PTH-01 VISCA Command Set

No	Issue Date	Description	Apply Firmware
1	2025/11/27	First version	PWB104

***Notice:**

1. **The RS-232 command list is for PTH-01.**
2. **The yellow highlight means the latest update.**
3. **The blue highlight means the deleted item.**

Table of Contents

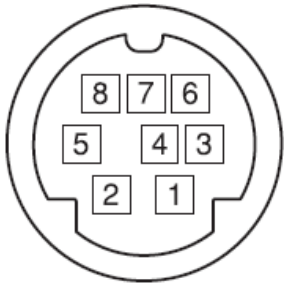
1. Communication Protocol

Transmit Method: Asynchronous Interface Half Duplex Serial Communication

- Transmit Speed: 9600bps or 38400bps
- Start bit: 1Bit
- Parity Check: NA
- Data Bit: 8Bit
- Stop Bit: 1Bit

2. The wire diagram

The RS232 wire diagram between presenter and remote controller as below



No	Pins
1	DTR IN
2	DSR IN
3	TXD IN
4	GND
5	RXD IN
6	GND

1 ACK & Completion message

	Reply Packet	Note
Ack	X0 4Y FF	Y = socket number
Completion (commands)	X0 5Y FF	Y = socket number
Completion (Inquiries)	X0 5Y ... FF	Y = socket number
X = 9 to F==>camera address + 8 , Y=1 to 2		

2 Error message

Error Packet	Description
X0 60 02 FF	Syntax Error
X0 60 03 FF	Command buffer full
X0 6Y 04 FF	Command cancelled
X0 6Y 05 FF	No socket (to be cancelled)
X0 6Y 41 FF	Command not executable
X = 9 to F==>camera address + 8, Y = socket number, Y=0 to 2, 0: Inquiry not execution	

3 Command execution cancel

	Cancel Packet	Note
Cancel	8X 2Y FF	Y = socket number
X = 1 to 7==>camera address, Y = socket number, Y=1 to 2		

4 Network Change

	Packet	Note
Address	88 30 01 FF	Always broadcasted (Reply:88 30 0w FF w:1+Address)
Network Change	X0 38 FF	
X = 9 to F==>camera address + 8		

5 IF_Clear

	Command	Reply Packet Note
IF_Clear	8X 01 00 01 FF	X0 50 FF
IF_Clear (broadcast)	88 01 00 01 FF	88 01 00 01 FF
X = 1 to 7==>camera address (For inquiry packet)		
X = 9 to F==>camera address +8 (For reply packet)		

