAMMD		FRMSZ			FRMRT			HR	HS	FRMALN		ISS	FLR	indetermination	

byte	P2								P3							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R/W	R/W	R/W	RSV		R/W			RSV		R/W		R/W			
Field	ZTG	ISE	ASS	indetermination		FLRM			indetermination		AFMD		NLMT			

○ CAMMD (camera mode)

　0x0 fixed for the DVC mode

○ FRMSZ (frame size)

　－ 0：640x480 / 2：720x480 / 3：720x576   4：1680x720 / 5：1280x720 / 6：1920x1080

○ FRMRT (frame rate)

　－ 0：10 FPS / 1：15 FPS / 2：24 FPS /   3：25 FPS / 4：30 FPS / 5：60 FPS / 6：50 FPS

○ HR (High Resolution mode)

　－ 0:ON / 1: OFF

○ HS (High Sensitivity mode)

　－ 0:ON / 1: OFF

○ FRMALN(output frame align)

　－ 0: 1 byte align / 1: 8 byte align / 2: 16 byte align / 3: 32 byte align

○ ISS (Image Stabilizer Support mode)

　－ 0: Support active / 1:　No support

○ FLR (Flicker reduction)

　－ 0:ON / 1: OFF

○ FLRM (Flicker reduction)

   − 0:AUTO / 2: 50Hz / 3: 60Hz

   <Note> This parameter is valid only when FLR is set to ON（"0"）.

○ ZTG (Zoom Tracking)

   − 0:ON / 1: OFF

○ ISE (Motion Image Stabilizer setup)

   − 0:OFF / 1: ON

○ ASS (Auto slow shutter)

   − 0:ON / 1: OFF

○ AFMD (Auto Focus mode)

   − 0:Continuous action / 1:interval action / 2:one push action

○ NLMT (AFNear Limit setup)

   − 0:10mm / 1:40mm / 2:60mm / 3:130mm / 4:200mm / 5:500mm / 6:700mm / 7:900mm / 8:1000mm / 9:2000mm / 10:4500mm

● CAM_STAT structure of DSC mode

byte	P0								P1							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R/W		R/W		R/W				R/W	R/W	R/W	R/W		R/W		R
Field	CAMMD		STLSZ		AEBST				PRT	HS	AEBC	STLDRV		CNTSPD		ISWRN

byte	P2									P3						
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R									RSV					R/W	R
Field	AFRSLT									0					AFLCK	AFS
	R0	R1	R2	R3	R4	R5	R6	R7	R8							

○ CAMMD (camera mode)

   0x1 fixed for DSC mode

○ STLSZ (frame size)

   − 0：L(1600 x 1200) / 1：WL(1920x1080) / 2：M(1280x960) /

      3：MS(800x600) / 4：S(640x480)

○ AEBST (AEB step)

   − 0：0.33EV / 1：0.66EV / 2：1.00EV

      3：1.33EV / 4：1.66EV / 5：2.00EV

○ PRT (Preview mode)

   − 0:30 FPS / 1: 15 FPS

○ HS (High sensitivity mode)

   − 0: OFF / 1: ON

○ AEBC (AEB capture number)

- 0 : 3pieces / 1 : 5pieces

○ STLDRV (Still image drive mode)

- 0: Single shoot / 1: Continuous shoot / 2 : AEB

○ CNTSPD (Continuous shooting speed)

- 0: High speed / 1: Medium speed / 2: Slow speed

○ ISWRN (Alert of shaking)

- 0: Activate alarm / 1: Disable alarm

○ AFRSLT (Each area of AF result)

  Rx is index of AF evaluation windows

- 0: not achieve the focus / 1: achieve the focus

○ AFLCK (Focus lock)

- 0:ON / 1: OFF

○ AFS (AF status)

- 0: In progress / 1: Completed

● CAM_STAT structure of common for both DVC and DSC

byte	P4								P5							
bit	7	6	5	4	3	2	1	0	7	6	5		4	3	2	1	0
R/W	R/W		R/W		RSV	R/W	R/W	RSV	R/W				R/W				
Field	AESP		AWBSP		0	HMR	HMR	0	AVIDX				TVIDX				

byte	P6								P7							
bit	7	6	5	4	3	2	1	0	7	6	5		4	3	2	1	0
R/W	R/W	R/W		R/W			R/W		R/W	R/W	RSV		R/W			
Field	AEMD	ISOMD		ISOIDX			METMD		BLC	AELCK	0		EVIDX			

○ AESP (AE convergence speed setup)
  − 0: slow / 1:Middle / 2:fast
○ AWBSP (AWB convergence speed setup)
  − 0: slow / 1:Middle / 2:fast
○ VMR (Vertical mirroring)
  − 0: No mirroring / 1: Mirroring
○ HMR (Horizontal mirroring)
  − 0: No mirroring / 1: Mirroring
○ AVIDX (diaphragm setup)
  − 0 : F1.8 / 1 : F2.0 / 2 : F2.8 / 3 : F4.0 / 4 : F5.6 / 5 : F8.0 / 6 : F11
○ TVIDX (Shutter speed setup)
  − 0:1/5 1:1/6 2: 1/7.5 3: 1/10 4: 1/12   5: 1/15   6: 1/24   7: 1/25   8: 1/30   9: 1/48   10: 1/50
    11:1/60 12: 1/100 13: 1/120 14: 1/250 / 15: 1/500 / 16: 1/1000、17: 1/2000 18:1/4000

  <Note> Actually valid shutter speeds vary by camera mode and the combination of flame rate.
         Please refer to chapter 6.4.42. 3 " Frame rate and shutter speed setup."

○ AEMD (AE mode)
  − 0: manual / 1: Program AE / 2: Aperture priority / 3: Shutter speed priority
○ ISOMD (ISO sensitivity mode)
  − 0: auto / 1: manual
○ ISOIDX (manual setup for ISO sensitivity)
  − 0 : ISO 80 / 1 : ISO 100 / 2 : ISO 200 / 3 : ISO 400 / 4 : ISO 800 / 5 : ISO 1250
○ METMD (metering mode)
  − 0: center weighted / 1: spot / 2: evaluation metering
○ BLC (Back light correction)
  − 0 : ON / 1 : OFF
○ AELCK (AE lock)
  − 0 : ON / 1 : OFF
○ EVIDX (EV correction)
  − 0 : -2.0   1 : -1.66   2 : -1.33   3 : -1.0   4 : -0.66   5 : -0.33   6 : 0.0   7 : 0.33   8 : 0.66
    9 : 1.0   10 : 1.33   11 : 1.66   12 : 2.0

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byte	P8								P9							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R/W		R/W				RSV		R/W	R/W	R/W		R/W			
Field	WBMD		WBMDIDX				0		AFRNG	FMD	AFWD		AFWDIDX			

byte	P10								P11							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R				R				R							
Field	FCSPOS				WBCS				ZOOMPOS							

○ WBMD (White balance mode)
- 0: Operating setup / 1: custom / 2: manual

<Caution> Setting is disable other than 0 by the once setup. Reading will be executed setting mode by individual setting

○ WBMDIDX (White balance index)
- 0: Auto / 1: custom / 2: manual / 3: day light / 4: cloudy / 5: shade / 6: fluorescent W / 7: fluorescent N / 8: fluorescent D / 9: tungsten

○ AFRNG (AF range)
- 0: full range / 1: normal range / macro range

○ FMD (focus mode)
- 0:auto / 1: manual

○ AFWD (AF evaluation window mode)
- 0: auto / 1: manual

○ AFWDIDX (AF evaluation window index)
- 0 : top left/ 1 : top center / 2 : top right /
  3 : middle left/ 4 : middle center / 5 : middle right /
  6 : bottom left/ 7 : bottom center / 8 : bottom right /

○ FCSPOS (Current focus position)
- 0:0.01m / 1 : 0.04m / 2 : 0.06m / 3 : 0.13m / 4 : 0.2m / 5 : 0.5m /
  6 : 0.7m / 7 : 1m / 8 : 2m / 9 : 4.5m / 10 : 12m / 11 : 25m / 12 : INF

○ WBCS (custom white balance status)
- 0 : before processing / 1 : processing in progress / 2: normal completion / 3 : error termination

○ ZOOMPOS (zoom position)
- 0 : Wide end to 1023: Tele end

byte	P12								P13						
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R														
Field	FOCALLEN (Integer portion)														

byte	P14								P15						
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R								R/W		R/W			RSV	R/W	
Field	FOCALLEN (fractional portion)								SCNMD		SCNIDX			0	NR	

○ FOCALLEN (actual focusing length)

  – 16.8 fixed decimal point type, Unit: mm

○ SCNMD (Scene mode)

  – 0 : ON / 1 : OFF

○ SCNIDX (Scene mode index)

    2: night (with auto change) / 3: night   (without auto change) /13: auto /

   14: WDR / 15: High color temperature

○ NR (noise reduction)

  – 0 : High / 1 : Middle / 2 : Low / 3 : Off

byte	P16								P17						
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R/W		R/W			R/W			R/W		R/W		R/W			
Field	SHARP		HUECR			HUECB			CRMCR		CRMCB		EFFCT			

byte	P18								P19						
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	RSV								R/W							
Field	0								AFITRVL							

○ SHARP (sharpness)

  – 0 : High / 1 : Middle / 2 : Low

○ HUECR (hue CR setup)

  – 0 : -2 / 1 : -1 / 2 : 0 / 3 : +1 / 4 : +2

○ HUECB (hue CB setup)

  – 0 : -2 / 1 : -1 / 2 : 0 / 3 : +1 / 4 : +2

○ CRMCR (chroma CR setup)

  – 0 : High / 1 : Middle / 2 : Low

○ CRMCB (chroma CB setup)

- 0 : High / 1 : Middle / 2 : Low

○ EFFECT (digital effect setup)

- 0: normal / 1: sepia / 2: monochrome / 3: pasteurization / 4: solarization / 5: negative /
  6:custom

○ AFITRVL (AF interval)

- 0x0005 to 0x0384 : specified number of seconds 5sec to 900sec (15min)

byte	P20								P21							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R								R							
Field	EV (integer portion)								EV(fractional portion)							

byte	P22								P23							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R								R							
Field	TV (integer portion)								TV(fractional portion)							

○ EV (exposure value)

- APEX value with S7.8 fixed decimal point number

○ TV (Exposure time)

- APEX value with S7.8 fixed decimal point number

byte	P24								P25							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R								R							
Field	AV (integer portion)								AV(fractional portion)							

byte	P26								P27							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	R								R							
Field	SV (integer portion)								SV(fractional portion)							

○ AV (Aperture Value)

- APEX value with S7.8 fixed decimal point number

○ SV (Film Speed Value)

- APEX value with S7.8 fixed decimal point number

Reserve bit see below

byte	P28								P29							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	RSV								RSV							
Field	0								0							

byte	P30								P31							
bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R/W	RSV								RSV							
Field	0								0							

6.4.37   Scene mode setup command

6.4.37.1   Command from HOST

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	0x0400		0x0004		SCNMD		SCNIDX	

● Function

   Setup and Select scene mode

● Details of parameter

   − SCNMD(Scene mode active/inactive)：UI_16 type

      ・ 0x0000：Scene mode active

      ・ 0x0001：Scene mode inactive

   − SCNIDX(scene index)：UI_16 type

SCN	Scene mode	Support	
		DVC	DSC
0x0002	Night (with auto change)	○	
0x0003	Night (without auto change)	○	
0x000D	Auto	○	○
0x000E	WDR	○	
0x000F	High color temperature	○	○

<Caution>: Same behavior with scene Auto mode when setup Night mode (manual / Auto

   change), WDR mode and High sensitivity at frame rate of movie.

