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Remote Camera Controller Interface Specifications

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Contents

1. Introduction.....	4
2. Configuration outline.....	5
3. Connection formats	6
4. Controller control	7
4.1. Network connection.....	7
4.1.1. Command format.....	7
4.1.2. Command sequence (In case of AW-RP120)	8
4.1.3. Command sequence (In case of AW-RP50)	10
4.2. Serial connection.....	11
4.2.1. Command format.....	11
4.2.2. Command sequence (Only supported by the AW-RP120)	11
5. Camera/pan-tilt head control	13
5.1. Serial connection (Only supported by the AW-RP120).....	13
5.1.1. Command sequence	13
6. Command details.....	14
6.1. Controller control.....	14
6.1.1. Camera selection	14
6.1.2. Preset memory (Only supported by the AW-RP120)	16
6.1.3. Tracing memory (Only supported by the AW-RP120).....	17
6.2. Camera/pan-tilt head control commands	18
7. Error return	20
7.1. In case of AW-RP120	20
7.2. In case of AW-RP50	22
<Appendix>.....	24

1. Introduction

This document sets forth the specifications for the external interface used when operations are performed from a PC using an Ethernet or RS-232C serial interface for the remote camera controller (hereafter “controller”).

Applicable models

- AW-RP50 series, AW-RP120 series

2. Configuration outline

Two formats for connecting the controller and PC are available: a network connection and an RS-232C serial connection.

The two following types of control can be exercised with each of these connections.

① Controller control

Camera switching, group switching and other operations performed using the controls on the panel of the controller are controlled.

A response is returned to the PC for the results of executing these operations using the controller.

This type of control can be exercised using a network connection and a serial connection.

② Camera/pan-tilt head control (serial connection only)

Adjustments of the gain, iris and other functions performed by the camera/pan-tilt head are controlled through the controller for both the camera and pan-tilt head. In terms of the response, response commands from the camera/pan-tilt head are returned to the PC.

This type of control can be exercised using the serial connection only (the connection between the controller and camera is also a serial connection); it cannot be exercised with a network connection.

For details of the connection formats, refer to Chapter 3.

3. Connection formats

When connecting the controller to the PC, either a network connection where connection is made to the LAN connector on the rear panel of the controller or a serial connection where connection is made to the REMOTE connector is available.

The method used to connect the controller with the camera/pan-tilt head is subject to restrictions depending on the connection format used. The connection methods are described below.

【Network connection】 (Supported by the AW-RP50 and AW-RP120)

The PC and controller are connected in a network.

This type of connection allows only for controller control so when the camera/pan-tilt head are to be controlled from the PC, they are controlled directly by the network without going through the controller.

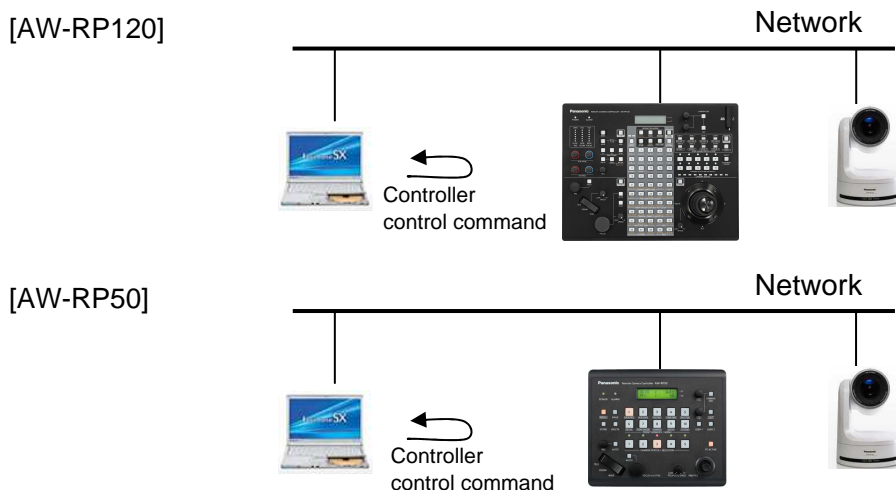


Fig.3.1 View of network connection

【Serial connection】(Only supported by the AW-RP120)

The PC and controller are connected using a serial interface (RS-232C).

In this case, the connection between the controller and camera/pan-tilt head is also a serial connection.