6 Camera RS-232 Command List

Command Set	Command	Command Packet	Comments
Ethernet	DHCP	8x 01 7C 01 0p FF	p: 2=On, 3=Off
	IP Address	8x 01 7C 02 0p 0q 0r 0s 0t 0u 0v 0x FF	address : pq.rs.tu.vx (HEX), pq = 0~255, rs = 0~255, tu = 0~255, vx = 0~255, e.g. 192.168.100.150 => 81 01 7C 02 0C 00 0A 08 06 04 09 06 FF
	Subnet Mask	8x 01 7C 03 0p 0q 0r 0s 0t 0u 0v 0x FF	address : pq.rs.tu.vx (HEX), pq = 0~255, rs = 0~255, tu = 0~255, vx = 0~255, e.g. 255.255.255.0 => 81 01 7C 03 0F 0F 0F 0F 0F 0F 00 00 FF
	Gateway	8x 01 7C 04 0p 0q 0r 0s 0t 0u 0v 0x FF	address : pq.rs.tu.vx (HEX), pq = 0~255, rs = 0~255, tu = 0~255, vx = 0~255, e.g. 192.168.100.254 => 81 01 7C 04 0C 00 0A 08 06 04 0F 0E FF
	DNS	8x 01 7C 05 0p 0q 0r 0s 0t 0u 0v 0x FF	address : pq.rs.tu.vx (HEX), pq = 0~255, rs = 0~255, tu = 0~255, vx = 0~255, e.g. 8.8.8.8 => 81 01 7C 05 00 08 00 08 00 08 00 08 FF
Power	On/Standby	8x 01 04 00 0p FF	p: 2=On, 3=Standby
System	Factory Reset (Soft)	8x 01 04 3F 03 00 FF	Reset device setting and keep network setting
	Factory Reset (Hard)	8x 01 04 3F 03 01 FF	Reset device setting
	Indicator LED	8x 01 7E 01 0A 05 0p FF	p: 2=On, 3=Off
	Reboot	8x 01 DE 01 FF	Set to reboot
	Baud Rate	8x 01 04 24 00 00 0p FF	p: 0=9600 bps, 1=38400 bps
Pan	Left	8x 01 06 01 VV 00 01 03 FF	VV: Pan Speed 0x01 (Low) ~ 0x18 (High)
	Right	8x 01 06 01 VV 00 02 03 FF	
	Absolute Position	8x 01 06 02 VV 00 0Y 0Y 0Y 0Y 00 00 00 00 FF	VV: Pan Speed 0x01 (Low) ~ 0x18 (High) YYYY : Pan Position 0x0000 ~ 0x600 & 0xFA00 ~ 0xFFFF (Center 0000)
	Relative Position	8x 01 06 03 VV 00 0Y 0Y 0Y 0Y 00 00 00 00 FF	VV: Pan Speed 0x01 (Low) ~ 0x18 (High) YYYY : Pan Position 0x0000 ~ 0x600 & 0xFA00 ~ 0xFFFF (Center 0000)
	Home	8x 01 06 04 FF	Go Home Position
	Reset	8x 01 06 05 FF	Initialize Pan Tilt and go to last position
	Pan Tilt Limit	8x 01 06 07 00 0W 0Y 0Y 0Y 0Y 00 00 00 00 FF	W: 1=Right YYYY: Pan Limit Position 0x0000~0x0600 W: 0=Left YYYY: Pan Limit Position 0xFFFF~0xFA00

Command Set	Command	Command Packet	Comments
Pan	Limit Clear	8x 01 06 07 01 0W 07 0F 0F 0F 07 0F 0F 0F FF	W: 1=Clear Right, 0=Clear Left
	Stop	8x 01 06 01 0A 01 03 03 FF	
	Pan Flip	8x 01 04 67 3F 0p FF	p: 2=On, 3=Off
	Preset Speed	8x 01 06 20 0p FF	p: 0=5 deg/sec, 1=15 deg/sec, 2=30 deg/sec, 3=60 deg/sec,
Preset	Reset	8x 01 04 3F 00 pp FF	pp: Memory Number 0x00 ~ 0x7F (* Preset address range : 0 ~ 127)
	Set	8x 01 04 3F 01 pp FF	
	Recall	8x 01 04 3F 02 pp FF	

7 RS-232 Inquiry Command List

Inquiry Command	Command Packet	Inquiry Packet	Comments
MAC Address Inq	8x 09 04 78 FF	y0 50 0a 0b 0c 0d 0e 0f 0g 0h 0i 0j 0k 0l FF	MAC Address = ab: cd: ef: gh: ij: kl
DHCP Inq	8x 09 7C 01 FF	y0 50 0p FF	p: 2=On, 3=Off
IP Address Inq	8x 09 7C 02 FF	y0 50 0p 0q 0r 0s 0t 0u 0v 0x FF	address : pq.rs.tu.vx (HEX)
Subnet Mask Inq	8x 09 7C 03 FF	y0 50 0p 0q 0r 0s 0t 0u 0v 0x FF	
Gateway Inq	8x 09 7C 04 FF	y0 50 0p 0q 0r 0s 0t 0u 0v 0x FF	
DNS Inq	8x 09 7C 05 FF	y0 50 0p 0q 0r 0s 0t 0u 0v 0x FF	
Power Mode Inq	8x 09 04 00 FF	y0 50 0p FF	p: 2=On, 3=Standby
FW version Inq - Linux	8x 09 00 02 00 03 FF	y0 50 mm nn oo pp qq rr ss FF	mmnnooppqqrrss : XXXxxxx(Ascii, data range = 0x00 ~ 0x7F)
SERIAL INQ	8x 09 02 18 FF	y0 50 aa bb cc dd ee ff gg hh ii FF	aa bb cc dd ee ff gg hh ii : Serial Number (ASCII)
Model Name	8x 09 06 A0 FF	y0 50 ii jj kk ll mm nn oo pp qq rr ss tt uu FF	ii : 0x00 jj kk ll mm nn oo pp qq rr ss tt : model name (ASCII)
Indicator LED Inq	8x 09 7E 01 0A 05 FF	y0 50 0p FF	p: 2=On, 3=Off
Device ID Inq	8x 09 7E CE FF	y0 50 aa bb cc dd ee ff gg hh ii jj kk ll FF	aa bb cc dd ee ff gg hh ii jj kk ll : Camera ID (ASCII)