When enable the scene mode, those command become invalid

" ○ " is Valid blank is invalid

Command (control)	CMD_ID	Night (without Auto change)	Night (Auto change)	Auto	WDR	High color temperature
AF range setup	0x020A	○＊	○＊		○＊	○＊
AF evaluation window setup	0x020E	○＊	○＊		○＊	○＊
AF Near Limit setup	0x0212	○＊	○＊		○＊	○＊
Metering mode setup	0x0402				○	
Exposure mode setup	0x0404					
EV correction setup	0x0406					
ISO sensitivity setup	0x040A					
Focus reduction setup	0x040C					
Focus mode setup	0x0410	○	○		○	○
White balance setup	0x0412					
Sharpness setup	0x0608					
noise reduction setup	0x060A					
Chroma setup	0x060C					
Hue setup	0x060E					
Motion image stabilizer setup	0x0A00					

<Caution>: Only valid when setup Auto mode at focus mode setup

6.4.37.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

    – RET_CMDEXEC_OK   : Normal response

    – RET_CMDEXEC_PRMERROR   : SCNMD/SCNIDX specified range error

6.4.38 Scene mode request command

6.4.38.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0401		0x0000	

● Function: Obtain scene mode setup status

● Details of parameter: None

6.4.38.2 Response (Received by the host system)

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	RES		0x0000		SCNMD		SCNIDX	

● Parameter length: 4byte

● Details of parameter

    – Definition of field is the same as Scene mode setup command

● RES (Error code)

    – RET_CMDEXEC_OK   : Normal response

6.4.39 Metering mode setup command

6.4.39.1 Command from HOST

Byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x0402		0x0002		METMD	

● Function:

Setup metering mode

● Details of parameter:

‒ Definition of interrupt by INT: UI_16 type

‒ METMD(metering mode) : UI_16 type

・ 0x0000 : center weighted metering

・ 0x0001 : spot metering

・ 0x0002 : evaluation metering

6.4.39.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

‒ RET_CMDEXEC_OK   : Normal response

‒ RET_CMDEXEC_PRMERROR   : METMD specified range error

6.4.40 Metering mode request command

6.4.40.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0403		0x0000	

● Function: Obtain metering mode status

● Details of parameter: None

6.4.40.2 Response (Received by the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		METMD	

● Parameter length: 2byte

● Details of parameter

　　　　Definition of field is the same as Metering mode setup command

● RES (Error code)

　　－ RET_CMDEXEC_OK　　　　　　　：　Normal response

6.4.41 Exposure mode setup command

6.4.41.1 Command from HOST

byte	0	1	2	3	4	5	6	7	8	9
Field	CMD_ID		PRM_SZ		PRM					
	0x0404		0x0006		AEMD		AVIDX		TVIDX	

● Function:

  Setup exposure mode

● Details of parameter
  - AEMD(Exposure mode) : UI_16 type
    · 0x0000 : Manual / 0x0001 : Programmed AE /
      0x0002 : Aperture priority AE / 0x0003 : Shutter priority AE
  - AVIDX(aperture setup) : UI_16 type
    · Valid when AEMD=0x0000 or 0x0002
    · 0x0000 : F1.8 / 0x0001 : F2.0 / 0x0002 : F2.8 / 0x0003 : F4.0 /
      0x0004 : F5.6 / 0x0005 : F8.0 / 0x0006 : F11
  - TVIDX(Shutter speed setup) : UI_16 type
    · Valid when AEMD=0x0000 or 0x0003
    · 0x0000 : 1/5 / 0x0001 : 1/6 / 0x0002 : 1/8 / 0x0003 : 1/10 / 0x0004 : 1/12 / 0x0005 :
      1/15 / 0x0006 : 1/24 / 0x0007 : 1/25 / 0x0008 : 1/30 / 0x0009 : 1/48 / 0x000A : 1/50 /
      0x000B : 1/60 / 0x000C : 1/100 / 0x000D : 1/125 / 0x000E : 1/250 / 0x000F : 1/500 /
      0x0010 : 1/1000 / 0x0011 : 1/2000 / 0x0012 : 1/4000
    <Note> Actually valid shutter speeds vary by camera mode and the combination of flame rate.
        Please refer to Chapter 6.4.42.3" Shutter speed setup with camera mode and flame
        rate"

6.4.41.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None
● RES (Error code)
  - RET_CMDEXEC_OK   : Normal response
  - RET_CMDEXEC_PRMERROR   : Combination error and specified range error among
    AEMD, AVIDX and TVIDX

6.4.42 Exposure mode request command

6.4.42.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0405		0x0000	

● Function: Obtain Exposure mode status

● Details of parameter: None

6.4.42.2 Response (Received by the host system)

byte	0	1	2	3	4	5	6	7	8	9
Field	CMD_ID		PRM_SZ		PRM					
	RES		0x0000		AEMD		AVIDX		TVIDX	

● Parameter length: 6byte

● Details of parameter

　　－　Definition of field is the same as Exposure mode setup command

● RES (Error code)

　　－　RET_CMDEXEC_OK　　　　　　：　Normal response

6.4.42.3 Frame rate and shutter speed setup

Available shutter speeds are different for each frame rate.

		DVC			DSC
		Frame rate			
		24	50,25,10	60,30,15	
Shutter speed	1/5	-	○	-	-
	1/6	○	-	-	-
	1/8	-	-	○	○
	1/10	-	○	-	-
	1/12	○	-	-	-
	1/15	-	-	○	○
	1/24	○	-	-	-
	1/25	-	○	-	-
	1/30	-	-	○	○
	1/48	○	-	-	-
	1/50	-	○	-	-
	1/60	-	-	○	○
	1/100	○	○	○	○
	1/125	○	○	○	○
	1/250	○	○	○	○
	1/500	○	○	○	○
	1/1000	○	○	○	○
	1/2000	○	○	○	○
	1/4000	○	○	○	-

6.4.43 EV correction setup command

6.4.43.1 Command from HOST

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	0x0406		0x0004		0x0000		EVIDX	

● Function:

　Setup EV correction value

● Details of parameter

－ EVIDX(EV correction)：UI_16 type

・ 0x0000：-2.0 / 0x0001：-1.66 / 0x0002：-1.33 / 0x0003：-1.0 / 0x0004：-0.66 /

0x0005：-0.33 /0x0006：0.0 / 0x0007：0.33 / 0x0008：0.66 / 0x0009：1.0 /

0x000A：1.33 / 0x000B：1.66 / 0x000C：2.0

6.4.43.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

－ RET_CMDEXEC_OK　　　　　：　Normal response

－ RET_CMDEXEC_PRMERROR　　：　EVIDX specified range error

6.4.44 EV correction request command

6.4.44.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0407		0x0000	

● Function: Obtain EV correction value

● Details of parameter: None

6.4.44.2 Response (Received by the host system)

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	RES		0x0000		0x0000		EVIDX	

● Parameter length: 4byte

● Details of parameter

  − Definition of field is the same as EV correction setup command

● Error code

  − RET_CMDEXEC_OK   :   Normal response

6.4.45   ISO sensitivity setup command

6.4.45.1 Command from HOST

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	0x040A		0x0004		ISOMD		ISOIDX	

● Function:

   Setup ISO sensitivity mode

● Details of parameter

   − ISOMD (ISO sensitivity mode) : UI_16 type

      ・ 0x0000: Auto / 0x0001: Manual

   − ISOIDX(ISO sensitivity manual setup) : UI_16 type

      ・ 0x0000：ISO80 / 0x0001：ISO100 / 0x0002：ISO200 / 0x0003：ISO400 /

         0x0004：ISO800 / 0x0005：ISO1250

6.4.45.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

   − RET_CMDEXEC_OK   : Normal response

   − RET_CMDEXEC_PRMERROR   : ISOMD/ISOIDX specified range error

6.4.46　ISO sensitivity request command

6.4.46.1　Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x040B		0x0000	

● Function: Obtain ISO sensitivity mode

● Details of parameter: None

6.4.46.2　Response (Received by the host system)

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	RES		0x0000		ISOMD		ISOIDX	

● Parameter length: 4byte

● Details of parameter

　　　Definition of field is the same as ISO sensitivity setup command

● Error code

　　− RET_CMDEXEC_OK　　　　　　　:　Normal response

6.4.47 Flicker reduction setup command

6.4.47.1 Control command

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x040C		0x0002		FLR	

● Function:

   Setup flicker reduction mode

● Details of parameter

  – FLR(Flicker reduction mode) : UI_16 type

    ・ 0x0000:ON (AUTO) / 0x0001: OFF

      0x0002:ON (50Hz fixed)   /   0x0003:ON (60Hz fixed)

6.4.47.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

  – RET_CMDEXEC_OK   :   Normal response

  – RET_CMDEXEC_PRMERROR   :   FLR specified range error

6.4.48　Flicker reduction request command

6.4.48.1　Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x040D		0x0000	

● Function: Obtain flicker reduction mode status

● Details of parameter: None

6.4.48.2　Response (Received by the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x040D		0x0000		FLR	

● Parameter length: 2byte

● Details of parameter

　　Definition of field is the same as flicker reduction setup command

● Error code

　　－　RET_CMDEXEC_OK　　　　　　　：　Normal response

6.4.49 Optical zoom setup command

6.4.49.1 Control command

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	0x040E		0x0004		ZMMD		ZMPRM	

● Function:

   Controls optical zoom position

● Details of parameter

   − ZMMD(zoom control mode)：UI_16 type

       ・ 0x0000: Specify speed

       ・ 0x0001:absolute position (step value)

       ・ 0x0002:absolute position (normalized value)

       ・ 0xff01:relative position (step value)

       ・ 0xff02: relative position (normalized value)

   − ZMPRM(zoom control parameter) : UI_16 type

       ・ Specify speed (ZMMD =0x0000) : -36 to 36

       ・ Specify absolute position (ZMMD=0x0001) : 0 (wide) to 1428(tele) : step value

       ・ Specify absolute position (ZMMD=0x0002) : 0 (wide) to 1023(tele) : normalized value

       ・ Specify relative position (ZMMD=0xff01) : -1428 (wide) to 1428(tele) : step value

       ・ Specify relative position (ZMMD=0xff02) : -1023 (wide) to 1023(tele) : normalized
           value

   <Note>: Those are only as a guide, it does not assure the accuracy of behavior

6.4.49.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● Error code

   − RET_CMDEXEC_OK   : Normal response

   − RET_CMDEXEC_PRMERROR   : ZMMD specified range error

   − RET_CMDEXEC_LENS_OUTOFRANGE   : ZMPRM   specified range error

6.4.49.3 Transfer parameter (ZMPRM)

Optical zoom is transferred by ZMPRM value as follows, negative value is to the wide direction, 0 is the stop and positive is to the tele direction.

Parameter connected with speed as follows

Setup value	Full Speed	Setup value	Full Speed	Setup value	Full Speed	Setup value	Full Speed
0	STOP	10	21%	20	42%	30	0.75
1	2%	11	23%	21	44%	31	79%
2	4%	12	25%	22	46%	32	83%
3	6%	13	27%	23	48%	33	88%
4	8%	14	29%	24	50%	34	92%
5	10%	15	31%	25	54%	35	96%
6	13%	16	33%	26	58%	36	100%
7	15%	17	35%	27	63%		
8	17%	18	38%	28	67%		
9	19%	19	40%	29	71%		

6.4.50 Optical zoom request command

6.4.50.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x040F		0x0000	

● Function: Obtain optical zoom status

● Details of parameter: None

6.4.50.2 Response (Received by the host system)

byte	0	1	2	3	4	5	6	7	8	9
Field	CMD_ID		PRM_SZ		PRM					
	RES		0x0000		ZMST		ZMDEVPOS		ZMPOS	

● Parameter length: 6byte

● Details of parameter

   − ZMST (lens status) : UI_16 type

     ・ 0x0000 :suspended zoom

     ・ 0x0001 : zooming

   − ZMDEVPOS (zoom position) UI_16 type

     ・ 0 (wide) to 1428 (tele) : step value

   − ZMPOS (zoom position) : UI_16 type

     ・ 0 (wide) to 1023(tele) :absolute value

● RES (Error code)

   − RET_CMDEXEC_OK   : Normal response

<Caution>: Zoom position value became setting value when reserve this command.

When zooming (ZMST=0x0001), this value is not match with actual value.

