

KP-D531 remote control protocol and command data

1) Comms* specifications

Sync system	Start-stop sync
Bit rate	9600 bps
Data length	8 bits
Start bit	1
Stop bits	2
Parity	None
Bit transfer	LSB first

***Comms : Communications**

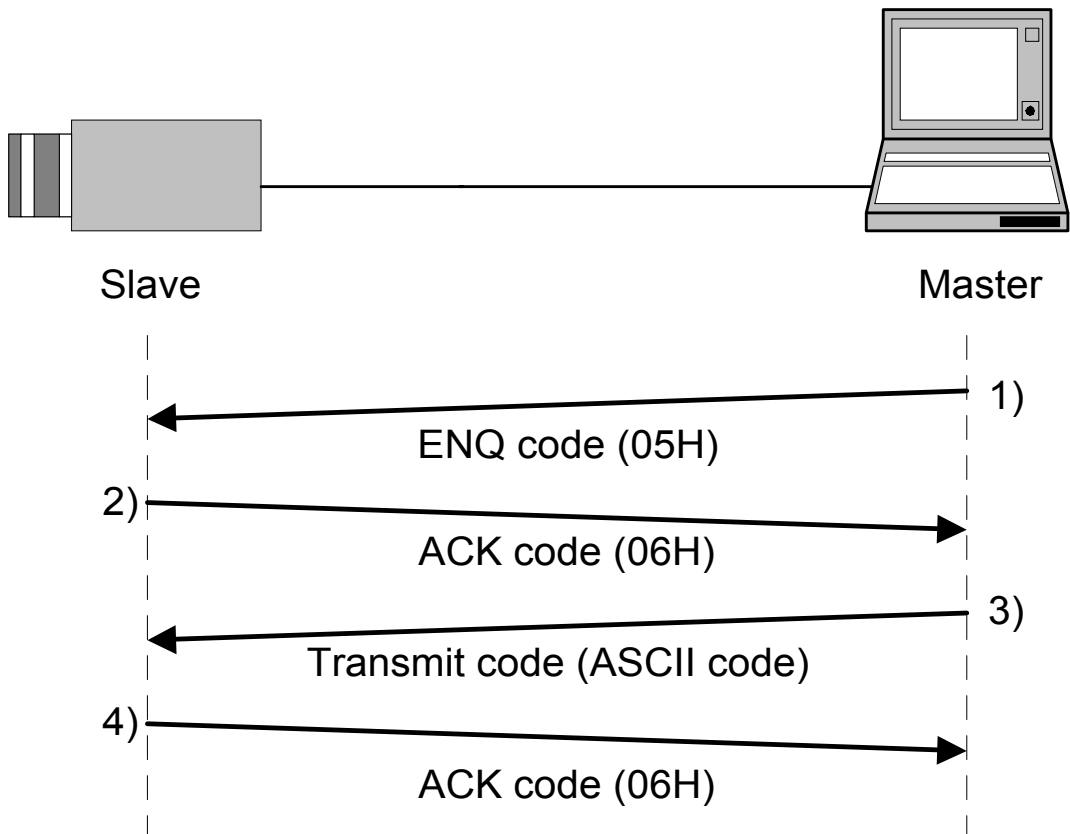
2) Comms control

The remote control software controls all communications. Data send/receive (BSC handshake) is by transferring TEXT data to the camera controller chip.