Inquiry Command	Command Packet	Inquiry Packet	Comments
Device ID Ext Inq	8x 09 7E DE FF	y0 50 aa bb cc dd ee ff gg hh ii jj kk ll FF	aa bb cc dd ee ff gg hh ii jj kk ll : Camera ID (ASCII)
Pan Flip Inq	8x 09 04 67 3F FF	y0 50 0p FF	p: 2=On, 3=Off
PanTilt Preset Speed Inq	8x 09 04 75 32 FF	y0 50 0p FF	p: 0=5 deg/sec, 1=15 deg/sec, 2=30 deg/sec, 3=40 deg/sec,
Position Inq	8x 09 06 12 FF	y0 50 0w 0w 0w 0w 00 00 00 00 FF	wwww: Pan Position 0000 ~ 0600 & FA00 ~ FFFF (center 0000)

8 RS232 over IP

8.1 Overview of RS232 over IP

RS232 over IP allows you to control this unit from the controller with the IP communication function via the LAN by using RS232.

You can connect up to 5 controllers simultaneously on one LAN segment.

The communication specifications of RS232 over IP are as follows:

8.2 Interface

RJ-45 10Base-T/100Base-TX (automatically discrimination)

8.3 Internet protocol

IPv4

8.4 Transport protocol

UDP

8.5 IP address

Set by the IP card setting command

8.6 Port address

52381

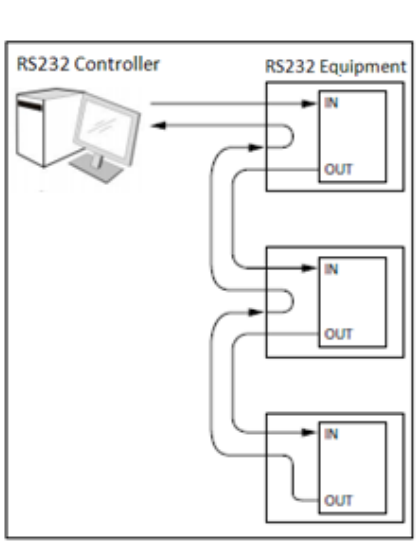
8.7 Delivery confirmation/Retransmission control

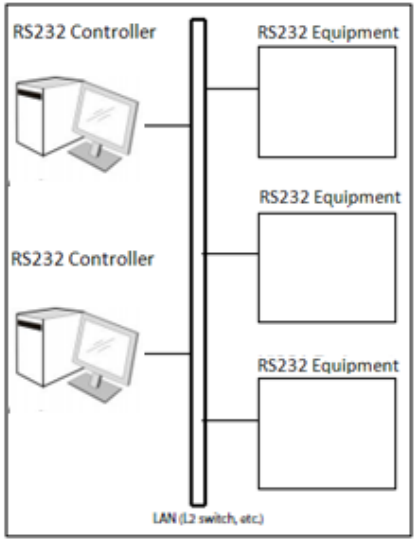
Depends on the application

8.8 Coverage

Limited dedicated network in the same segment without going through a bridge connection.

In this section, the device outputting commands, for example, a computer, is called the controller, and this unit and the devices connected to the same LAN are called the peripheral device. In the connection using RS-232/RS-422, the controllers and peripheral devices are connected to a one-direction ring. On the IP communication connection, the controllers and peripheral devices are connected by star type through a LAN.





RS232/RS422 connection **IP communication connection**

While the IP communication connection, the address of each device cannot be set in the RS232 message as it is because the controllers and peripheral devices that are connected simultaneously are increased. In this case, addresses of the controllers and peripheral devices that are set in the RS232 message are locked to 0 (for the controller) or 1 (for the peripheral device).