This type of connection allows for controller control and camera/pan-tilt head control.

The camera/pan-tilt head are controlled through the controller using the “Camera Control Protocol” and “P/T Control Protocol” commands. For details of these commands, refer to “6.2 Camera/pan-tilt head control commands”.

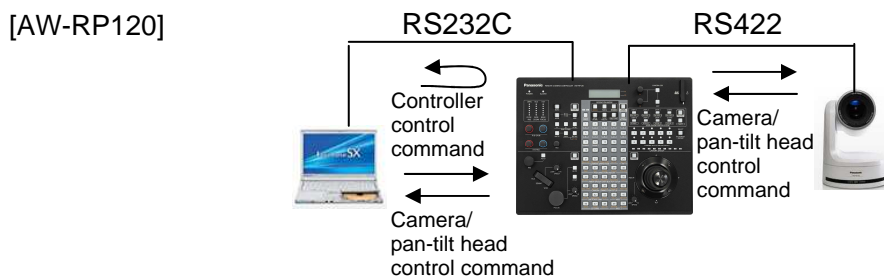


Fig.3.2 View of serial connection

4. Controller control

The external interface used when controlling the controller from Ethernet is described below.

4.1. Network connection

The format of the controller control command is detailed below. For the message details, refer to <Appendix>. The number of the controller port is “80”.

4.1.1. Command format

【Command format】

[Send]

http://[**IP Address**]/cgi-bin/aw_cam?cmd=[**Command**]&res=[**Type**]

where

※**IP Address**..... IP address of controller at connection destination

※**Command**..... Details given in “Command” column in the command tables below

※**Type**..... Normally “1” (but “0” for the AWB[OWS] command and ABB[OAS] command)

[Receive]

200 OK “**Command**”

※**Command**..... Response value of each command; set in the HTTP message body

Example: Camera switching: CAM1

[Send]

http://192.168.0.10/cgi-bin/aw_cam?cmd=XCN:01:1&res=1

<AW-RP120>

[Receive] The response is a text-format response as described below.

HTTP/1.1 200 OK

<AW-RP50>

[Receive] The response is an HTTP response.

200 OK “**XCN:01:1**”

As per the command format described on the previous page, the command sequence which is followed when communication is performed is shown below.

For details of the sequence followed when an error has occurred in response to a command, refer to "7. Error return".

4.1.2. Command sequence (In case of AW-RP120)

【Sequence】

"PC" is the control terminal in the sequence below.

Example: Camera switching to CAM1

Camera IP Address = 192.168.0.10

Command = XCN:01:1

The controller switching is controlled from the PC, and [HTTP/1.1 200 OK] is returned as the response. Given below is the command sequence.

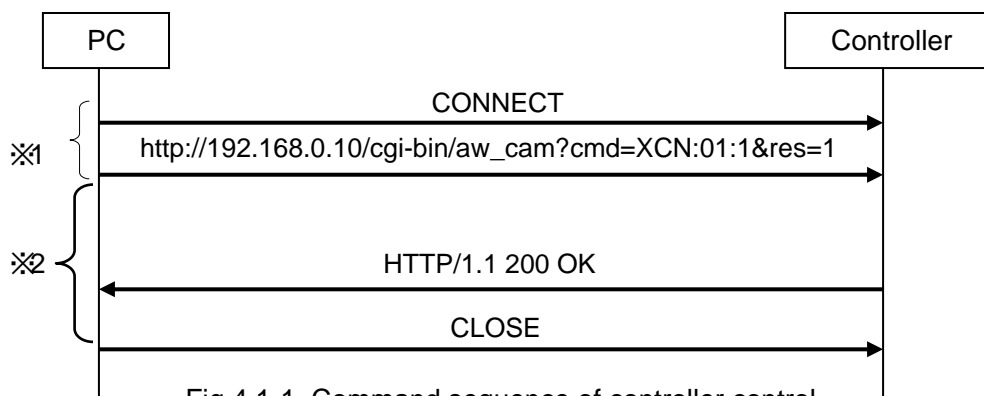


Fig.4.1-1 Command sequence of controller control

When control has been received from the PC, the controller may sometimes exercise control over the camera as well. This involves the preset memory and tracing memory.

Preset play control is exercised from the PC, and [HTTP/1.1 200 OK] is returned as the response. Given below is the command sequence.

