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.

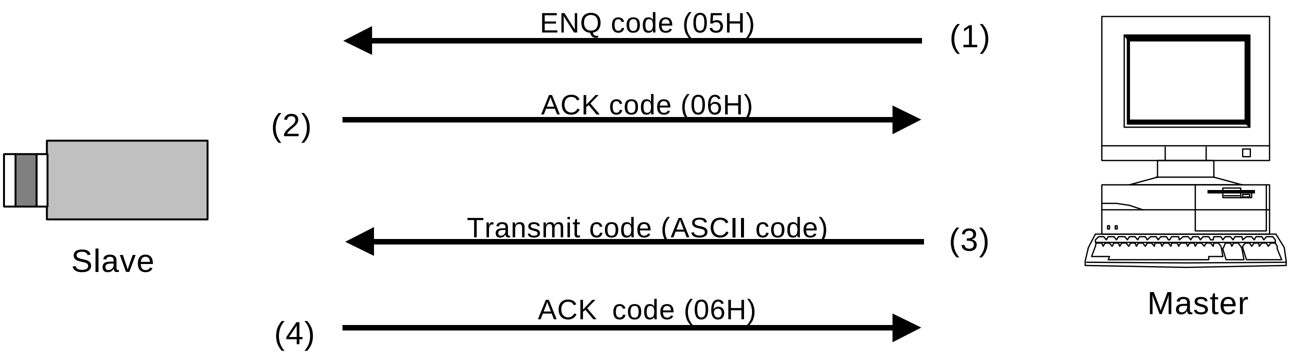
3. Comms procedure

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)



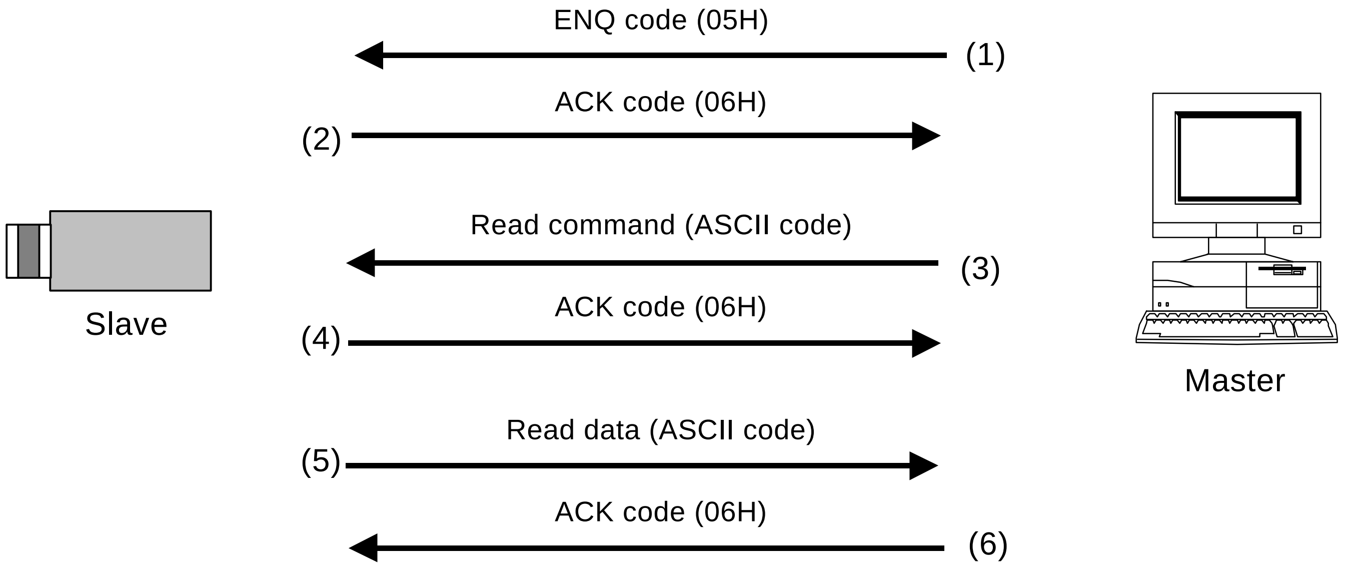
(1) Session starts when ENQ is sent from master to slave.