6.4.51 Focus mode setup command

6.4.51.1 Command from HOST

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	0x0410		0x0004		FMD		AFMD	

● Function:

   Setup focus mode

● Details of parameter

   − FMD(focus mode) : UI_16 type

       ・ 0x0000 : Auto / 0x0001 : Manual

   − AFMD (Auto Focus mode) : UI_16 type

       ・ Valid at Auto (FMD=0x0000)

   − 0x000: Continuous action / 0x0001:interval action / 0x0002:one push action

       ・

6.4.51.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

   − RET_CMDEXEC_OK   : Normal response

   − RET_CMDEXEC_PRMERROR   : FMD or AFMD specified range error

6.4.52 Focus mode request command

6.4.52.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0411		0x0000	

● Function: Obtain focus mode status

● Details of parameter: None

6.4.52.2 Response (Received by the host system)

byte	0	1	2	3	4	5	6	7
Field	Header		PRM_SZ		PRM			
	RES		0x0000		FMD		AFMD	

● Parameter length: 4byte

● Details of parameter

   Definition of field is the same as focus mode setup

● RES (Error code)

   − RET_CMDEXEC_OK   : Normal response

6.4.53   White balance setup command

6.4.53.1   Command from HOST

byte	0	1	2	3	4	5	6	7	8	9
Field	CMD_ID		PRM_SZ		PRM					
	0x0412		0x0006		WBMD		PRM1		PRM2	

● Function:

   Setup white balance

● Details of parameter: Definition of PRM1 and PRM2 depend on WBMD

WBMD	PRM1	PRM2
0x0000	WBIDX	RSV
0x0001	RSV	RSV
0x0002	XVAL	YVAL

- − WBMD(White balance mode) : UI_16 type
    - ・ 0x0000 : Function setup / 0x0001 : Custom setup / 0x0002 : Manual setup
- − WBIDX(White balance index) : UI_16 type
    Valid when WDMD=0x0000
    - ・ 0x0000 : Auto / 0x0001 : Custom / 0x0002 : Manual / 0x0003 : Day / 0x0004 : Cloudy / 0x0005 : Shade / 0x0006 : Fluorescent W / 0x0007 : Fluorescent N / 0x0008 : Fluorescent D / 0x0009 : Tungsten
- − XVAL (x from xyChromaticity Diagram) :   UNDEFINED type
    Valid when WBMD = 0x0002
    - ・ 0.16 fixed-point notation (only decimal 16bit)
- − YVAL (y from   xy Chromaticity Diagram) :   UNDEFINED type
    Valid when WBMD = 0x0002
    - ・ 0.16 fixed-point notation (only decimal 16bit)
    Please meet the following requirements about the value set to x,y.
    - ・ x range 0.25 ≤ x ≤ 0.54
    - ・ y range 0.25 ≤ y ≤ 0.49
    x + y should be less than 1.0.

● Find the details in Chapter 7.1.5" Custom mode"

● About   the following parameters of WBIDX(White balance index)

   0x0001(Custom) : Recall the value that is set at custom setup mode

   0x0002(Manual) : Recall the value that is set at manual setup mode

● About manual setup mode, express the used light source with xy chromaticity diagram, and specify the x and y

6.4.53.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

    – RET_CMDEXEC_OK   :   Normal response

    – RET_CMDEXEC_PRMERROR   :   WBMD/WBIDX specified range error

6.4.54 White balance request command

6.4.54.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0413		0x0000	

● Function:

   Obtain white balance setup

● Details of parameter: None

6.4.54.2 Response (Received by the host system)

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	RES		0x0000		WDMD		WDIDX	

● Parameter length: 4byte

● Details of parameter

  WDMD: 0x0000

    WB behavior depends on WDIDX

    WDIDX means the same as White balance setup command

  WDMD: 0x0001

    Custom behavior

    WDIDX is indeterminate value

  WDMD: 0x0002

    Manual behavior

    WDIDX is indeterminate value

● RES (Error code)

    – RET_CMDEXEC_OK   :   Normal response

6.4.55 Zoom tracking command

6.4.55.1 Control command

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x041C		0x0002		ZTG	

● Function: Obtain zoom tracking mode status

● Details of parameter

    – ZTG(Zoom tracking) : UI_16 type

        · 0x0000 : ON / 0x0001 : OFF

6.4.55.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

    – RET_CMDEXEC_OK   :   Normal response

    – RET_CMDEXEC_PRMERROR   :   ZTG specify range error

6.4.56 Zoom tracking mode request command

6.4.56.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x041D		0x0000	

● Function: Obtain zoom tracking mode status

● Details of parameter: None

6.4.56.2 Response (Received by the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		ZTG	

● Parameter length: 2byte

● Details of parameter

   Definition of field is the same as Zoom tracing mode setup command

● RES (Error code)

   − RET_CMDEXEC_OK   :   Normal response

6.4.57 Focus control setup command

6.4.57.1 Command from HOST

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	0x041E		0x0004		FCSMD		FCSPRM	

● Function: Controls focus lens

　　　　This command is valid when AF mode is set to manual

● Details of parameter

　　－ FCSMD(Focus control mode)：UI_16 type

　　　　・ 0x0000： Specify speed

　　　　・ 0x0001:absolute position (step value)

　　　　・ 0x0002:absolute position (normalized value)

　　　　・ 0xff01:relative position (step value)

　　　　・ 0xff02: relative position (normalized value)

　　－ FCSPRM(Focus control parameter)SI_16 type

　　　　・ Specify speed (FCSMD=0x0000) : -36 to 36

　　　　・ Specify absolute position (FCSMD=0x0001) : -504 (wide) to 311(tele) : step value

　　　　・ Specify absolute position (FCSMD=0x0002) : 0 (wide) to 1023(tele) : normalized value

　　　　・ Specify relative position (FCSMD=0xff01) : -815 (wide) to 815(tele) : step value

　　　　・ Specify relative position (FCSMD=0xff02) : -1023 (wide) to 1023(tele) : normalized value

<Note>: normalized value normalize possible focusing area of controlling focus lens

　　　When using focus control by speed setup, it must specify command speed setup to "0" to stop.

　　　Those are only as a guide, it does not assure the accuracy of behavior.

　　　And focus may not move specified position, because focus range is limited by zoom position.

6.4.57.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

　　－ RET_CMDEXEC_OK　　　　　　　：　Normal response

　　－ RET_CMDEXEC_PRMERROR　　　：　FCSMD specified range error

　　－ RET_CMDEXEC_LENS_OUTOFRANGE：FCSPRM specified range error

6.4.58 Focus control request command

6.4.58.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x041F		0x0000	

● Function: Obtain focus lens status

● Details of parameter

　　　Definition of field is the same as focus mode transfer setup command

6.4.58.2 Response (Received by the host system)

byte	0	1	2	3	4	5	6	7	8	9
Field	CMD_ID		PRM_SZ		PRM					
	RES		0x0000		FCSST		FCSDEVPOS		FCSPOS	

● Parameter length: 6byte

● Details of parameter

　　－ FCSST (lens status) : UI_16 type

　　　　・ 0x0000 : suspended focusing

　　　　・ 0x0001 : focusing

　　－ FCSDEVPOS (Focus position) UI_16 type

　　　　・　-504 (Near) to 311 (Far) :　step value

　　－ FCSPOS (Focus position) UI_16 type

　　　　・ 0(Near) to 1023 (Far) : absolute value

● RES (Error code)

　　－ RET_CMDEXEC_OK　　　　　　　:　Normal response

<Caution>: Focus position value becomes setting value when receive this command

　　　　　　When Focusing (FCSST=0x0001), this value is not match with actual value

6.4.58.3 Transfer parameter (FCSPRM)

Focus is transferred by FCSPRM value as follows, negative value is to the Near direction, 0 is the stop and positive is to the Far direction. Parameter is connected with speed as follows. Maximum speed depends on hard ware.

Setup value	Minimum Speed	Setup value	Minimum Speed	Setup value	Minimum Speed	Setup value	Minimum Speed
0	STOP	10	10	20	20	30	34
1	1	11	11	21	21	31	36
2	2	12	12	22	22	32	38
3	3	13	13	23	23	33	40
4	4	14	14	24	24	34	44
5	5	15	15	25	25	35	46
6	6	16	16	26	26	36	48
7	7	17	17	27	28		
8	8	18	18	28	30		
9	9	19	19	29	32		

6.4.59 Digital effect setup command

6.4.59.1 Control command

byte	0	1	2	3	4	5	6	7	8	9	10	11
Field	CMD_ID		PRM_SZ		PRM							
	0x0606		0x0020		EFFECT		FIXEN	FIXCR	FIXCB	NEGAEN	SORAEN	POSEN

byte	12	13	14	15	16	17	18	19	20	21	22	23
Field	PRM											
	POS0	POS1	POS2	POS3	POS4	POS5	POS6	POS7	POS8	POS9	POS10	POS11

byte	24	25	26	27	28	29	30	31	32	33	34	35
Field	PRM											
	POS12	POS13	POS14	POS15	POS16	POS17	POS18	POS19	POS20	POS21	POS22	POS23

● Function:

　　Setup digital effect

● Details of parameter

　　– EFFECT(Digital effect setup) : UI_16 type

　　　　・ 0x0000 : Normal / 0x0001 : Sepia / 0x0002 : monochrome /

　　　　　0x0003 : Pasteurization / 0x0004 : Solarization /

　　　　　0x0005 : Negative / 0x0006 : custom

6.4.59.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

　　– RET_CMDEXEC_OK　　　　　　:　Normal response

　　– RET_CMDEXEC_PRMERROR　　:　EFFECT specified range error

6.4.60 Digital Effect request command

6.4.60.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0607		0x0000	

● Function: Obtain digital effect status

● Details of parameter: None

6.4.60.2 Response (Received by the host system)

byte	0	1	2	3	4	5	6	7	8	9	10	11
Field	CMD_ID		PRM_SZ		PRM							
	0x0607		0x0000		EFFECT		FIXEN	FIXCR	FIXCB	NEGAEN	SORAEN	POSEN

byte	12	13	14	15	16	17	18	19	20	21	22	23
Field	PRM											
	POS0	POS1	POS2	POS3	POS4	POS5	POS6	POS7	POS8	POS9	POS10	POS11

byte	24	25	26	27	28	29	30	31	32	33	34	35
Field	PRM											
	POS12	POS13	POS14	POS15	POS16	POS17	POS18	POS19	POS20	POS21	POS22	POS23

● Parameter length: 32byte

● Details of parameter

 Definition of field is the same as digital effect setup command

● RES (Error code)

 – RET_CMDEXEC_OK   : Normal response

6.4.60.3 Custom setup

It is possible to setup many digital effects to combine with parameters

● Fixed color tone effect

 Monochrome and sepia are fixed color tone effect. It is more changeable than tree parameter, FIXWN, FIXCR and FIXCB.

 ● FIXEN : Setup fixed color tone effect ON/OFF

 – 0x00: effect OFF

 – 0x01: effect ON

● FIXCR :   Setup fixing CR value

  − 0x00 to 0xFF: CR code

● FIXCB : Setup fixing CR value

  − 0x00 to 0xFF: CR code

- Inversion

  Turn over luminance

● NEGAEN : Setup inversion ON/OFF

  − 0x00: effect OFF

  − 0x01: effect ON

- Sorarization

  Output dark part as exactly like it is. And output brighter than middle level as turn over luminance

 If it uses with Inversion that outputs dark part as turn over luminance and output brighter than middle level as exactly like it is

 * Cannot use with postarization

● SORAEN : Setup sorarizaion ON/OFF

  − 0x00: effect OFF

  − 0x01: effect ON

- Posterization

  Posterization effect uses POS0 to POS23 data

● POSAEN : Setup posterization ON/OFF

  − 0x00: effect OFF

  − 0x01: effect ON

● POS0 to POS23 : Setup output level

  − 0x00: 0x00 to 0xff

Setup output level in ascending order from POS0.

Ignore data when small value comes up than previous value.