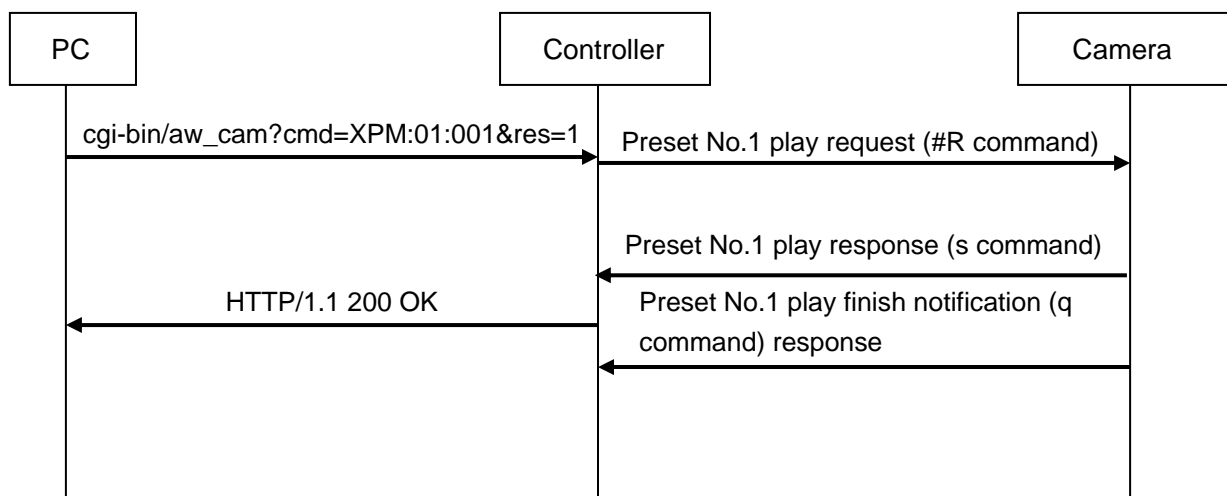


Fig.4.1-2 Command sequence of controller control (Preset memory, etc.)

To receive preset playback completion notifications on the PC, connect directly to the camera and

receive update notifications.

(For details, refer to "4. Camera information update notification" in the HD Integrated Camera Interface Specifications.)

*1 If a command is not sent within 20 seconds after connection (CONNECT), connection will be severed from the AW-RP120.

*2 If disconnection (CLOSE) is not executed within * seconds after the PC sends the command, connection will be severed from the AW-RP120.

4.1.3. Command sequence (In case of AW-RP50)

【Sequence】

“PC” is the control terminal in the sequence below.

Example: Camera switching to CAM1
 Camera IP Address = 192.168.0.10
 Command = XCN:01:1

The controller switching is controlled from the PC, and [200 OK “XCN:01:1”] is returned as the response. Given below is the command sequence.

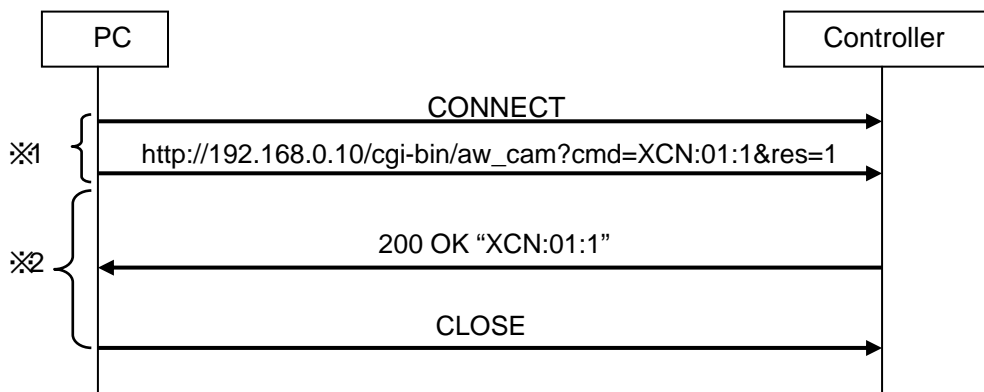


Fig.4.1-3 Command sequence of controller control

※1 If a command is not sent within 10 seconds after connection (CONNECT), connection will be severed from the AW-RP50.