3) Comms procedure

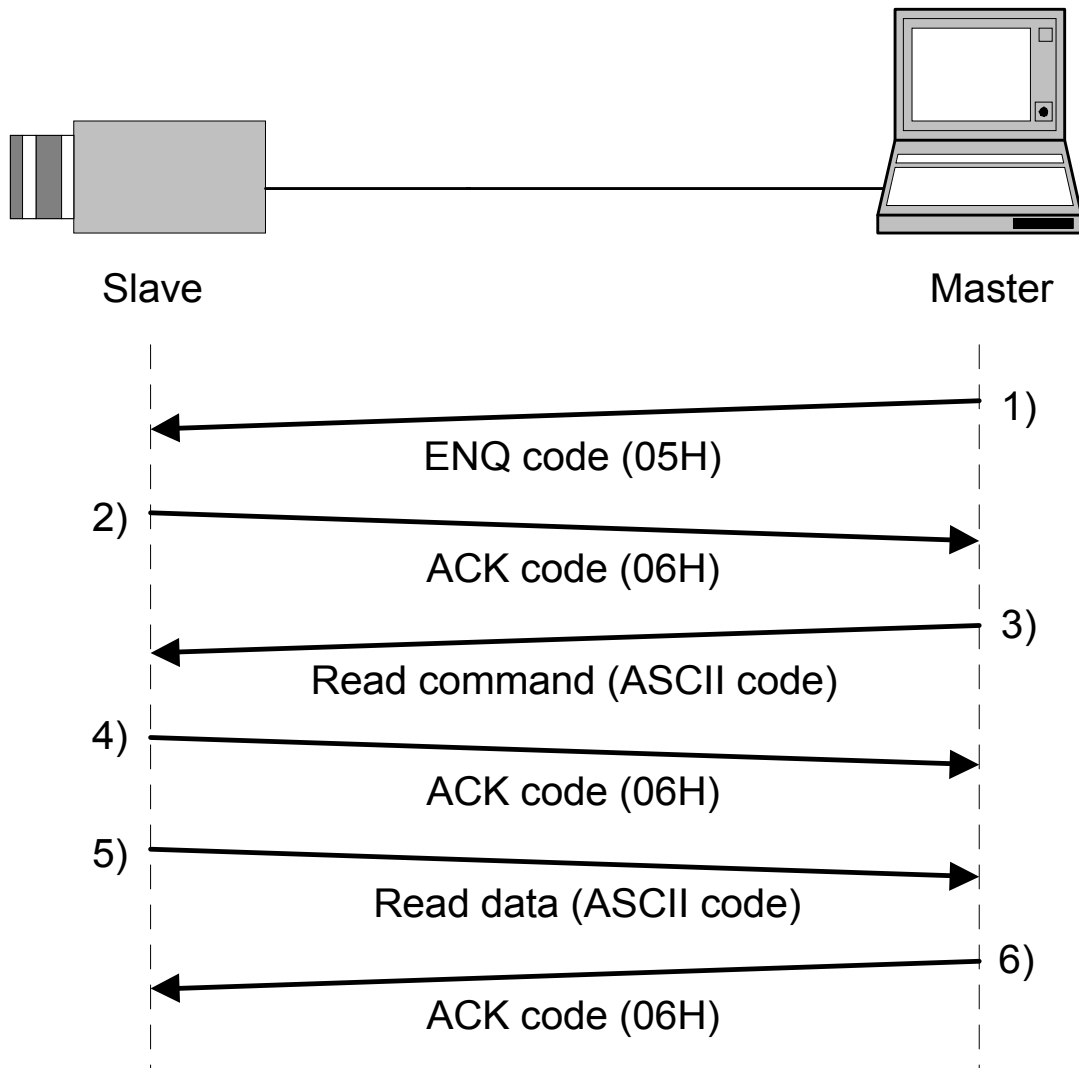
- The following pages indicate the camera controller chip and remote control software data protocol. In the description, the camera is designated as slave and the software as master.
- Receive protect timer (time out error)
The receive protect timer for master and slave processes is 1 second. For example, if 1 block of TEXT data is being received, if the data interval exceeds 1 second, error is produced and the data are lost. An acknowledgment of data receipt is not produced.

a) Transmission from master (normal process)