(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.

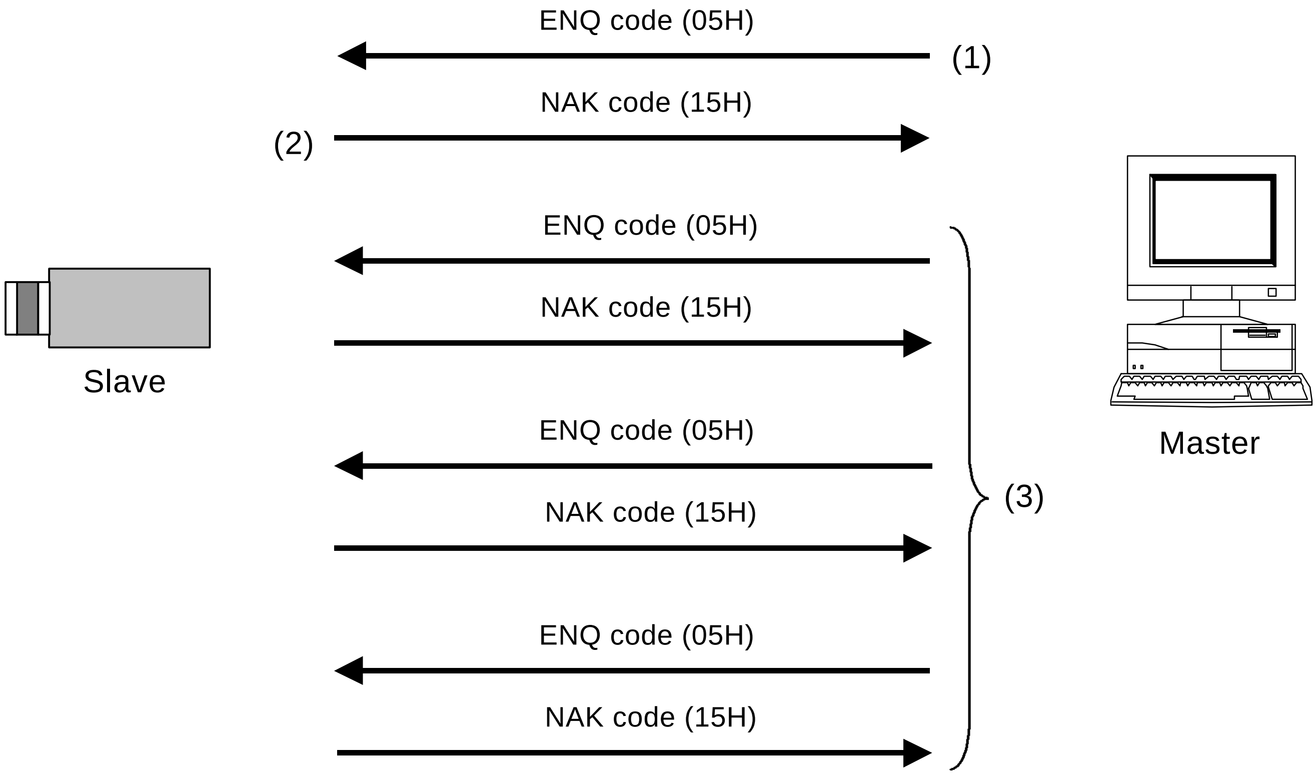
(3) Master sends read data command to slave.