※2 If disconnection (CLOSE) is not executed within * seconds after the PC sends the command, connection will be severed from the AW-RP50.

4.2. Serial connection

The external interface used when operating the remote controller from an RS-232C serial interface is described below. Control is exercised over the controller, and control is exercised over the camera/pan-tilt head.

The RS-232C communication specifications are as below.

Item	Setting
Method	Full duplex
Baud rate	9600bps
Data bit	8bit
Stop bit	1bit
Parity	None
Flow control	None

4.2.1. Command format

[Send/Receive]

[STX] [Command][ETX]

where

※STX..... 0x02

※ETX..... 0x03

※Command..... Details given in “6. Command details”

4.2.2. Command sequence (Only supported by the AW-RP120)

The controller switching is controlled from the PC, and [200 OK “XCN:01:1”] is returned as the response. Given below is the command sequence.

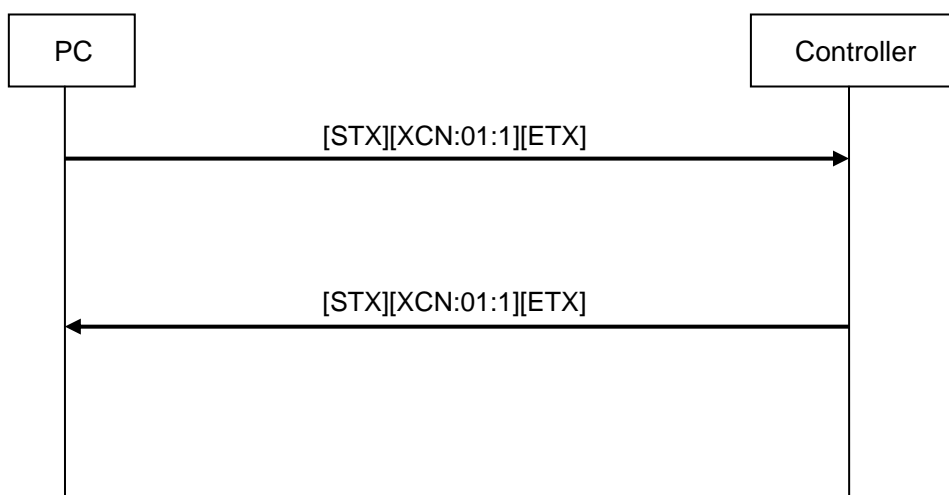


Fig.4.2-1 Camera selection protocol sequence

※If there is no response from the controller, wait at least 10 seconds before re-sending the command.

When control has been received from the PC, the controller may sometimes exercise control over the camera as well.

This involves the preset memory and tracing memory.

Preset play control is exercised from the PC, and a result is returned.

Given below is the command sequence.