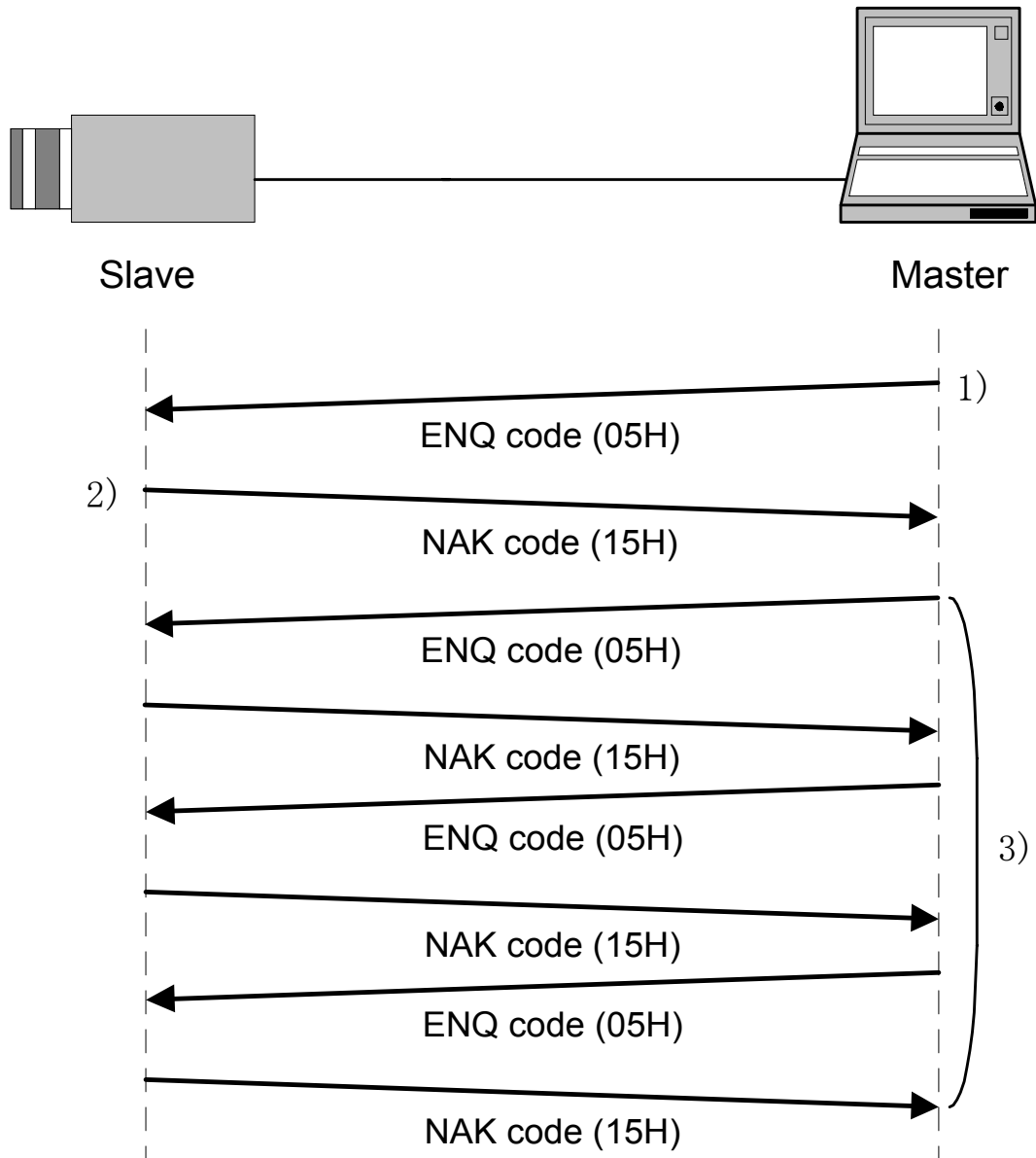
- 1) Session starts when ENQ is sent from master to slave.
- 2) Slave acknowledges by returning ACK to master.
- 3) Master sends data to slave.
- 4) Slave acknowledges receipt of data by again returning ACK to master and end the handshake.

b) Master reads data (normal process)



- 1) Session starts when ENQ is sent from master to slave.
- 2) Slave acknowledges by returning ACK to master.
- 3) Master sends read data command to slave.
- 4) Slave receives read data command, then acknowledges by returning ACK code to master.
- 5) Slave sends read data to master.
- 6) Master receives read data, then acknowledges by returning ACK code to slave.

c) Data transmitted by master (control abort process)