6.4.61　Sharpness setup command

6.4.61.1　Control command

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x0608		0x0002		SHARP	

● Function: Setup sharpness

● Details of parameter
- SHARP(Sharpness index) : UI_16 type
  - 0x0000 : High / 0x0001 : Middle / 0x0002 : Low

6.4.61.2　Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)
- RET_CMDEXEC_OK　　　　　　　　:　Normal response
- RET_CMDEXEC_PRMERROR　　　　:　SHARP specified range error

6.4.62 Sharpness request command

6.4.62.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0609		0x0000	

- ● Function: Obtain sharpness setup status
- ● Details of parameter: None

6.4.62.2 Response (Received by the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		SHARP	

- ● Parameter length: 2byte
- ● Details of parameter

    Definition of field is the same as sharpness setup command

- ● RES (Error code)
    - – RET_CMDEXEC_OK   :   Normal response

6.4.63 Noise reduction setup command

6.4.63.1 Control command

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x060A		0x0002		NR	

● Function:

   Setup noise reduction

● Details of parameter

   − NR(Noise reduction index) : UI_16 type

      ・ 0x0000 : High / 0x0001 : Middle / 0x0002 : Low / 0x0003 : Off

6.4.63.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

   − RET_CMDEXEC_OK   : Normal response

   − RET_CMDEXEC_PRMERROR   : NR specified range error

6.4.64 Noise reduction request command

6.4.64.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x060B		0x0000	

- ● Function: Obtain noise reduction setup status
- ● Details of parameter: None

6.4.64.2 Response (Received by the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		NR	

- ● Parameter length: 2byte
- ● Details of parameter

    Definition of field is the same as noise reduction setup command

- ● RES (Error code)
    - − RET_CMDEXEC_OK   :   Normal response

6.4.65 Chroma setup command

6.4.65.1 Control command

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	0x060C		0x0004		CRMCR		CRMCB	

● Function:

   Setup chroma

● Details of parameter

   − CRMCR(Chroma CR setup) : UI_16 type

      · 0x0000 : High / 0x0001 : Middle / 0x0002 : Low

   − CRMCB(Chroma CR setup) : UI_16 type

      · 0x0000 : High / 0x0001 : Middle / 0x0002 : Low

6.4.65.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code) :

   − RET_CMDEXEC_OK   : Normal response

   − RET_CMDEXEC_PRMERROR   : CRMCR/CRMCB specified range error

6.4.66 Chroma request command

6.4.66.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x060D		0x0000	

- ● Function: Obtain chroma setup status
- ● Details of parameter: None

6.4.66.2 Response (Received by the host system)

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	RES		0x0000		CRMCR		CRMCB	

- ● Parameter length: 4byte
- ● Details of parameter

    Definition of field is the same as chroma setup

- ● RES (Error code)
    - − RET_CMDEXEC_OK   :   Normal response

6.4.67 Hue setup command

6.4.67.1 Command from HOST

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	0x060E		0x0004		HUECR		HUECB	

● Function:

　Setup hue

● Details of parameter

　－ HUECR(Hue CR setup)：UI_16 type

　　・ 0x0000：-2 / 0x0001：-1 / 0x0002：0 / 0x0003：+1 / 0x0004：+2

　－ HUECB(Hue CB setup)：UI_16 type

　　・ 0x0000：-2 / 0x0001：-1 / 0x0002：0 / 0x0003：+1 / 0x0004：+2

6.4.67.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

　－ RET_CMDEXEC_OK　　　　　　　：　Normal response

　－ RET_CMDEXEC_PRMERROR　　　：　HUECR/HUECB specified range error

6.4.68 Hue request command

6.4.68.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x060F		0x0000	

● Function: Obtain hue setup status

● Details of parameter: None

6.4.68.2 Response (Received by the host system)

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	RES		0x0000		HUECR		HUECB	

● Parameter length: 4byte

● Details of parameter

Definition of field is the same as hue setup command

● RES (Error code)

‒ RET_CMDEXEC_OK   :   Normal response

6.4.69 Output test pattern setup command

6.4.69.1 Command from HOST

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x0610		0x0002		TSTPTN	

● Function: Output test pattern making by inside

● Details of parameter:

‒ TSTPTN (test pattern setup) : UI_16 type
  ・ 0x0000 : Color field (normal operation)
  ・ 0x0001 : Color bar pattern
  ・ 0x0002 : Gray step Pattern
  ・ 0x0003 : Horizontal Gradation data pattern
  ・ 0x0004 : Horizontal and Vertical Gradation Data Pattern
  ・ 0x0005 : Vertical color bars

6.4.69.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● RES (Error code)

- RET_CMDEXEC_OK   :   Normal response
- RET_CMDEXEC_PRMERROR   :   TSTPTN specified range error

6.4.70 Output test pattern request command

6.4.70.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0611		0x0000	

● Function: Obtain test pattern setup value

● Details of parameter: None

6.4.70.2 Response (Received by the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		TSTPTN	

● Parameter length: 2byte

● Details of parameter

Definition of field is the same as control command

● RES (Error code)

- RET_CMDEXEC_OK   :   Normal response

6.4.71 Still image drive mode setup command

6.4.71.1 Command from HOST

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x0804		0x0002		STLDRV	

● Function:

   Setup still image drive mode

● Details of parameter

    − STLDRV(Still image drive mode) : UI_16 type

       ・ 0x0000 : Single shoot / 0x0001 : Continuous shoot / 0x0002 : AEB

6.4.71.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

    − RET_CMDEXEC_OK   :   Normal response

    − RET_CMDEXEC_PRMERROR   :   STLDRV specified range error

6.4.72   Still image drive mode request command

6.4.72.1   Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0805		0x0000	

● Function: Obtain still image drive mode status

● Details of parameter: None

6.4.72.2   Response (Received by the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		STLDRV	

● Parameter length: 2byte

● Details of parameter

    Definition of field is the same as control command

● RES (Error code)

    ‒   RET_CMDEXEC_OK   :   Normal response

6.4.73 Continuous shoot speed setup command

6.4.73.1 Command from HOST

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x0806		0x0002		CNTSPD	

● Function:

  Setup still image continuous shoot speed

● Details of parameter

  − CNTSPD (Continuous shoot speed) : UI_16 type

    ・ 0x0000 : High / 0x0001 : Medium / 0x0002 : Low

6.4.73.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

  − RET_CMDEXEC_OK   : Normal response

  − RET_CMDEXEC_PRMERROR   : CNTSPD specified range error

6.4.74 Continuous shoot speed request command

6.4.74.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0807		0x0000	

● Function: Obtain continuous shoot speed

● Details of parameter: None

6.4.74.2 Response (Received by the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		CNTSPD	

● Parameter length: 2byte

● Details of parameter

Definition of field is the same as continuous shoot speed setup command

● RES (Error code)

- RET_CMDEXEC_OK   :   Normal response

6.4.75 Still image size setup command

6.4.75.1 Command from HOST

Byte	0	1	2	3	4	5	6	7	8	9	10	11
Field	CMD_ID		PRM_SZ		PRM							
	0x0808		0x0008		STLSZ		HS		VMR		HMR	

● Function:

　　Setup still image size

　　PE1005S will change the mode based on the setup that is specified by this command when

　　mode change process will be executed.

● Details of parameter

　　– STLSZ(Frame size) : UI_16 type

　　　　・ 0x0000 : L(1600 x 1200) / 0x0001 : WL(1920x1080) / 0x0002 : M(1280x960) /

　　　　　 0x0003 : MS(800x600) / 0x0004 : S(640x480)

　　– HS(High sensitivity mode) : UI_16 type

　　　　・ 0x0000: OFF / 0x0001: ON

　　– VMR(Vertical mirroring) : UI_16 type

　　　　・ 0x0000 : No mirroring effect / 0x0001 : Mirroring effect active

　　– HMR(Horizontal mirroring) : UI_16 type

　　　　・ 0x0000 :　No mirroring / 0x0001 : Mirroring effect active

6.4.75.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

　　– RET_CMDEXEC_OK　　　　　　　　: 　Normal response

　　– RET_CMDEXEC_PRMERROR　　　 : 　STLSZ, HS, VMR, HMR specified range error

6.4.76   Still image size request command

6.4.76.1   Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0809		0x0000	

● Function: Obtain still image size

● Details of parameter: None

6.4.76.2   Response (Received by the host system)

byte	0	1	2	3	4	5	6	7	8	9	10	11
Field	CMD_ID		PRM_SZ		PRM							
	RES		0x0000		STLSZ		HS		VMR		HMR	

● Parameter length: 8byte

● Details of parameter

   Definition of field is the same as still image size setup command

● RES (Error code)

   − RET_CMDEXEC_OK   :   Normal response

6.4.76.3   Available high sensitivity mode depending on the image size

The following shows the available high sensitivity mode setup for each image size.

		HS	
		OFF	ON
STLSZ		○	-
0x0000	L	○	-
0x0001	WL	○	-
0x0002	M	○	-
0x0003	MS	○	○
0x0004	S	○	○

Mirror mode can be setup for any size and high sensitivity mode.

6.4.77 AEB setup command

6.4.77.1.1 Control command

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	0x080E		0x0004		AEBC		AEBST	

● Function:

  Setup number of bracket and quantity of bracket

● Details of parameter:

  − AEBC(Number of AEB shooting) : UI_16 type

    · 0x0000 : 3pieces / 0x0001 : 5pieces

  − AEBST(AEB step) : UI_16 type

    · 0x0000 : 0.33EV / 0x0001 : 0.66EV / 0x0002 : 1.00EV

      0x0003 : 1.33EV / 0x0004 : 1.66EV / 0x0005 : 2.00EV

6.4.77.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

  − RET_CMDEXEC_OK   : Normal response

  − RET_CMDEXEC_PRMERROR   : AEBC/AEBST specified range error

6.4.78   AEB request command

6.4.78.1   Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x080F		0x0000	

- ● Function: Obtain number of AE bracket and quantity of AE bracket
- ● Details of parameter: None

6.4.78.2   Response (Received by the host system)

byte	0	1	2	3	4	5	6	7
Field	CMD_ID		PRM_SZ		PRM			
	RES		0x0000		AEBC		AEBST	

- ● Parameter length: 4byte
- ● Details of parameter

    Definition of field is the same as AEB setup command

- ● RES (Error code)

    − RET_CMDEXEC_OK   :   Normal response

6.4.79   Still image preview mode setup command

6.4.79.1   Command from HOST

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x0810		0x0002		PRT	

● Function:

     Setup frame rate for still image preview

     PE1005S will change the mode based on the setup that is specified by this command when mode change process will be executed.

     Still image preview frame rate turns to be slower than setup frame rate under low-light

● Details of parameter

     −   PRT(Preview mode) : UI_16 type

         ·   0x0000:30 FPS / 0x0001: 15 FPS

6.4.79.2   Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

     −   RET_CMDEXEC_OK   :   Normal response

     −   RET_CMDEXEC_PRMERROR   :   PRT specified range error

6.4.80 Still image preview mode request command

6.4.80.1 Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0811		0x0000	

● Function: Obtain still image preview frame rate status

● Details of parameter: None

6.4.80.2 Response (Received by the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		PRT	

● Parameter length: 2byte

● Details of parameter

　　　Definition of field is the same as still image preview mode setup command

● RES (Error code)

　　－ RET_CMDEXEC_OK　　　　　　　:　Normal response

6.4.81   Motion image stabilizer setup command

6.4.81.1   Command from HOST

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x0A00		0x0002		ISE	

● Function:

Setup motion image stabilizer

This command is inactive when frame format that is not supported for motion image stabilizer.

This set up is kept.

● Details of parameter:

  – ISE(Image stabilizer setup) : UI_16 type

    ・ 0x0000 :   OFF / 0x0001: ON

6.4.81.2   Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

  – RET_CMDEXEC_OK   :   Normal response

  – RET_CMDEXEC_PRMERROR   :   ISE specified range error

6.4.82   Motion image stabilizer request command

6.4.82.1   Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0A01		0x0000	

● Function: Obtain motion image stabilizer setup status
● Details of parameter: None

6.4.82.2   Response (Received by the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		ISE	

● Parameter length: 2byte
● Details of parameter:

   Definition of field is the same as Motion image stabilizer setup command
● RES (Error code):
   − RET_CMDEXEC_OK   :   Normal response

6.4.83 Frame format setup command

6.4.83.1 Control command

byte	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Field	CMD_ID		PRM_SZ		PRM															
	0x0A04		0x0010		FRMSZ		FRMRT		HR		HS		FRMALN		VMR		HMR		ISS	

● Function:

Setup frame rate format

This command is inactive until mode change process will be executed.