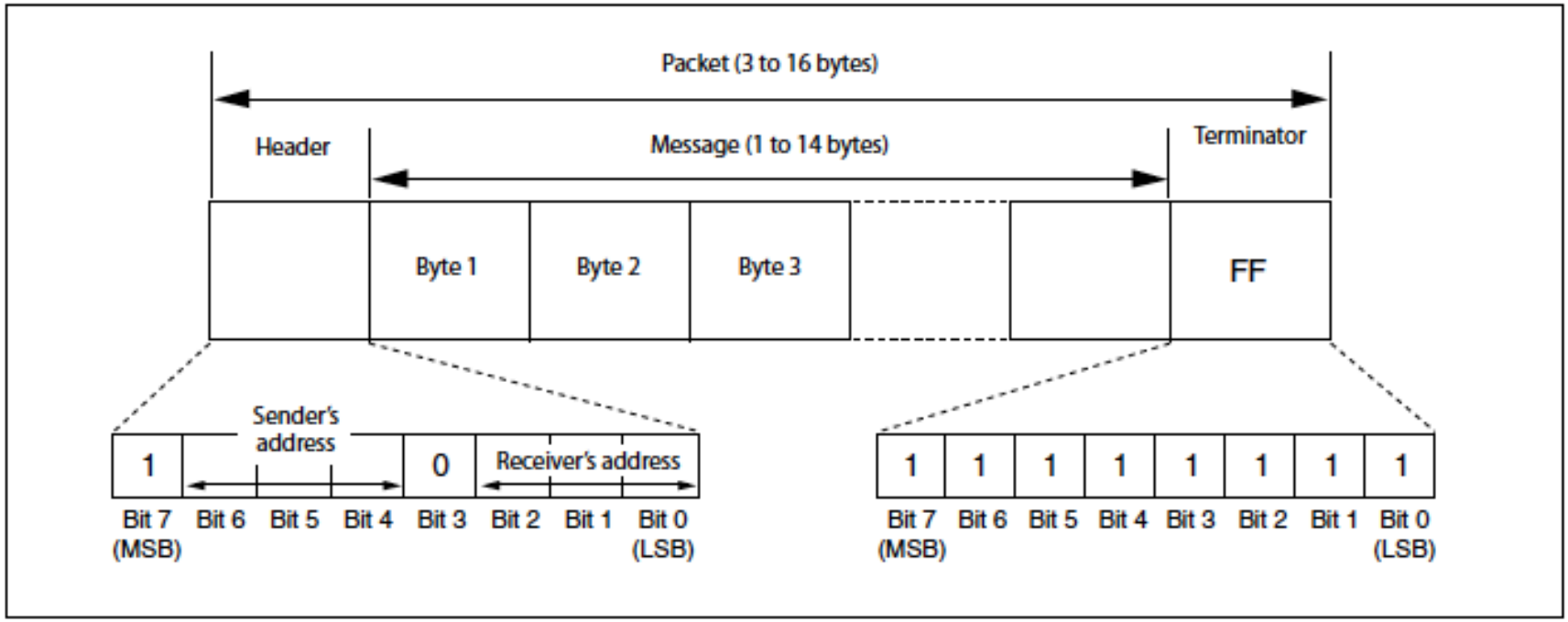
8.9 Packet Structure

The basic unit of VISCA communication is called a packet [Pic.1]. The first byte of the packet is called the header and comprises the sender's and receiver's addresses. For example, the header of the packet sent to the SRG assigned address 1 from the controller (address 0) is 81h in hexadecimal. The packet sent to the SRG assigned address 2 is 82h. In the command list, as the header is 8X, input the address of the SRG to X. The header of the reply packet from the SRG assigned address 1 is 90h. The packet from the SRG assigned address 2 is A0h.

Some of the setting commands for SRG can be sent to all devices at one time (broadcast)*. In the case of broadcast, the header should be 88h in hexadecimal.

When the terminator is FFh, it signifies the end of the packet.