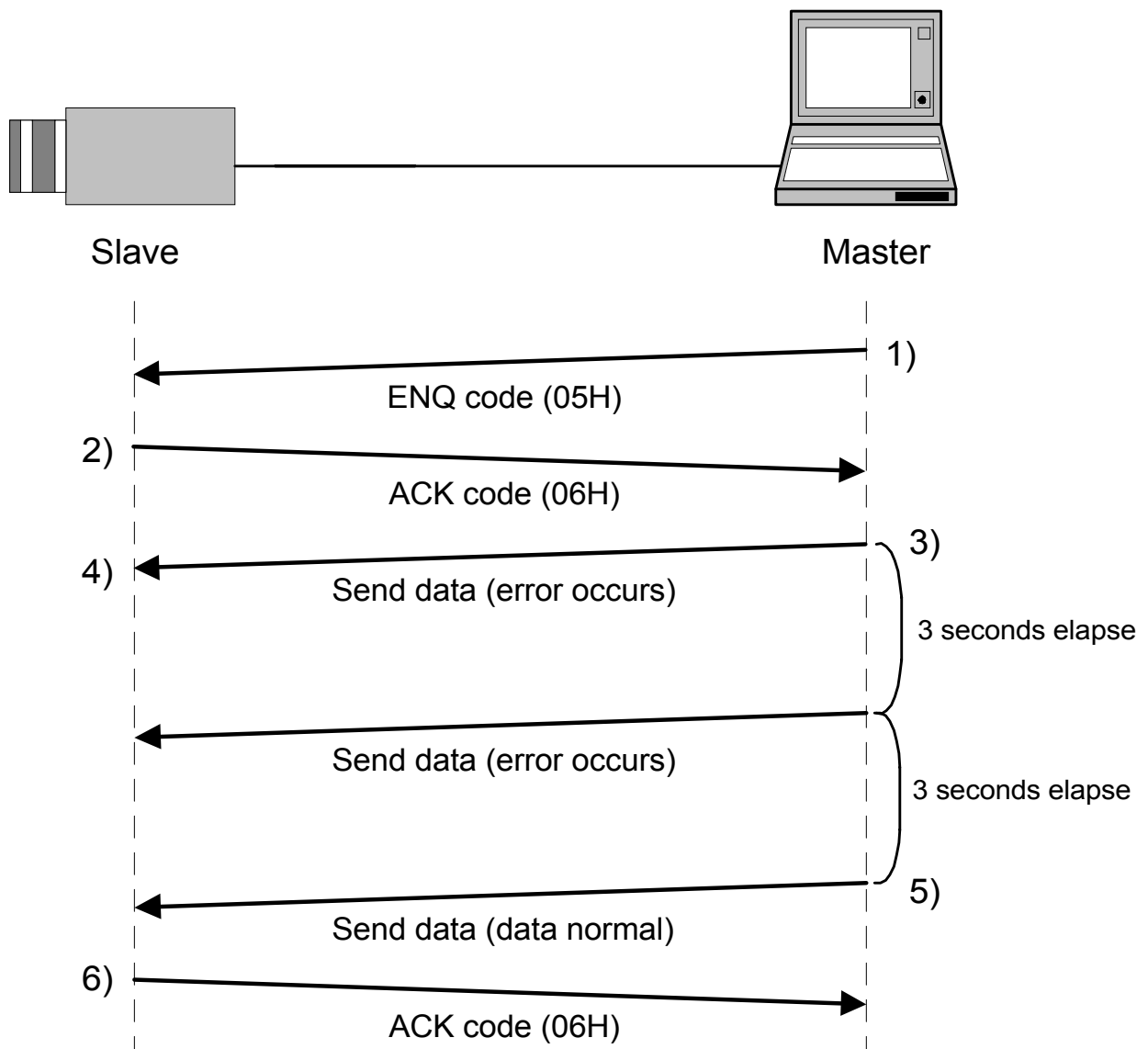


1) Master sends ENQ code to slave.

2) Since ACK code cannot be sent, slave sent NAK code to master.

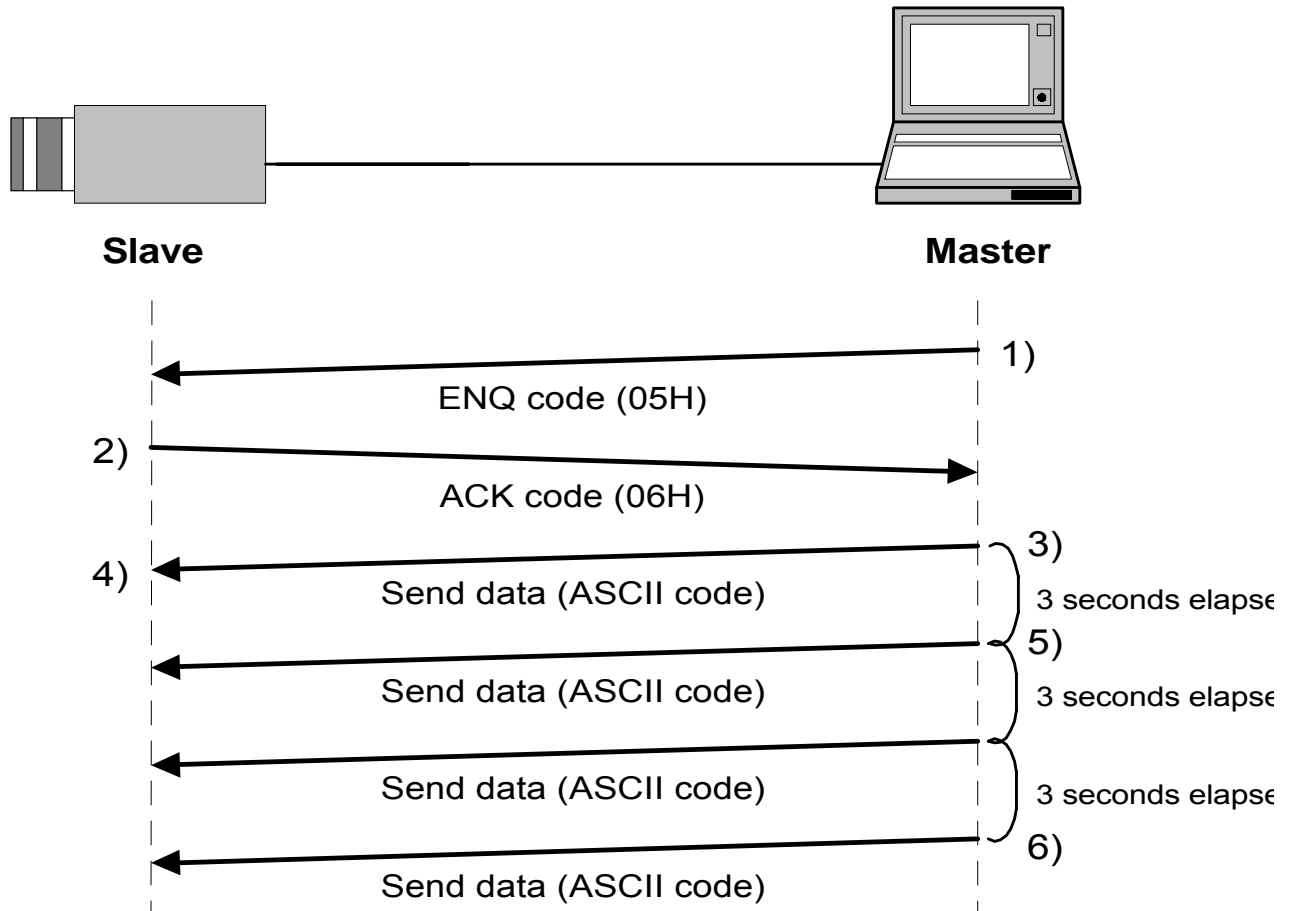
3) Sequence is repeated 3 times in attempts to retransmit. After receiving the 3rd successive NAK code, comms control is aborted.