(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)

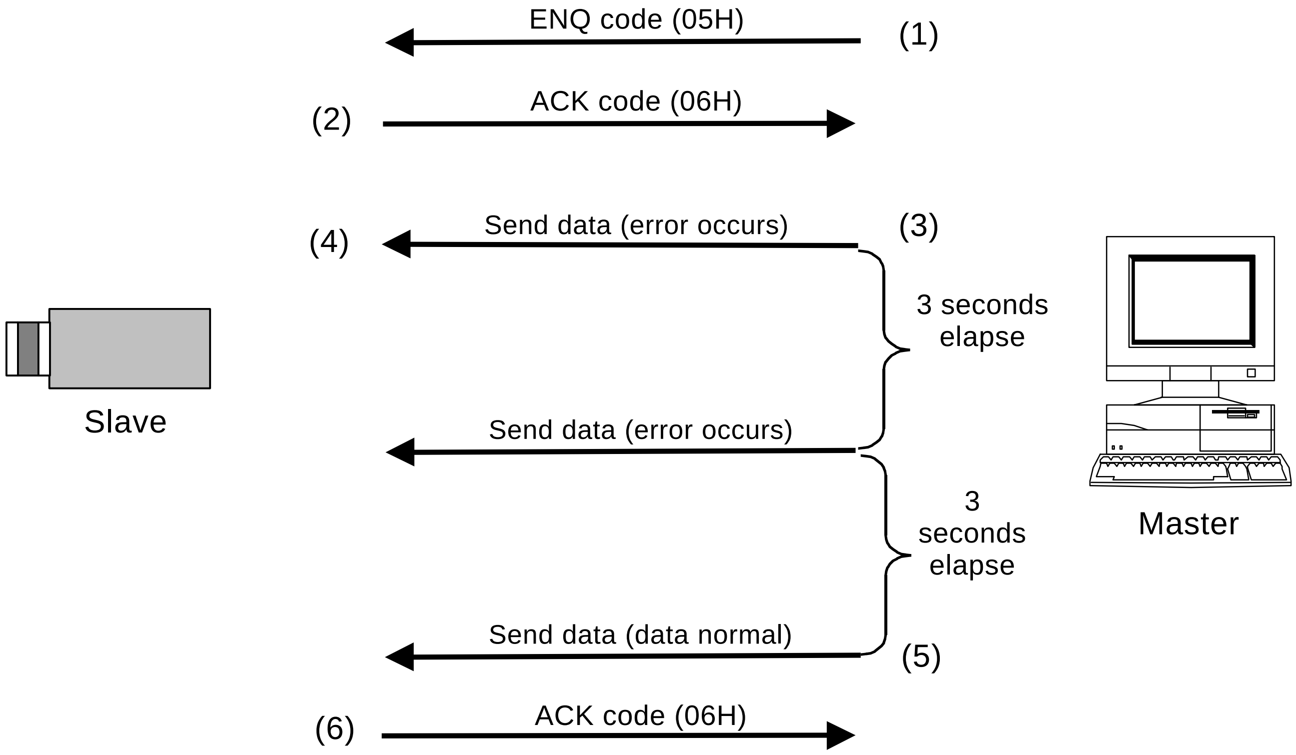


(1) Master sends ENQ code to slave.

(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.