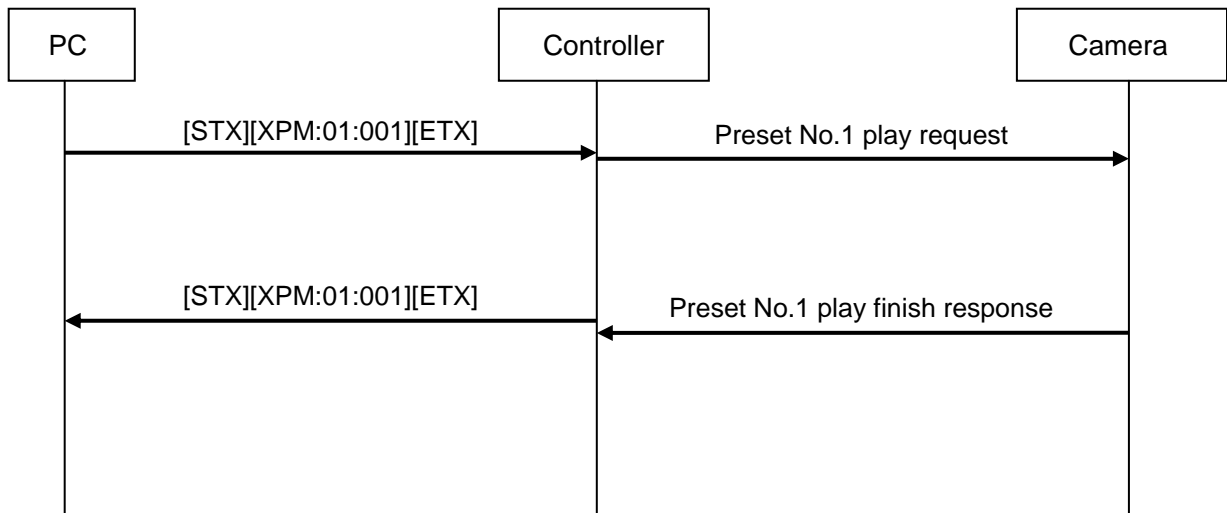


Fig.4.2-2 Preset play sequence

5. Camera/pan-tilt head control

Control is exercised over the camera/pan-tilt head using the “CONVERTIBLE CAMERA and PAN/TILT SYSTEM” protocol.

For details of the commands, refer to the separate “PROTOCOL of CONVERTIBLE CAMERA and PAN/TILT SYSTEM”. For details of the commands which are set forth in the document and which are supported by the controller, refer to “6. Command details”.

5.1. Serial connection (Only supported by the AW-RP120)

This function is available for a serial connection only.

5.1.1. Command sequence

The camera/pan-tilt head are controlled through the controller.

The response from the camera/pan-tilt head is also returned to the PC.

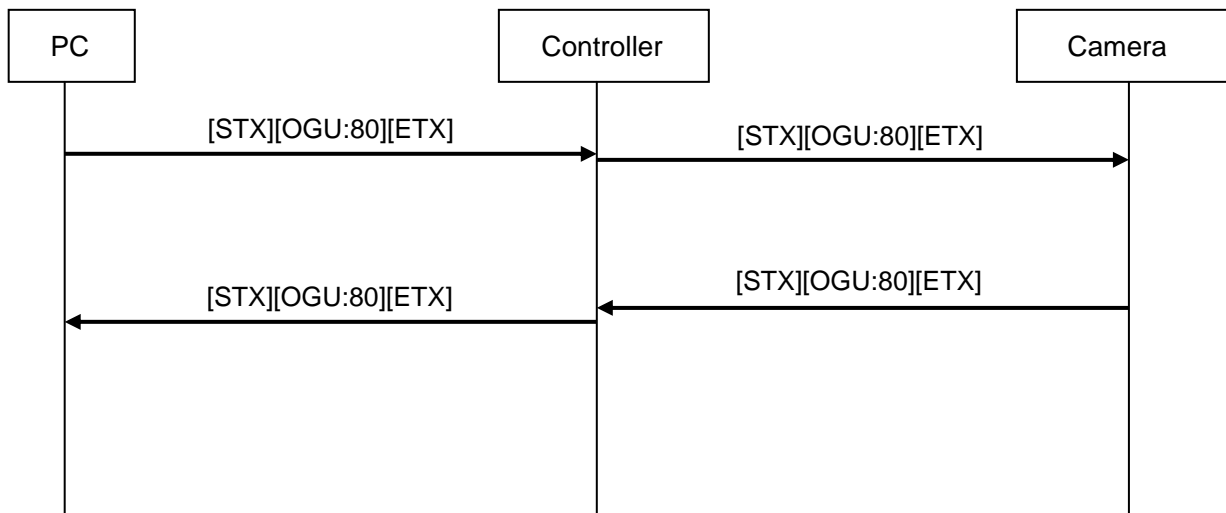


Fig.5.1 Camera/pan-tilt head control (GAIN UP (Auto)) sequence

6. Command details

6.1. Controller control

6.1.1. Camera selection

These commands switch the camera selection by specifying the port numbers, camera numbers and group numbers.