● Details of parameter

–   FRMSZ(Frame rate size)：UI_16 type

・ 0x0000：640x480 / 0x0002：720x480 / 0x0003：720x576 / 0x00004：1680x720 /
0x0005：1280x720 /6：1920x1080

–   FRMRT(Frame rate)：UI_16 type

・ 0x0000：10 FPS / 0x0001：15 FPS / 0x0002：24 FPS /
0x0003：25 FPS / 0x0004：30 FPS / 0x0005：60 FPS / 0x0006：50 FPS

–   HR(High sensitivity mode)：UI_16 type

・ 0x0000:ON / 0x0001: OFF

–   HS(High sensitivity mode)：UI_16 type

・ 0x0000:ON / 0x0001: OFF

–   FRMALN(Output frame alignment)：UI_16 type

・ 0x0000：1 byte / 0x0001：8 byte /0x0002:16 / 0x0003：32 byte

< Caution> specify output scale of horizontal valid pixel. It is possible to not same as set
parameter by FRMSX; frame size, because integral multiple of this parameter is equal to
output of horizontal frame size.

–   VMR (Vertical mirror)：UI_16 type

・ 0x0000： No mirroring / 0x0001： Mirroring

–   HMR (horizontal mirror)：UI_16 type

・ 0x0000： No mirroring / 0x0001： Mirroring

–   ISS(Motion stabilizer support mode)：UI_16 type

・ 0x0000： Support active / 0x0001： Support inactive

6.4.83.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES(Error code)

    – RET_CMDEXEC_OK   :   Normal response

    – RET_CMDEXEC_PRMERROR   :   FRMSZ, FRMRT, HR, HS,

        FRMALN,VMR,HMR,ISS specified range error or combination error.

6.4.84   Frame format request command

6.4.84.1   Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0A05		0x0000	

● Function: Obtain motion image frame format status

● Details of parameter: None

6.4.84.2   Response (Received by the host system)

| byte	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Field	CMD_ID		PRM_SZ		PRM															
	RES		0x0000		FRMSZ		FRMRT		HR		HS		FRMALN		VMR		HMR		ISS	

● Parameter length: 16byte

● Details of parameter

   Definition of field is the same as Frame format setup command

● RES (Error code)

   − RET_CMDEXEC_OK   :   Normal response

6.4.84.3 Available options for each image frame format

Frame format	FRMSZ	FRMRT	HR	HS	ISS	IS
1920x1080-30P	0x0006	0x0004	0x0001	0x0001	1 only	NA
1920x1080-25P		0x0003				
1920x1080-24P		0x0002				
1920x1080-15P		0x0001			0 or 1	Applicable
1280 x 720 -60P	0x0005	0x0005		0x0001	1 only	NA
1280 x 720 -50P		0x0006				
1280 x 720 -30P High resolution mode		0x0004	0x0000		0 or 1	Applicable
1280 x 720 -24P High resolution mode		0x0002				
1280 x 720 -15P High resolution mode		0x0001				
Cine720(1680x720) -30P	0x0004	0x0004	0x0001		1 only	NA
Cine720(1680x720) -24P		0x0002				
625(720x576)-25P High resolution mode	0x0003	0x0003	0x0000		0 or 1	Applicable
625(720x576)-25P High sensitivity mode			0x0001	0x0000		
625(720x576)-10P High resolution mode		0x0000	0x0000	0x0001		
625(720x576)-10P High sensitivity mode			0x0001	0x0000		
525(720x480)-30P High resolution mode	0x0002	0x0004	0x0000	0x0001		
525(720x480)-30P High sensitivity mode			0x0001	0x0000		
525(720x480)-15P High resolution mode		0x0001	0x0000	0x0001		
525(720x480)-15P High sensitivity mode			0x0001	0x0000		
640 x 480-30P High resolution mode	0x0000	0x0004	0x0000	0x0001		
640 x 480-30P High sensitivity mode			0x0001	0x0000		
640 x 480-15PHigh resolution mode		0x0001	0x0000	0x0001		
640 x 480-15P High sensitivity mode			0x0001	0x0000		

6.4.85 Auto slow shutter setup command

6.4.85.1 Command from HOST

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	0x0A06		0x0002		ASS	

● Function:

   Setup auto slow shutter

● Details of parameter

   − ASS(Auto slow shutter) : UI_16 type

      ・ 0x0000 : ON / 0x0001: OFF

6.4.85.2 Response (Received by the host system)

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	RES		0x0000	

● Details of parameter: None

● RES (Error code)

   − RET_CMDEXEC_OK   : Normal response

   − RET_CMDEXEC_PRMERROR   : ASS specified range error

6.4.86   Auto slow shutter request command

6.4.86.1   Command from HOST

byte	0	1	2	3
Field	CMD_ID		PRM_SZ	
	0x0A07		0x0000	

● Function: Obtain auto slow shutter status

● Details of parameter: None

6.4.86.2   Response (Received by the host system)

byte	0	1	2	3	4	5
Field	CMD_ID		PRM_SZ		PRM	
	RES		0x0000		ASS	

● Parameter length: 2byte

● Details of parameter

　　　Definition of field is the same as Auto slow shutter setup command

● RES (Error code)

　　－ RET_CMDEXEC_OK　　　　　　　 :　Normal response

7 Example of command sequence

7.1.1 Startup sequence

Please reference " PE1005S DATA SHEET" for the information of power on and reset control.
Describe state transition below.
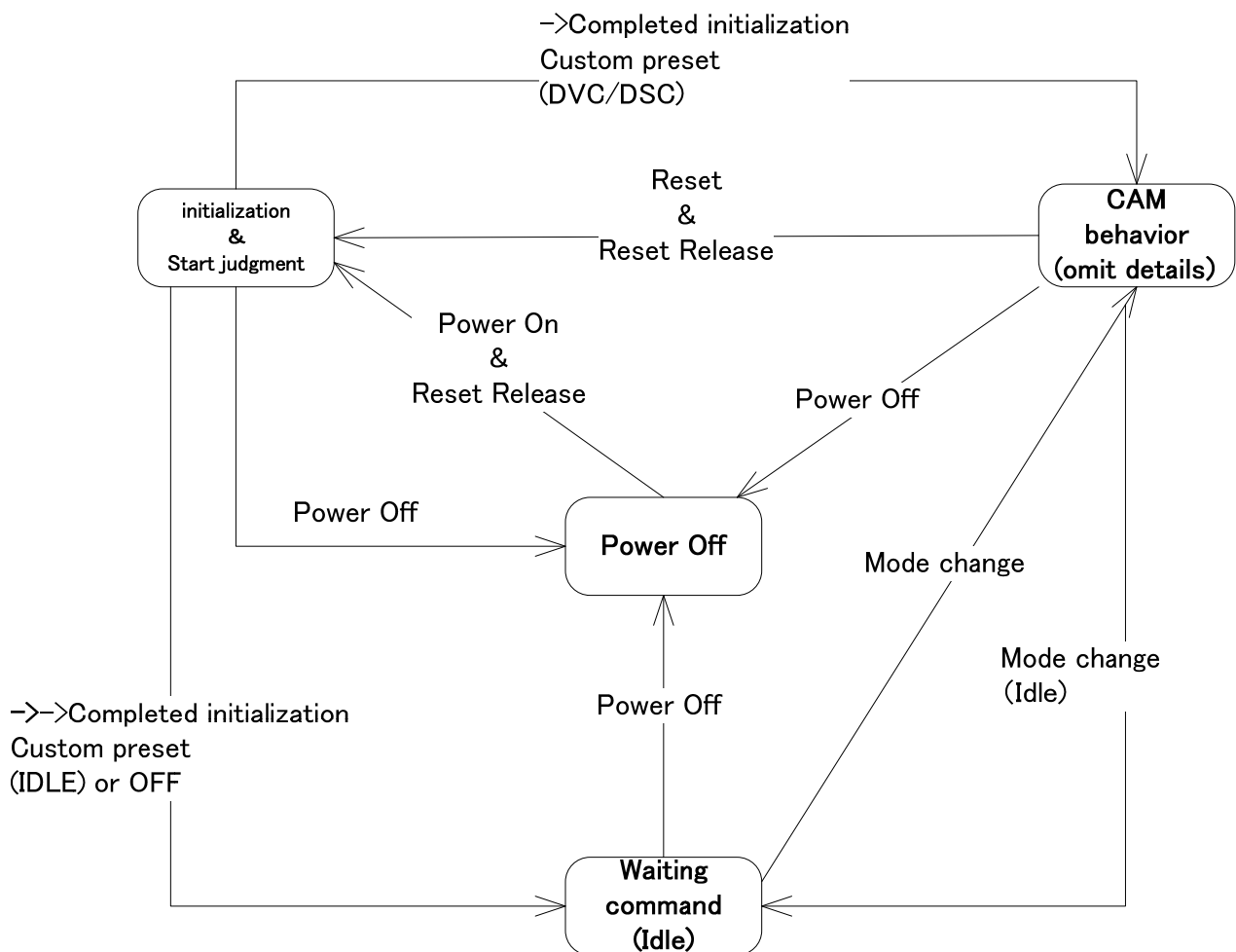
7.1.1.1 Startup confirmation sequence

The following diagram shows how to confirm the startup and to reset communication between the host system and PE1005S.
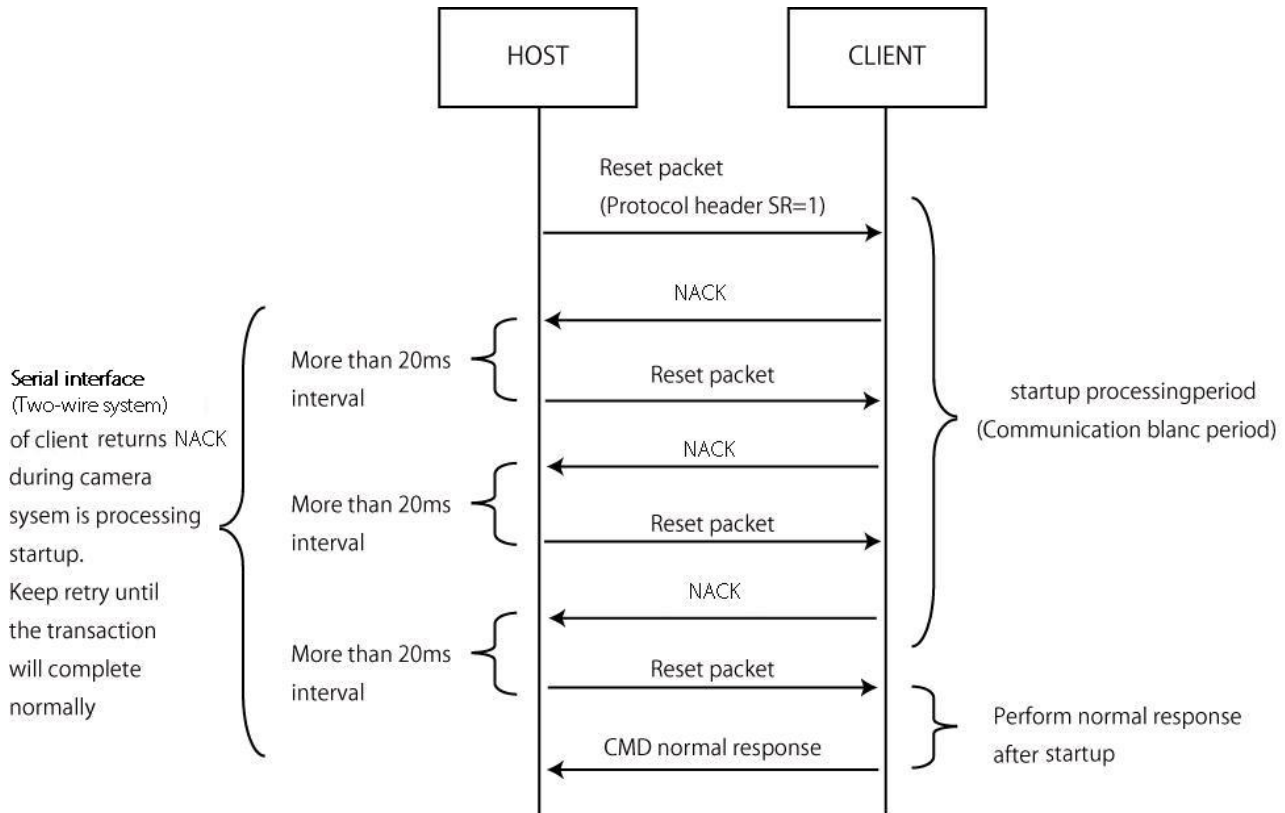
Diagram 6 Startup sequence

1. PE1005S sends NACK to the slave address if PE1005S is not ready to receive the command packet. When HOST received NACK, please allow 20 msec intervals before resending the command packet. If PE1005S is ready to receive the command packet, it will returns ACK by responding the command packet that is sent by the host system.
2. Use sense command for reset
    Ex.) " Serial No. request command " when status is ILP, " Camera mode request command" when status is Camera.