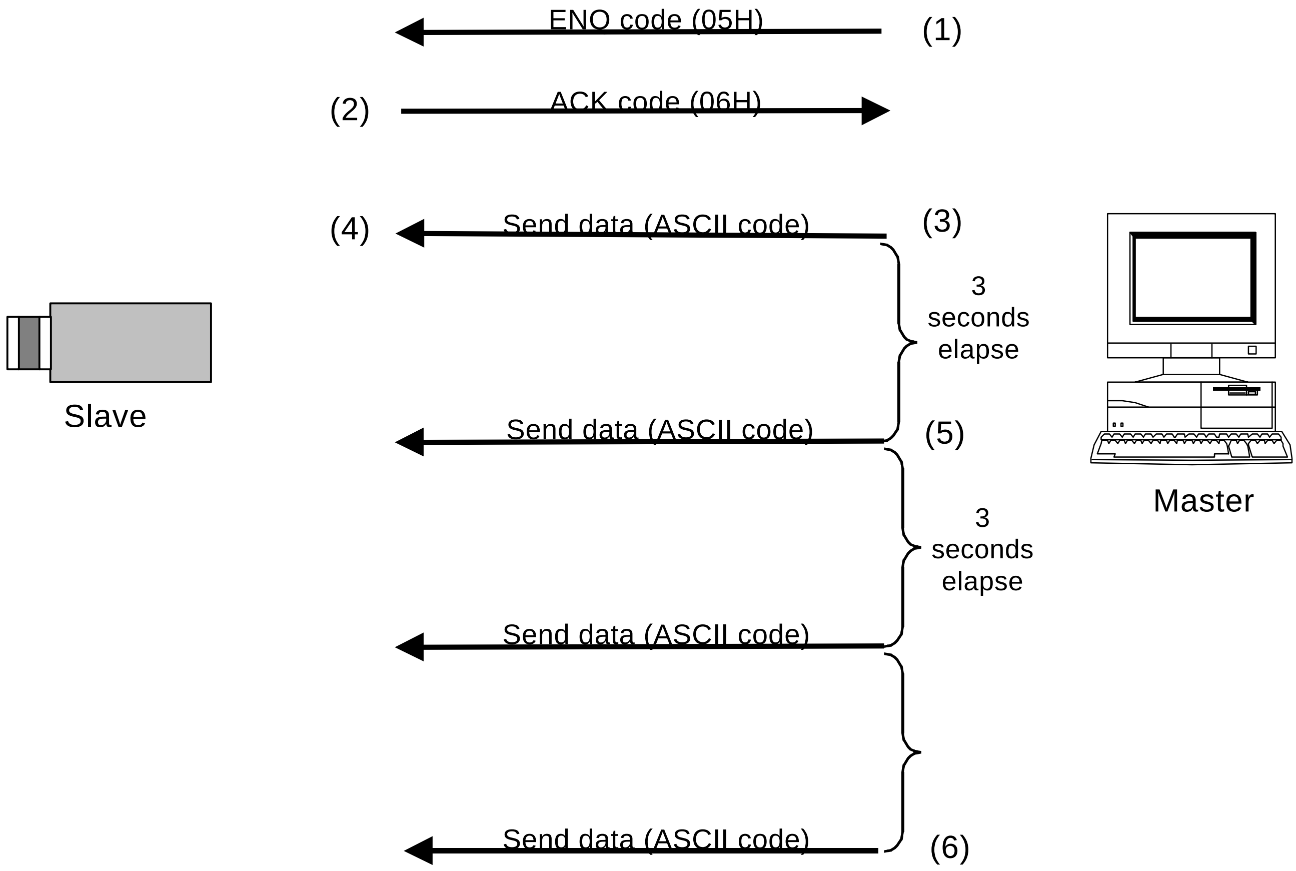
(3) Master sends data, but error detected (framing, over-run error).

(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.