Table 6.1.1. Camera selection

Command name	Category	Control method		Command	Data value	Setting	Remarks
		Serial	IP				
Camera switching control command (specifying the port numbers)	Control	○	○	XPT:[Data]	1	Port1	Up to Port5 for the AW-RP50
	Response	○	RP120: – RP50: ○	XPT:[Data]	∟ 10	∟ Port10	
Group switching control command	Control	○	○	XGP:[Data]	1	Group1	Up to Group10 for the AW-RP120
	Response	○	RP120: – RP50: ○	XGP:[Data]	∟ 20	∟ Group20	
Camera switching control command (specifying the camera numbers)	Control	○	○	XCN:01:[Data]	1	CAM1	
	Response	○	RP120: – RP50: ○	XCN:01:[Data]	∟ 100	∟ CAM100	
Camera switching control command (specifying the group or the port numbers)	Control	○	○	XCN:02:[Data1] : [Data2]	[Data1] 1	[Data1] Group1	Up to Port5 for the AW-RP50 Up to Group10 for the AW-RP120
	Response	○	RP120: – RP50: ○	XCN:02:[Data1] : [Data2]	∟ 20 [Data2] 1 ∟ 10	∟ Group20 [Data2] Port1 ∟ Port10	
Camera number confirmation command (inquiry selected camera number)	Confirmation	○	○	XQC:01	-	-	
	Response	○	○	XQC:01:[Data]	0 1 ∟ 100	Unselected CAM1 ∟ CAM100	
Camera Group/Port confirmation command (inquiry selected camera Group/Port number)	Confirmation	○	○	XQC:02	-	-	
	Response	○	○	XQC:02:[Data1] : [Data2]	[Data1] 1 ∟ 20 [Data2] 0 1 ∟ 10	[Data1] Group1 ∟ Group20 [Data2] Unselected Port1 ∟ Port10	Up to Port5 for the AW-RP50 Up to Group10 for the AW-RP120

Example of use)

•Camera switching: CAM20

[Control] PC → AW-RP120

http://192.168.0.10/cgi-bin/aw_cam?cmd=XCN:01:20&res=1

[Response] AW-RP120 → PC

HTTP/1.1 200 OK

•Camera Group/Port confirmation: Port 5 and Group 10

[Control] PC → AW-RP120

http://192.168.0.10/cgi-bin/aw_cam?cmd=XQC:02&res=1

[Response] AW-RP120 → PC

HTTP/1.1 200 OK<CR><LF>

<CR><LF>

XQC:02:10:5<CR><LF>

<CR><LF>

6.1.2. Preset memory (Only supported by the AW-RP120)

This command specifies the preset number and plays the preset memory.

Table 6.1.2. Preset memory

Command name	Category	Control method		Command	Data value	Setting	Remarks
		Serial	IP				
Preset memory play control command	Control	○	○	XPM:01:[Data]	001 } 100	Preset No1 } Preset No100	Only supported by the AW-RP120.
	Response	○	—	XPM:01:[Data]			

Example of use)

•Preset memory play: Preset No1

[Control] PC → AW-RP120

http://192.168.0.10/cgi-bin/aw_cam?cmd=XPM:01:001&res=1

[Response] AW-RP120 → PC

HTTP/1.1 200 OK

6.1.3. Tracing memory (Only supported by the AW-RP120)

These commands enable the tracing memory to be placed in the standby, play or stop status for the camera/pan-tilt head selected.

Table 6.1.3. Tracing memory

Command name	Category	ControlMethod		Command	Data value	Setting	Remarks
		Serial	IP				
TMEM standby control command	Control	○	○	XTM:02:[Data]	001	TracingNo1 ? TracingNo100	Only supported by the AW-RP120.
	Response	○	—	XTM:02:[Data]	?		
TMEM play control command	Control	○	○	XTM:01:[Data]	000	Play	Only supported by the AW-RP120.
	Response	○	—	XTM:01:[Data]			
TMEM stop control command	Control	○	○	XTM:00:[Data]	001 ? 010	Stop	Only supported by the AW-RP120.
	Response	○	—	XTM:00:[Data]			

Example of use)

• TMEM standby: TracingNo1

[Control] PC → AW-RP120

http://192.168.0.10/cgi-bin/aw_cam?cmd=XTM:02:001&res=1

[Response] AW-RP120 → PC

HTTP/1.1 200 OK

6.2. Camera/pan-tilt head control commands

The controller supports the following commands in the "PROTOCOL of CONVERTIBLE CAMERA and PAN/TILT SYSTEM". (AW-RP120 only)