7.1.1.2 Startup camera system sequence

The following diagram shows how to start the camera system.

When Camera mode setup value is IDLE (initial value)   When camera mode setup value is DVC/DSC

HOST   CLIENT   HOST   CLIENT

Startup confirm sequence

Can omit this part
- Request IPL Version
- IPL Version information
- Request F/W Version
- F/W Version information

IDLE

System setup command
RET_CMDEXEC_OK

Startup confirm sequence

Camera setup at once
RET_CMDEXEC_OK

DVC/DSC

Omit below

Startup confirm sequence

Can omit this part
- Request IPL Version
- IPL Version information
- Request F/W Version
- F/W Version information

System setup command
RET_CMDEXEC_OK

DVC/DSC

Camera setup at once
RET_CMDEXEC_OK

Omit below

Diagram 7 Camera system startup sequence

(1) After turn on power, camera system firmware in PE1005S starts

(2) Specify Movie or Still picture mode and setup shooting parameter so on by sending ' Camera setup command at once' .

If camera mode is IDEL (initial value) please execute following processing.

(3) Request PE1005S a ' Mode change' interrupt define setup command

(4) Assert interrupt to PE1005S via INT_IN port from Low to High.

 * PE1005S turns to be specified camera mode as a result of receiving interrupt request *

(5) PE1005S returns INT_OUT interrupt to the host system when the above mode change will be completed.

(6) PE1005S start providing image output data from the next VLD rising edge. When ' Movie capture mode' , movie frame data is provided, while preview frame is provided when PE1005S is set to ' Still capture mode' .

7.1.1.3 Custom preset sequence
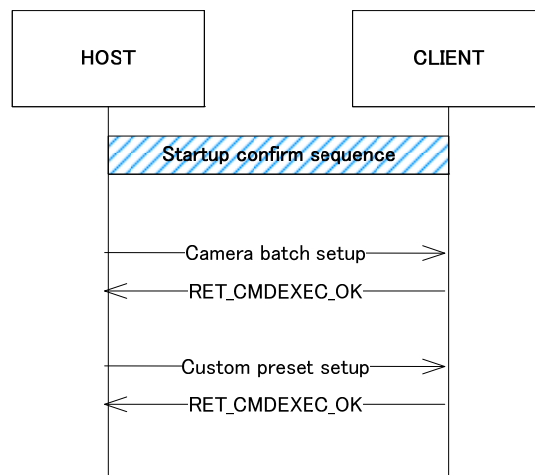
Diagram 7 Camera system startup sequence

（1）After turn on power, camera system firmware in PE1005S starts

（2）Send camera status setup command at once (control) or individual setup command (control) to setup
        DVC/DSC mode, shooting parameters.

（3）Specify " ON " by custom preset setup command.

（4）Obtain custom preset value to nonvolatile memory
        Zoom and focus position preset obtain step value of position information on preset

（5）Valid preset setup after restart PE1005S

7.1.2 Shutdown sequence

The following diagram shows how to shutdown camera system.
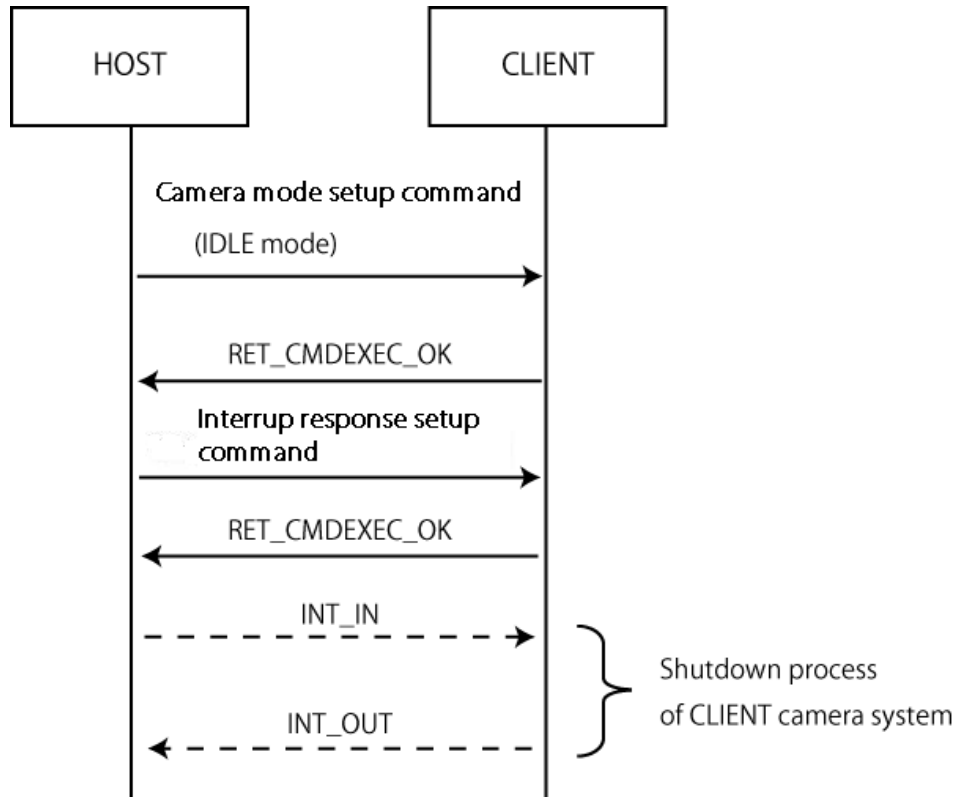
Diagram 9 Shutdown sequence

(1) Specify ' Idle' by sending the camera mode setup command.

(2) Specify ' Mode change' by sending interrupt define setup command

(3) Assert interrupt to PE1005S via INT_IN port from Low to High.

PE1005S startup as an ' Idle mode' as a result of receiving ' Mode change interrupt' .

(4) PE1005S sends interrupt to the host system via INT_OUT port.

(5) Turn off PE1005S. Please reference " PE1005S DATA SHEET" chapter 3.3 Power ON/OFF for the

more details.

7.1.3 Mode change sequence

The following diagram shows how to perform ' Mode change sequence' .

HOST   CLIENT

Camera mode setup command

RET_CMDEXEC_OK

Interrupt response command
(Mode change)

RET_CMDEXEC_OK

INT_IN

Turn to be the
specified mode

INT_OUT

Image data output
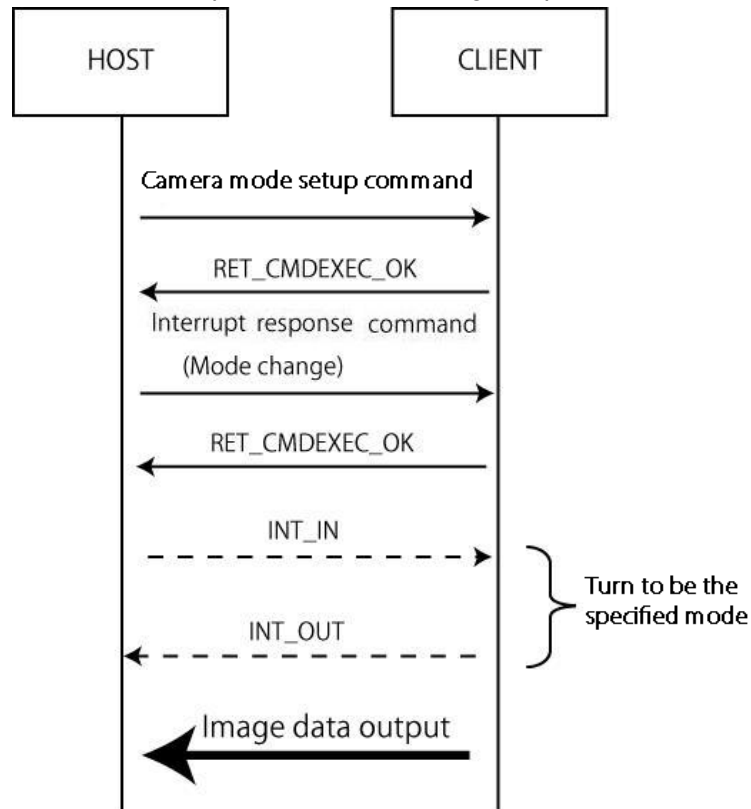
Diagram 10 Mode change sequence

(1) Setup Movie/Still mode and shooting parameters so on by sending the ' Camera status setup at once
        command' .
(2) Request ' Mode change' by sending ' Interrupt response command' .
(3) Assert interrupt to PE1005S via INT_IN port from Low to High
        Startup as a specified mode as a result of receiving mode change interrupt request
(4) PE1005S asserts the interrupt request to the host system via INT_OUT port when the ' mode
        change' is completed.
(5) PE1005S start providing image output data from the next VLD rising edge. When ' Movie capture
        mode' , movie frame data is provided, while preview frame is provided when PE1005S is set to
        ' Still capture mode' .

7.1.4 Still image sequence

7.1.4.1 Half shutter available
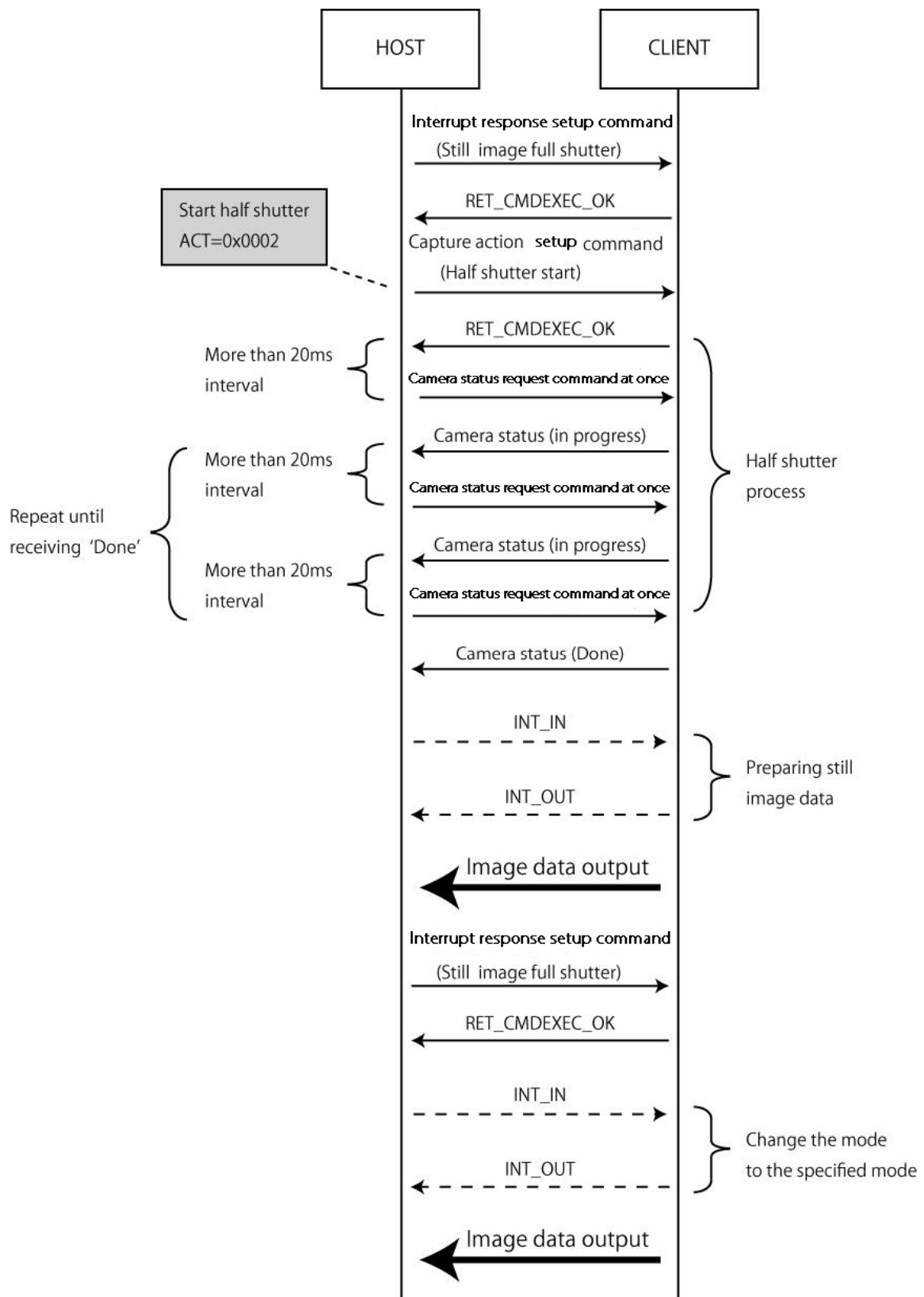
Diagram 11 Still image sequences (Half shutter available)