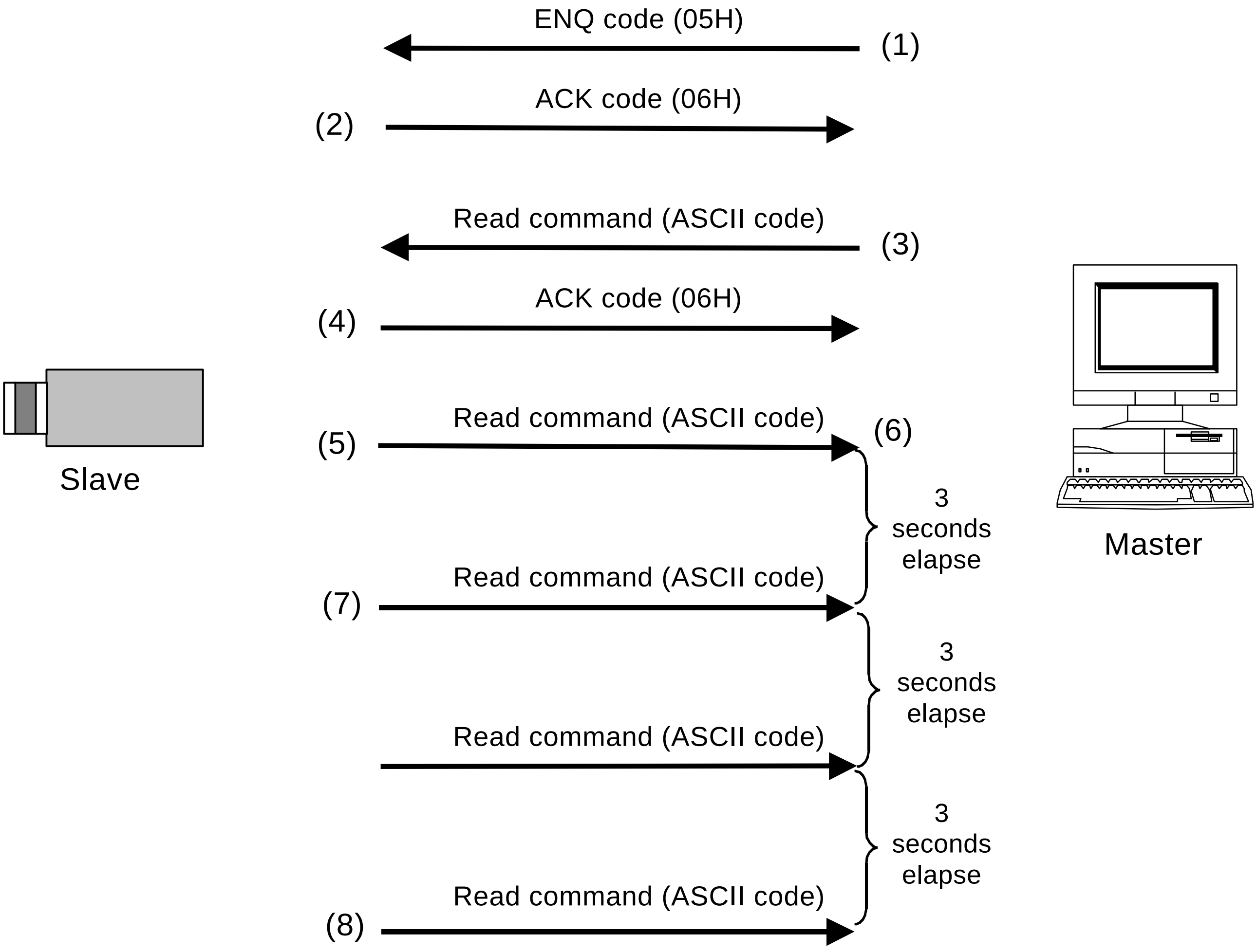
(3) Master sends data.

(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)


ENQ code (05H)
(1)
(2)
ACK code (06H)
Read command (ASCII code)
(3)
(4)
ACK code (06H)
Slave
(5)
Read command (ASCII code)
(6)
3 seconds elapse
Master
(7)
Read command (ASCII code)
3 seconds elapse
Read command (ASCII code)
3 seconds elapse
(8)
Read command (ASCII code)

(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).

STX 1byte	Text data 14byte	ETX 1byte	SUM 2byte

18bytes

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 (ASCII code)

4) Text data format details (transmission sequence).

Status 2byte	ID No. 2byte	Area address 2byte	Relative No. 2byte	Data 2byte3×

14bytes

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)

STX 1byte	Text data 6byte	ETX 1byte	SUM 2byte

10bytes

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 bytes (ASCII code)

4) Text data details (transmission sequence)

Data 2byte3×

6bytes

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

Note : Data transfer sequence

Area address	Data type	Data bytes	1st byte	2nd byte	3rd byte
1 , 3	Common data	1	Data	0	0
		2	Upper	Lower	0
		3	Upper	Mid	Lower
	State data	1	Data	0	0
		2	Lower	Upper	0
		3	Lower	Mid	Upper

Common data are transferred from upper data, state data are transferred from lower data.