d) Data transmitted by master (data error process)



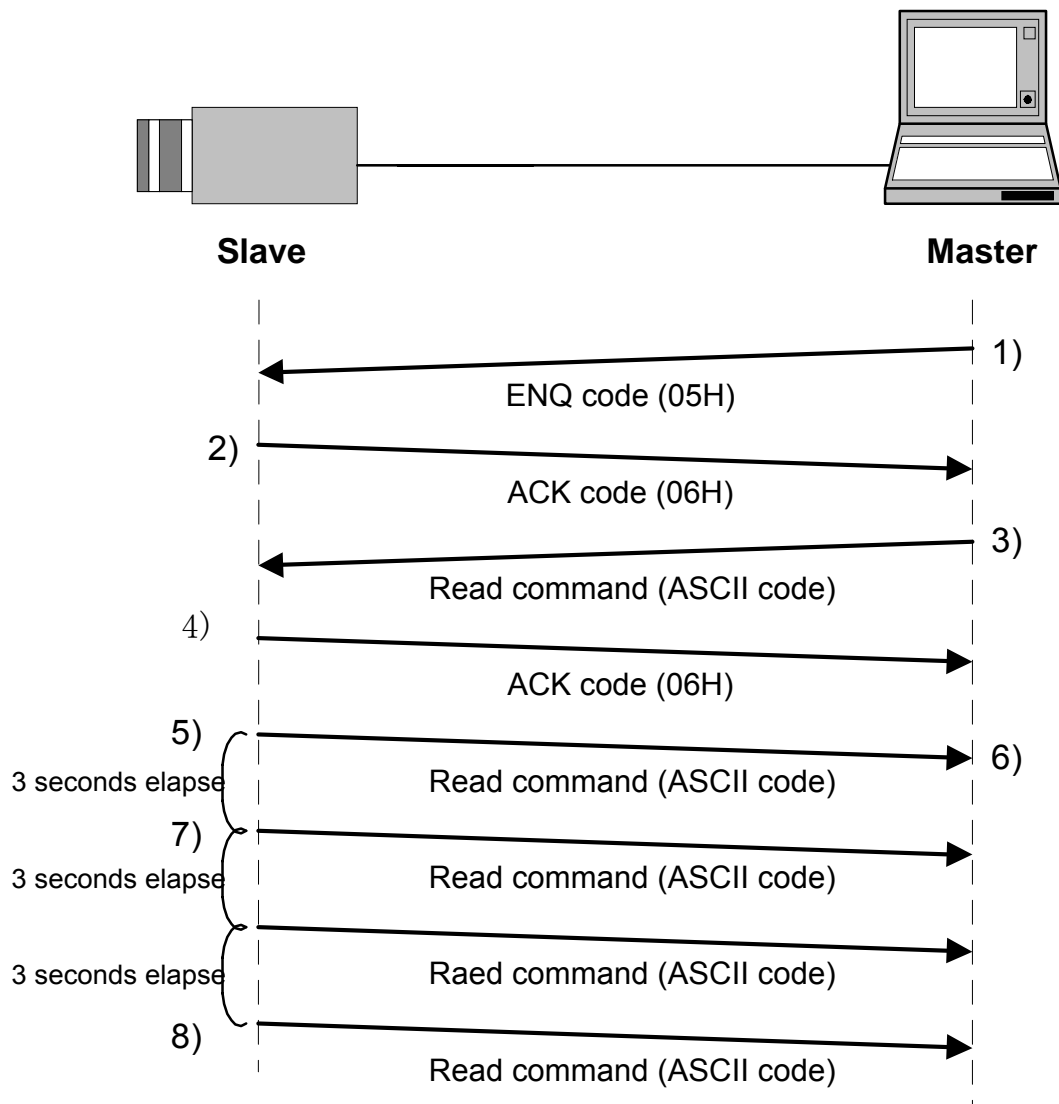
- 1) Session starts when ENQ is sent from master to slave.
- 2) Slave acknowledges by returning ACK to master.
- 3) Master sends data, but error detected (framing, over-run error).
- 4) Slave detects error and does not accept data.
- 5) Sequence 3 and 4 repeats, then master transfers normal data.
- 6) Slave detects normal data and returns ACK code to master to end the session.