（1）Change mode to ' Still image shooting' so that preview frame is provided by PE1005S

（2）Specify ' Still image full shutter by sending ' interrupt response setup command'

（3）Specify ' Start half shutter' by using the ' Capture action setup command' PE1005S start half
      shutter operation

（4）Send ' Camera status request command' until AFS (status of AF) will be completed.

（5）Assert interrupt to PE1005S via INT_IN port from Low to High
      VLD is hold to high as a result of ending the preview frame after the next VLD following the still
      image full shutter interrupt.

（6）PE1005S asserts interrupt via INT_OUT when still image capturing is completed

（7）VLD hold to high again after providing one frame starting from falling edge of the next VLD.

（8）Specify ' Mode change' by sending ' Interrupt response setup command'

（9）Assert interrupt to PE1005S via INT_IN from Low to High
      Restart with still image mode as a result of receiving mode change interrupt

（10）PE1005S asserts the interrupt request to the host system via INT_OUT port when the ' mode
      change' is completed

（11）PE1005S start providing image output from the next falling edge of VLD
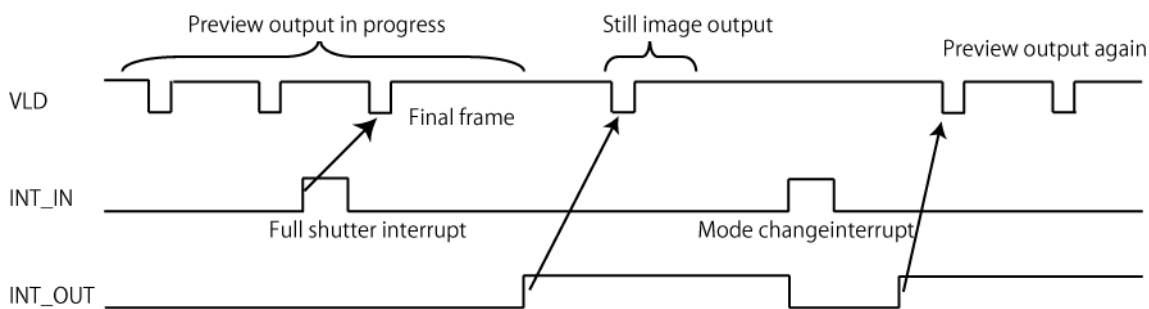
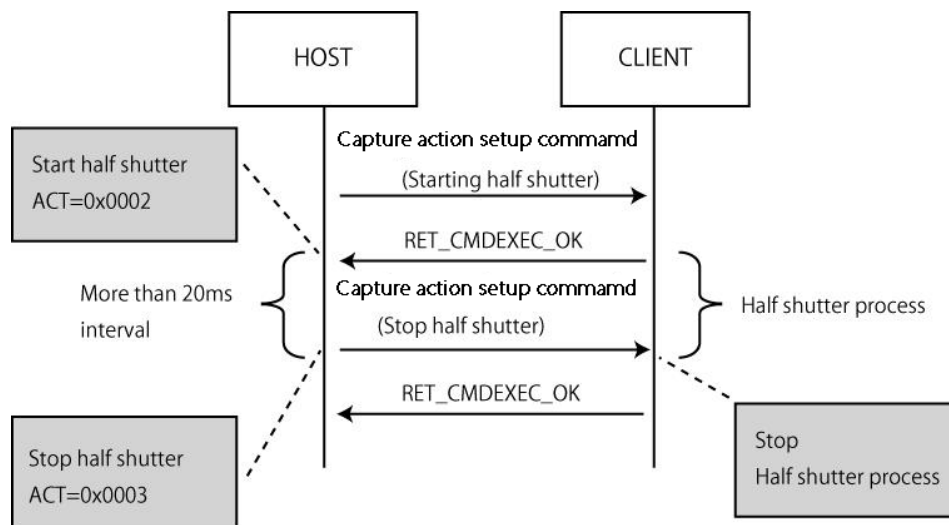Diagram 12 Still image output timing

7.1.4.2 Canceling half shutter

Diagram 13 Still image sequences (Canceling half shutter)

（1）Change the mode to 'Still image shooting' so that preview frame is provided.

（2）'Still image full shutter' by sending 'Interrupt response setup command'.

（3）Specify 'Start half shutter' by sending 'Capture action command'.
        PE1005S start operating the half shutter'.

（4）Specify 'Canceling half shutter' by sending 'Capture action setup command'.
        PE1005S stop half shutter operation

7.1.4.3 No half shutter
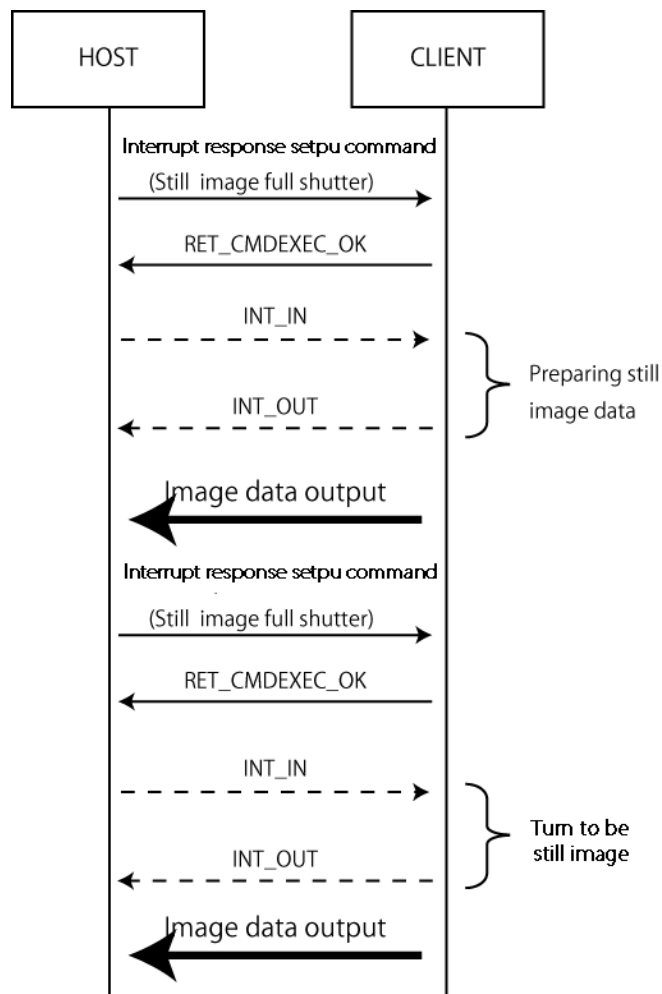
Diagram 14 Still image sequence (No half shutter)

(1) Change mode to ' Still capture mode' so that preview frame is provided.

(2) Specify ' Still image full shutter' by sending ' Interrupt response setup command' .

(3) Assert interrupt to PE1005S via INT_IN port from Low to High

VLD is hold to high as a result of ending the preview frame after the next VLD following the still image full shutter interrupt.

(4) PE1005S asserts interrupt via INT_OUT from Low to High when still image capturing is completed.

(5) VLD hold to High again after providing one frame starting from falling edge of the next VLD.

(6) Specify ' Mode change' by sending ' Interrupt response setup command' .

(7) Assert interrupt to PE1005S via INT_IN port from Low to High

Restart with still image mode as a result of receiving mode change interrupt.

(8) PE1005S asserts the interrupt request to the host system via INT_OUT port when the ' mode change' is completed.

(9) PE1005S start providing image output from the next falling edge of VLD.

<Caution>

Output image is out of focus without operating PE1005S with half shutter.
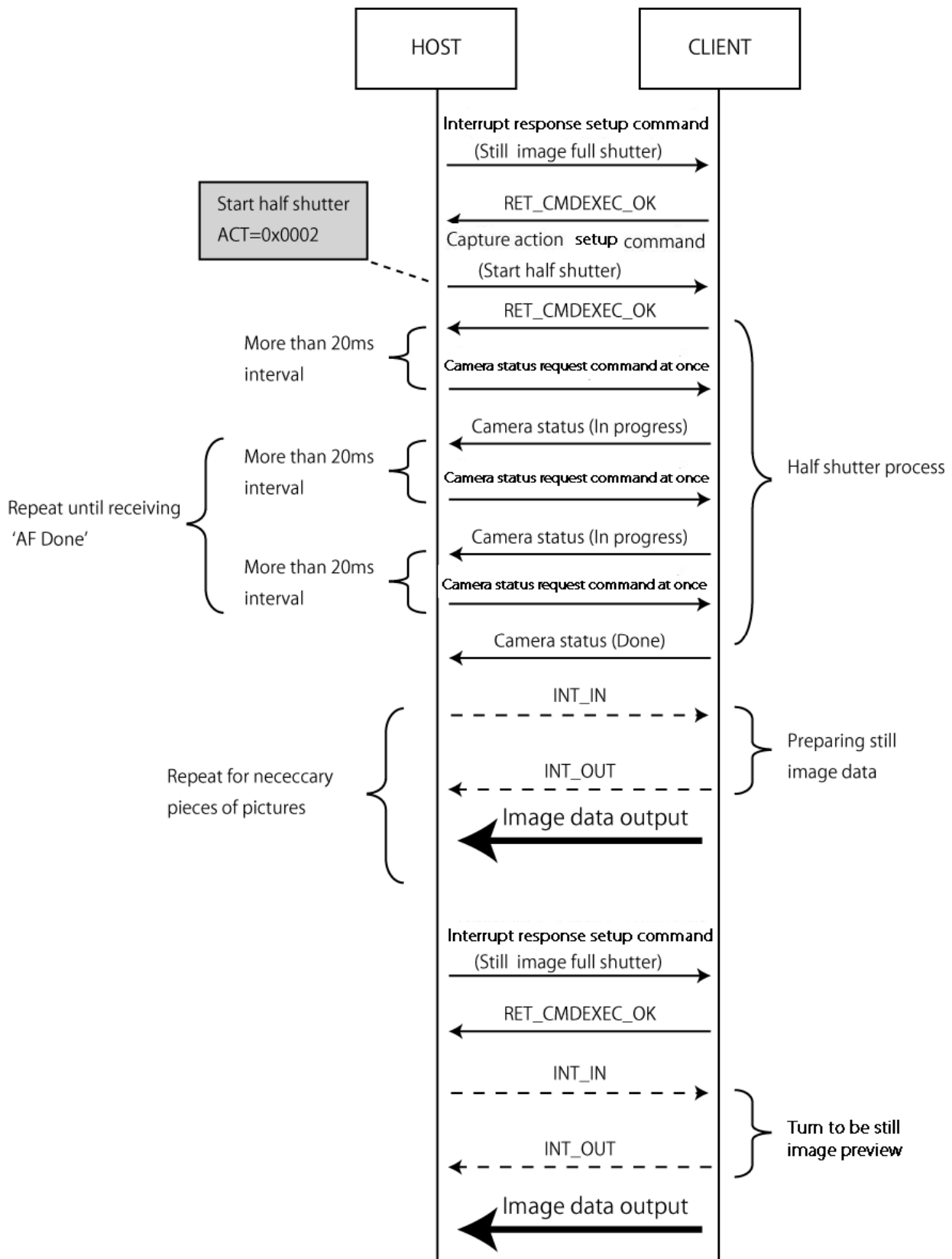
7.1.4.4 Continuous shooting sequence

Diagram 15 Still image sequences (Continuous shooting sequence)

(1) Change the mode to ‘ Still shooting’ so that preview frame is provided.