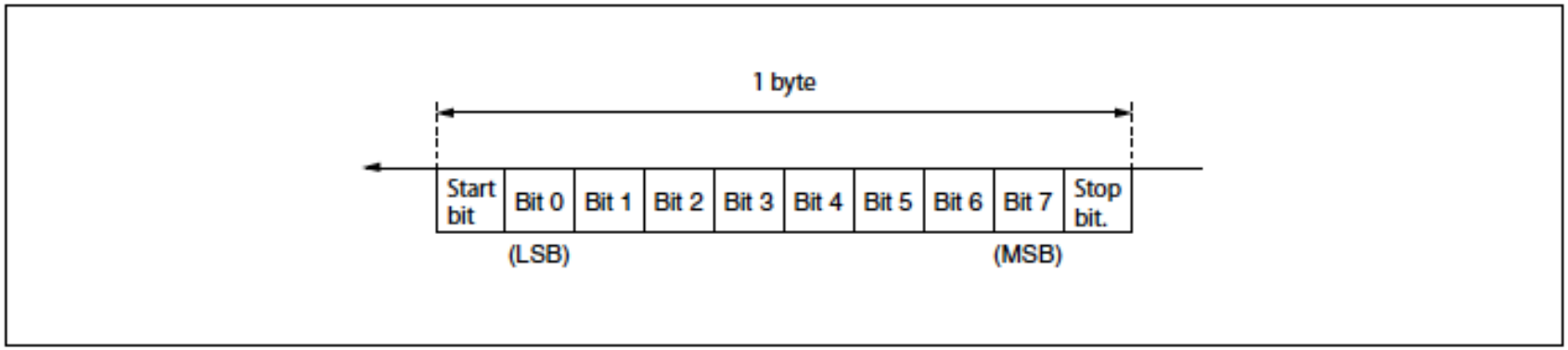
*The broadcast function is not available for VISCA over IP.



Pic. 1 Packet structure

Note:

Pic. 1 shows the packet structure, while Pic.2 shows the actual waveform. Data flow will take place with the LSB first.



Pic. 2 Actual waveform for 1 byte

9 Communication method of VISCA over IP

9.1 Communication method

VISCA over IP can process the VISCA communication between the controllers and peripheral devices using the messages that can be identified on the LAN, and sends/receives them. Because of this, VISCA over IP is not concerned about the contents of the communication between the controllers and peripheral devices. However, the VISCA communication sequence is different, depending on the types, as follows.

9.2 VISCA command

This is a command from the controller to the peripheral device. When the peripheral device receives this command, Acknowledge is returned. After completing command processing, a completion notice is returned. This command uses the socket of VISCA. The order of completion notices may be changed if the multiple commands are sent to the same peripheral device.

9.3 VISCA inquiry

This is an inquiry from the controller to the peripheral device. When the peripheral device receives this type of command, the reply for the inquiry is returned. This command does not use the socket of VISCA. The order of the replies is not changed if a multiple commands are sent.

9.4 VISCA reply

This is an Acknowledge, completion notice, reply, or error reply from the peripheral device to the controller. The classification for sending messages from the peripheral device to the controller is common.

9.5 VISCA device setting command

This is the device setting command from the controller to the peripheral device. When the peripheral device receives this classifications command, the peripheral device performs the function depend on the command.

9.6 Address

Sets the address of the peripheral device, and does not return a reply to the controller. While using VISCA over IP, the address command is not sent from the controller because a Network Change command from the peripheral device that triggers sending command is not issued.

9.7 IF_Clear

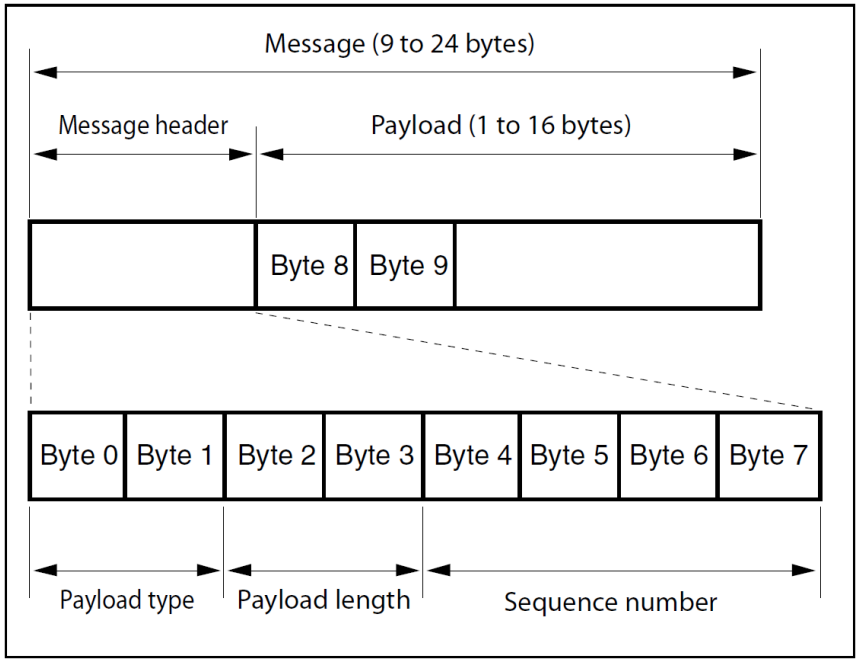
Sends the reply message to the controller after clearing, without using VISCA socket.