e) Data frame error (Master transmission)



- 1) Session starts when ENQ is sent from master to slave.
- 2) Slave acknowledges by returning ACK to master.
- 3) Master sends data.
- 4) For some reason, slave does not receive data.
- 5) Master does not receive acknowledgment to the send code and repeats the sequence every 3 seconds for 3 times.
- 6) If unsuccessful after 3 attempts, master aborts the sequence and ends communication.

f) Transmission frame error (Master receive)

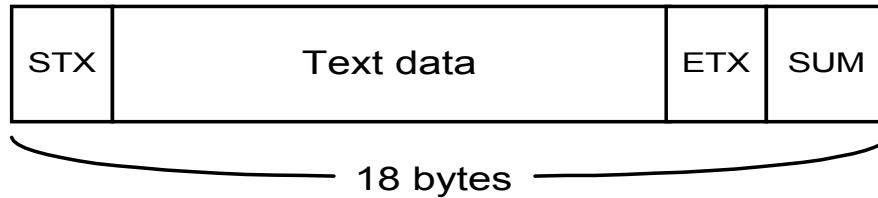


- 1) Session starts when ENQ is sent from master to slave.
- 2) Slave acknowledges by returning ACK to master.
- 3) Master sends read command.
- 4) Slave returns ACK code to acknowledge read command.
- 5) Slave sends corresponding read data to master.
- 6) For some reason, master fails to receive read data.
- 7) Slave fails to receive acknowledgment of read data and attempts to resend every 3 seconds for 3 times.
- 8) After the third failure, slave aborts the sequence and ends communication.

(4) Comms command Text data format

a) Send data and read command data (master to slave)

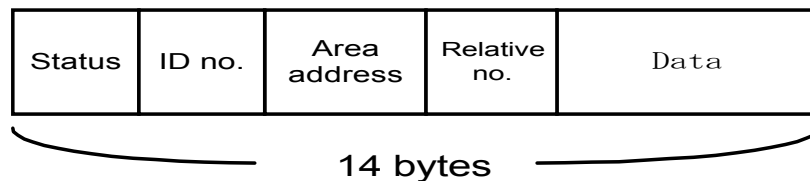
- 1) Command data are converted into ASCII code and transmitted.
- 2) Comms byte quantity is 18.
- 3) Comms data format (transmission sequence).



■ Comms data description

- STX : Code indicating start of text. 1 byte (02H)
- Text data : Transmit / receive data. 14 byte (ASCII code)
- ETX : Code indicating end of text. 1 byte (03H)
- SUM : XOR result (FFH) of adding STX, Text data and ETX. 2 byte

4) Text data format details (transmission sequence).

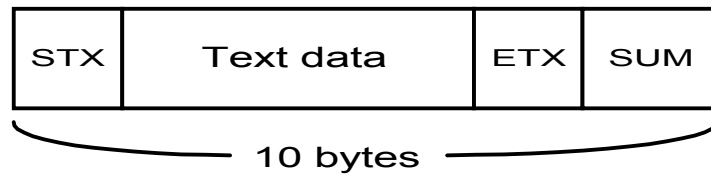


■ Text data details

- Status : Transmission data status. 2 bytes (ASCII code)
Used for EEPROM write (0: write absent, 1: write present)
- ID no. : Identification (camera ID) number set by user.
However, ID no. FFH is global address and all data are changed.
2 bytes (ASCII code)
- Area address : Sets number (0 to 255) for each adjustment item.
2 bytes (ASCII code)
- Relative no. : Sets number determined by each area address.
2 bytes (ASCII code)
- Data (note) : Sets data to be transmitted. 2 bytes x 3 (ASCII code)

b) Read (receive) data (slave to master)