(2) Specify ‘ Still image full shutter’ by sending ‘ Interrupt response setup command’ .

(3) Specify ‘ Start half shutter’ by sending ‘ Capture action setup command’ (skipping OK)
    PE1005S start half shutter operation

(4) Send ‘ Camera status command’ until ‘ AFS (AF status)’ become ‘ Execution completed’ .
    (skipping OK)

(5) Assert interrupt to PE1005S via INT_IN port from Low to High
    VLD is hold to high as a result of ending the preview frame after the next VLD following the still
    image full shutter interrupt.

(6) PE1005S asserts the interrupt request to the host system via INT_OUT port from Low to high when
    ‘ Still image capture’ is completed.

(7) VLD is held to high after providing one image frame following the next falling edge of VLD.

(8) Continuous shooting is achieved by repeating the above (5) – (8) steps.

(9) Specify ‘ Mode change’ after finishing by sending ‘ Interrupt response command’ .

(10) Assert interrupt to PE1005S via INT_IN port from Low to High
    *PE1005S restarts as a still image mode as a result of receiving ‘ Mode change interrupt’ .

(11) PE1005S asserts interrupt via INT_OUT port when the mode change is completed.

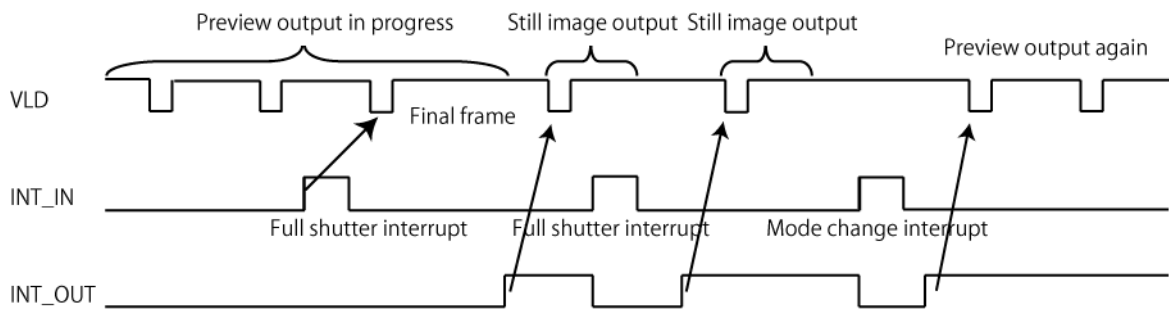(12) The preview image frame is provided from the next falling edge of VLD.

Diagram 16 Continuous shooting timing

7.1.5   Custom WB setup
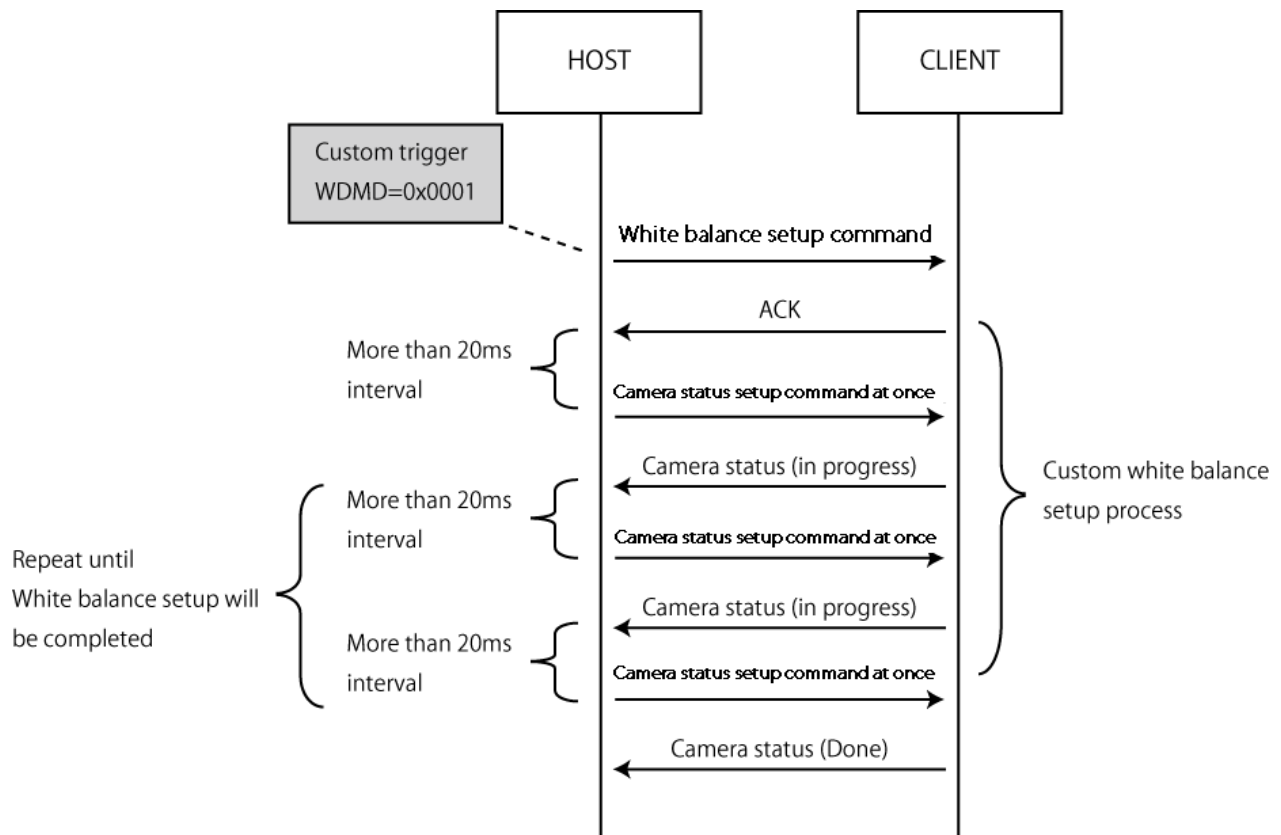

Diagram 17 Custom white balance setup sequences

（1）Specify custom trigger by sending the white balance setup command.
    PE1005S starts custom white balance process

（2）Send 'Camera status request at once command' until PE1005S complete the WBCS (custom white balance) process.

（3）If WBCS is "Terminated by Error" reseting after changed the object

APPENDIX.A

Command Error Code List

Value	Error Code	Description
0x8000	RET_CMDEXEC_OK	No error (normal response)
0x8001	RET_CMDEXEC_UNKNOWN	Unknown error
0x8003	RET_CMDEXEC_NOTSUPPORT	Receiving Unsupported command ID
0x8004	RET_CMDEXEC_PRMERROR	Specify illegal parameter
0x8064	RET_CMDEXEC_LENS_OUTOFSPEED	Lens parameter specifier range over
0x8065	RET_CMDEXEC_LENS_OUTOFPOS	Lens position specifier range over (unused)
0x8066	RET_CMDEXEC_LENS_OUTOFSTEP	Lens step pacifier range over (unused)

APPENDIX.B

Initial value of parameters

Command(control)	CMD_ID	PRM	custom preset	Default value	Description
System start up	0x0008	non-parameter	–		
interrupted response setup	0x0018	INT	–		
Custom preset setup	0x0100	PSTMD	O	0x0000	OFF
Camera status setup at once	0x0200	–	–		
Camera preset setup	0x0202	CAMMD	O	0x0001	DVC
Camera mode setup	0x0204	ACT	–		
AF range setup	0x020A	RNG	O	0x0000	Full range
AF evolution windows setup	0x020E	AFWD	O	0x0000	Auto
		AFWDIDX	O	–	
AF Near Limit setup	0x0212	NLMT	O	0x0000	10mm(NL invalid)
AF interval setup	0x0214	AFITRVL	O	0x0005	5 sec
AE Lock setup	0x0228	AELCK	O	0x0001	Release AE Lock
Focus Lock setup	0x022A	AFLCK	O	0x0001	Release AF Lock
Back light	0x022E	BLC	O	0x0001	Back light OFF
AWB convergence speed setup	0x0230	AWBSP	O	0x0001	middle
AE convergence speed setup	0x0232	AESP	O	0x0001	middle
Camera status set up at once for PE1005S	0x0300		–	–	
Scene mode setup	0x0400	SCNMD	O	0x0001	Invalid Scene mode
		SCNIDX	O	–	
Metering mode setup	0x0402	METMD	O	0x0002	Multi
Exposure mode setup	0x0404	AEMD	O	0x0001	Program AE
		AVIDX	O	–	
		TVIDX	O	–	
EV correction setup	0x0406	EVIDX	O	0x0006	0.0EV
ISO sensitivity setup	0x040A	ISOMD	O	0x0000	Auto
		ISOIDX	O	–	
Flicker reduction set up	0x040C	FLR	O	0x0000	ON
Optical zoom setup	0x040E	ZMMD	–	–	
		ZMPRM	–	–	
		ZMDEVPOS	O	901	Position XXX (step value)
Focus mode setup	0x0410	FMD	O	0x0000	Auto
		AFMD	O	0x0000	Continuous action
White balance setup	0x0412	WBMD	O	0x0000	light source setup
		PRM1	O	0x0000	Auto
		PRM2	O	–	

Zoom tracking setup	0x041C	ZTG	O	0x0000	ON
Focus control setup	0x041E	FCSMD	-	-	
		FCSPRM	-	-	
		FCSDEVPOS	O	0	Position XXX (step value)
One Push Trigger AF setup	0x0420	none-parameter	-	-	
Digital effect setup	0x0606	EFFECT	O	0x0000	Normal
		FIXEN	O	-	
		FIXCR	O	-	
		FIXCB	O	-	
		NEGAEN	O	-	
		SORAEN	O	-	
		POSEN	O	-	
		POS0〜23	O	-	
Sharpness setup	0x0608	SHARP	O	0x0001	middle
Noise reduction setup	0x060A	NR	O	0x0001	middle
Chroma setup	0x060C	CRMCR	O	0x0001	middle
		CRMCB	O	0x0001	middle
Hue setup	0x060E	HUECR	O	0x0002	0
		HUECB	O	0x0002	0
Output test pattern setup	0x0610	TSTPTN	O	0x0000	Color field(normal operation)
Still image drive mode setup	0x0804	STLDRV	O	0x0000	single shoot
Continuous shoot speed setup	0x0806	CNTSPD	O	0x0001	middle speed
Still image size setup	0x0808	STLSZ	O	0x0000	L(1600x1200)
		HS	O	0x0000	OFF
		VMR	O	0x0000	none mirror
		HMR	O	0x0000	none mirror
AEB setup	0x080E	AEBC	O	0x0000	3 pic
		AEBST	O	0x0000	0.33EV
Still image preview mode setup	0x0810	PRT	O	0x0000	30 FPS
Motion image stabilizer setup	0x0A00	ISE	O	0x0001	ON
Frame format setup	0x0A04	FRMSZ	O	0x0006	1920x1080
		FRMRT	O	0x0004	30 FPS
		HR	O	0x0001	OFF
		HS	O	0x0001	OFF
		FRMALN	O	0x0003	32 Byte
		VMR	O	0x0000	none mirror
		HMR	O	0x0000	none mirror
		ISS	O	0x0001	none Support
Auto slow shutter setup	0x0A06	ASS	O	0x0001	OFF