9.8 CAM_VersionInq

Sends the reply message to the controller, without using VISCA socket.

9.9 Format

These are the specifications of the message header (8 bytes) and payload (1 to 16 bytes).



Note: The actual LAN out method is big-endian, LSB first.

Pic.3 Message structure of the VISCA over IP

Example:

	Payload type		Payload length		Sequence number				Payload (1~16Byte)										
Command	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	...	Byte 16
CAM_Power On	01	00	00	06	00	00	00	01	81	01	04	00	02	FF					
Pan-tiltDrive Up	01	00	00	09	00	00	00	02	81	01	06	01	0C	0C	03	01	FF		
Pan-tiltDrive Down	01	00	00	09	00	00	00	03	81	01	06	01	0C	0C	03	02	FF		
CAM_FocusModeInq	01	10	00	5	00	00	00	04	81	9	4	38	FF						

9.10 Payload type

Stores the value (Byte 0 and Byte 1) of the following table on the payload division.

Name	Value (Byte 0)	Value (Byte 1)	Description
VISCA command	01h	00h	Stores the VISCA command.
VISCA inquiry	01h	10h	Stores the VISCA inquiry.
VISCA reply	01h	11h	Stores the reply for the VISCA command and VISCA inquiry, or VISCA device setting command.
VISCA device setting command	01h	20h	Stores the VISCA device setting command.
Control command	02h	00h	Stores the control command.
Control reply	02h	01h	Stores the reply for the control command.

Pic.4 Payload Type Table

9.11 Payload length

Stores the number of bytes (1 to 16) of data is stored on the payload.
Example: when the payload length is 16 bytes.
Byte 2:00h
Byte 3:10h

9.12 Sequence number

The controller stores the sequence number that is added every time a message is sent. If the sequence number reaches the limit, next values will be 0. The peripheral device saves the sequence number in the message from the controller, and stores the sequence number of the received message corresponding to the message sent to the controller.

9.13 Payload

Depending on the payload type, the following are stored.

- VISCA command
  - Stores the packet of the VISCA command.
- VISCA inquiry
  - Stores the packet of VISCA message.
- VISCA reply
  - Stores the reply for the command or inquiry (Acknowledge message, completion message, or error message).
- VISCA device setting command
  - Stores the packet of the VISCA device setting command.
- Control command
  - The following are stored on the payload division of the control command.

Name	Value	Description
RESET	01h	Resets the sequence number to 0. The value that was set as the sequence number is ignored.
ERROR	0Fyyh	yy=01: Abnormality in the sequence number.
		yy=02: Abnormality in the message (message type)

- Controlled reply
  - The following are stored on the payload division of the reply for the control command.

Message	Value	Description
Acknowledge	01h	Reply for RESET.

9.14 Delivery confirmation

VISCA over IP uses UDP as a communications protocol of the transport layer. Delivery of messages is not guaranteed for the UDP communication. Delivery confirmation and retransmission should be performed on the application.

When the controller sends a message to the peripheral device, wait until a reply for the message is received before sending the next message. You can confirm delivery of messages by managing the time-out waiting for a reply message sent.

If time out occurs on the controller, loss of one of the following message is considered:

- Command
- Acknowledge message
- Completion message for command
- Inquiry
- Reply message for the inquiry
- Error message
- Inquiry of the VISCA device setting command
- Reply message of the VISCA device setting command.