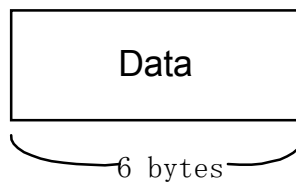
- 1) Command data are converted into ASCII code and transmitted.
- 2) Comms byte quantity is 10.
- 3) Comms data format (transmission sequence)



■ Comms data description

- STX : Code indicating start of text. 1 byte (02H)
- Text data : Transmit / receive data. 6 byte (ASCII code)
- ETX : Code indicating end of text. 1 byte (03H)
- SUM : XOR result (FFH) of adding STX, Text data and ETX. 2 byte

4) Text data details (transmission sequence)



■ Text data details (transmission sequence)

- Data (note)
: Sets data to be transmitted. 2 bytes x 3 (ASCII code)

1. Remote control protocol and command data of KP-D531

(Note: Each data(1 to 7 , SUM) must be converted to ASCII codes)

- 1) EEPROM = 00 (not write)
- 2) CAMERA ID = GLOBAL
- 3) AREA ADDRESS = **SEND ONLY**
- 4) SUM = FF XOR (STX + (1 to 7) + ETX) low byte

No.	Item	STX	1	2	3	4	5	6	7	ETX	NOTE
			EEPROM	ID No.	AREA ADDRESS	RELATIVE NO.	DATA				
1	AGC mode	ON	02	00	FF	01	06	00	00	00	03
2		OFF	02	00	FF	01	06	01	00	00	03
3	AGC GAIN (AGC:ON MAX GAIN)	6dB	02	00	FF	01	4D	00	00	00	03
4		12dB	02	00	FF	01	4D	01	00	00	03
5		21dB	02	00	FF	01	4D	02	00	00	03
6		31dB	02	00	FF	01	4D	03	00	00	03
7		MAX	02	00	FF	01	4D	04	00	00	03
8	MANUAL SHUTTER speed	1/60s	02	00	FF	01	08	00	00	00	03
9		1/100s	02	00	FF	01	08	01	00	00	03
10		1/250s	02	00	FF	01	08	02	00	00	03
11		1/500s	02	00	FF	01	08	03	00	00	03
12		1/1000s	02	00	FF	01	08	04	00	00	03
13		1/2000s	02	00	FF	01	08	05	00	00	03
14		1/4000s	02	00	FF	01	08	06	00	00	03
15		1/10000s	02	00	FF	01	08	07	00	00	03
16		1/20000s	02	00	FF	01	08	08	00	00	03
17		1/30000s	02	00	FF	01	08	09	00	00	03
18	AES	AUTO	02	00	FF	01	08	0A	00	00	03
19	WHITE BALANCE mode	ATW	02	00	FF	01	04	00	00	00	03
20		PRESET	02	00	FF	01	04	01	00	00	03
21		MANUAL	02	00	FF	01	04	02	00	00	03
22	R gain (WB: MANUAL MODE ONLY)	MIN	02	00	FF	01	0D	01	00	00	03
23		CENTER	02	00	FF	01	0D	64	00	00	03
24		MAX	02	00	FF	01	0D	FF	00	00	03
25	B gain (WB: MANUAL MODE ONLY)	MIN	02	00	FF	01	0E	01	00	00	03
26		CENTER	02	00	FF	01	0E	64	00	00	03
27		MAX	02	00	FF	01	0E	FF	00	00	03