【Camera command】

Command name	Send command
GAIN UP	OGU
GAIN SELECT	OGS
T PEDESTAL	OTP
T PEDESTAL	OTD
R GAIN	ORI
B GAIN	OBI
R PEDESTAL	ORP
B PEDESTAL	OBP
AWC MODE	OAW
AWB SET	OWS
ABB SET	OAS
SHUTTER	OSH
SHUTTER MODE	OSA:90
SHUTTER SPEED	OSA:91
DETAIL	ODT
TOTAL DTL LEVEL	OSA:30
HE870 HD DETAIL	OHD
HC1500 SD DETAIL	OSE:0E
HC1500 SD DETAIL LVL	OSE:00
SCENE FILE	XSF
COLOR BAR/CAMERA	DCB
PRESET SCOPE	OSE:71
ND Control	OFT
MENU OFF/ON	DUS
MENU SW	DPG
ITEM SW	DIT
YES SW	DUP
NO SW	DDW
Auto Focus	OAF
Auto Iris	ORS
Push Auto Focus	OSE:69
R GAIN	ORG
B GAIN	OBG
Contrast(Picture Level)	OSD:48

【Pan-tilt command】

Command name	Send command
Speed With Zoom Pos	#SWZ
Pan Preset Speed	#UPVS
Tilt Preset Speed	#UTVS
ND Control	#D2
Lamp Control	#D4
OPTION SW Control	#D6
Defroster Control	#D7
Wiper Control	#D8
Heater/Fan Control	#D9
Install Position	#INS
Pan Speed Control	#P
Tilt Speed Control	#T
Focus Speed Control	#F
Zoom Speed Control	#Z
Iris Control	#AXI
Auto Iris	#D3
Pan/Tilt Speed	#PTS
Power	#O
Preset Recall	#R
Preset Memory	#M
Preset Delete	#C
Limitation Setting	#L
Limitation Setting	#LC
Home Position	#U
Pan/Tilt Absolute Position Control	#APC
Auto Focus	#D1

7. Error return

There are three kinds of errors — ER1, ER2 and ER3 as described below — which are generated in response to the controller control commands in a network connection. In a serial connection, the same command as the request is returned as the response to the control command.

7.1. In case of AW-RP120

① ER1 (unsupported command)

This error is generated when a command which is not supported by the controller has been received.

Example) When the non-existent “XF” command is executed for the controller.

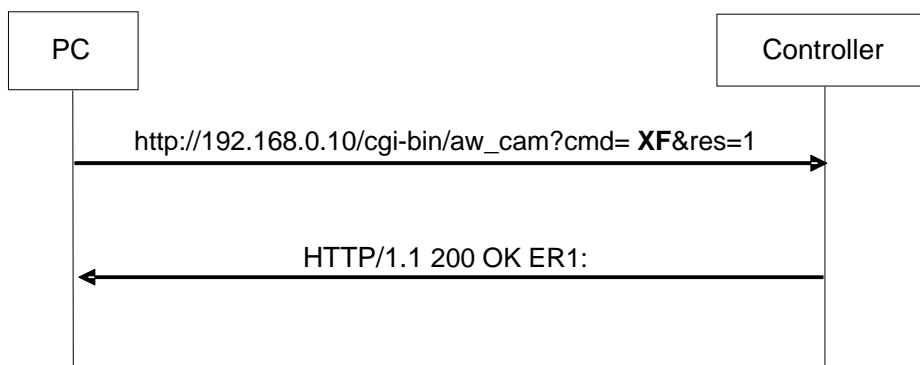


Fig.7.1-1 Error (ER1)

② ER2 (busy status)

Error generated when the controller is in the Busy status such as when group switching is in progress.

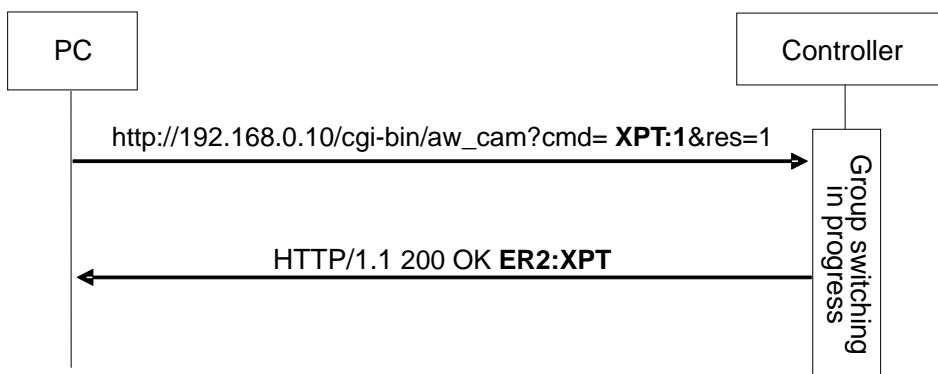


Fig.7.1-2 Error (ER2)

③ ER3 (outside acceptable range)

This error is generated when the data value of a command is outside the acceptable range.