No.	Item		STX	1	2	3	4	5	6	7	ETX	NOTE
				EEPROM	ID No.	AREA ADDRESS	RELATIVE NO.	DATA				
28	TITLE	OFF	02	00	FF	01	1D	00	00	00	03	
29		TOP	02	00	FF	01	1D	00	00	00	03	
30		BOTTOM	02	00	FF	01	1D	01	00	00	03	
31		MENU	02	00	FF	01	2A	02	00	00	03	
32	MENU	OFF	02	00	FF	01	2A	00	00	00	03	
33		MAIN	02	00	FF	01	2B	00	00	00	03	
34		TITLE	02	00	FF	01	2B	01	00	00	03	
35		LIGHT CONT.	02	00	FF	01	2B	03	00	00	03	
36		AREA SELECT	02	00	FF	01	2B	04	00	00	03	
37		WHITE BAL.	02	00	FF	01	2B	05	00	00	03	
38		D. ZOOM	02	00	FF	01	2B	07	00	00	03	
39		SUB	02	00	FF	01	2B	08	00	00	03	
40		BLC MODE	OFF	02	00	FF	01	1B	00	00	00	03
41	ON		02	00	FF	01	1B	01	00	00	03	
42	BLC AREA (BLC:ON)	NO. 1	02	00	FF	01	1C	00	00	00	03	
43		NO. 2	02	00	FF	01	1C	01	00	00	03	
44		NO. 3	02	00	FF	01	1C	02	00	00	03	
45		NO. 4	02	00	FF	01	1C	03	00	00	03	
46		NO. 5	02	00	FF	01	1C	04	00	00	03	
47		NO. 6	02	00	FF	01	1C	05	00	00	03	
48		NO. 7	02	00	FF	01	1C	06	00	00	03	
49		NO. 8	02	00	FF	01	1C	07	00	00	03	
50		NO. 9	02	00	FF	01	1C	08	00	00	03	
51	B/W GAIN	OFF	02	00	FF	01	55	00	00	00	03	
52		ON	02	00	FF	01	55	01	00	00	03	
53	B/W MODE	OFF	02	00	FF	01	64	00	00	00	03	
54		ON	02	00	FF	01	64	01	00	00	03	
55		AUTO (HI)	02	00	FF	01	64	02	00	00	03	
56		AUTO (MID)	02	00	FF	01	64	03	00	00	03	
57		AUTO (LO)	02	00	FF	01	64	04	00	00	03	
58	BURST	OFF	02	00	FF	01	9B	00	00	00	03	
59		ON	02	00	FF	01	9B	01	00	00	03	

No.	Item	STX	1	2	3	4	5	6	7	ETX	NOTE
			EEPROM	ID No.	AREA ADDRESS	RELATIVE NO.	DATA				
60	SENS UP	OFF	02	00	FF	01	1A	00	00	00	03
61		AUTO X2	02	00	FF	01	1A	01	00	00	03
62		AUTO X4	02	00	FF	01	1A	02	00	00	03
63		AUTO X6	02	00	FF	01	1A	03	00	00	03
64		AUTO X8	02	00	FF	01	1A	04	00	00	03
65		AUTO X10	02	00	FF	01	1A	05	00	00	03
66		AUTO X12	02	00	FF	01	1A	06	00	00	03
67		AUTO X16	02	00	FF	01	1A	07	00	00	03
68		AUTO X32	02	00	FF	01	1A	08	00	00	03
69		MANUAL X2	02	00	FF	01	1A	0B	00	00	03
70		MANUAL X4	02	00	FF	01	1A	0C	00	00	03
71		MANUAL X6	02	00	FF	01	1A	0D	00	00	03
72		MANUAL X8	02	00	FF	01	1A	0E	00	00	03
73		MANUAL X10	02	00	FF	01	1A	0F	00	00	03
74		MANUAL X12	02	00	FF	01	1A	10	00	00	03
75		MANUAL X16	02	00	FF	01	1A	11	00	00	03
76		MANUAL X32	02	00	FF	01	1A	12	00	00	03
77		MANUAL X64	02	00	FF	01	1A	13	00	00	03

No.	Item	STX	1	2	3	4	5	6	7	ETX	NOTE
			EEPROM	ID No.	AREA ADDRESS	RELATIVE NO.	DATA				
78	DIGITAL ZOOM	OFF	02	00	FF	01	37	01	00	00	03
79		ON	02	00	FF	01	37	00	00	00	03
80		WIDE	02	00	FF	01	38	01	00	00	03
81		TELE	02	00	FF	01	38	00	40	00	03
82	IRIS level	MIN	02	00	FF	01	0C	01	00	00	03
83		CENTER	02	00	FF	01	0C	64	00	00	03
83		MAX	02	00	FF	01	0C	FF	00	00	03
84	GAMMA mode	OFF	02	00	FF	01	14	01	00	00	03
85		ON	02	00	FF	01	14	00	00	00	03
86	CHROMA GAIN	MIN	02	00	FF	01	16	00	00	00	03
87		CENTER	02	00	FF	01	16	80	00	00	03
88		MAX	02	00	FF	01	16	FF	00	00	03
89	PEDESTAL level	MIN	02	00	FF	01	10	00	00	00	03
90		CENTER	02	00	FF	01	10	80	00	00	03
91		MAX	02	00	FF	01	10	FF	00	00	03
92	DETAIL level	MIN	02	00	FF	01	15	00	00	00	03
93		CENTER	02	00	FF	01	15	80	00	00	03
94		MAX	02	00	FF	01	15	FF	00	00	03
95	DNR	OFF	02	00	FF	01	3E	00	00	00	03
96		ON	02	00	FF	01	3E	01	00	00	03
97	CAMERA ID	GLOBAL	02	00	FF	01	0F	FF	00	00	03
98		OTHER' S	02	00	FF	01	0F	00	00	00	03