Example)

The “XPT (Camera switching)” command was executed with a data value of “90” which is outside the acceptable range.

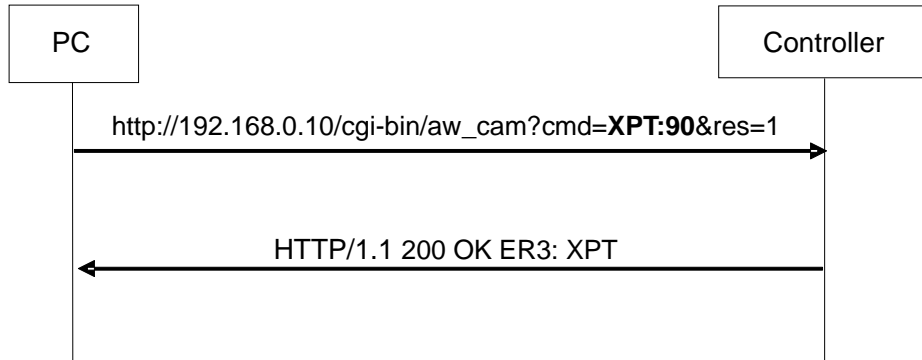


Fig.7.1-3 Error (ER3)

7.2. In case of AW-RP50

① 400 Bad Request (unsupported command)

This error is generated when a command which is not supported by the controller has been received.

Example) When the non-existent “XF” command is executed for the controller.

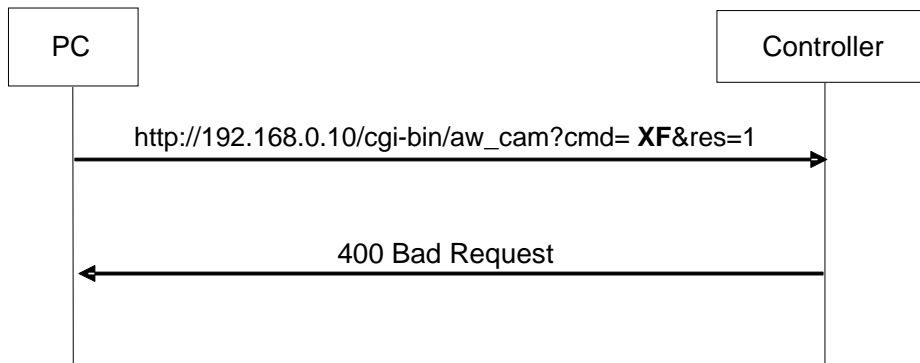


Fig.7.2-1 Error (unsupported command)

② 500 Internal Server Error (busy status)

Error generated when the controller is in the Busy status such as when group switching is in progress.

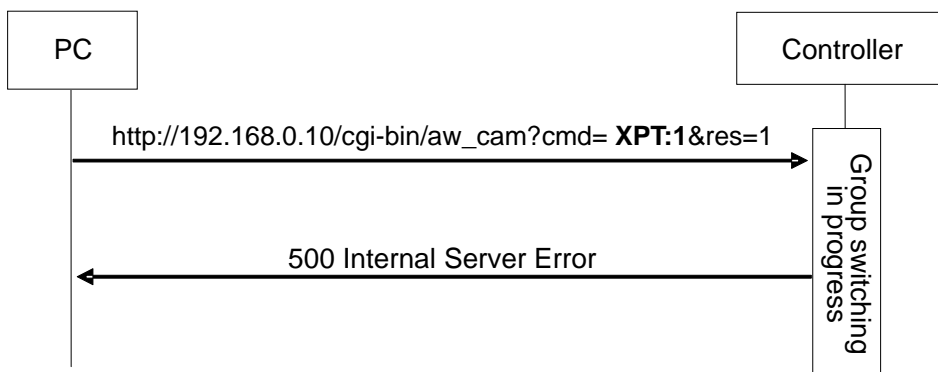


Fig.7.2-2 Error (busy status)

③ 400 Bad Request (outside acceptable range)

This error is generated when the data value of a command is outside the acceptable range.

Example)

The “XPT (Camera switching)” command was executed with a data value of “90” which is outside the acceptable range.

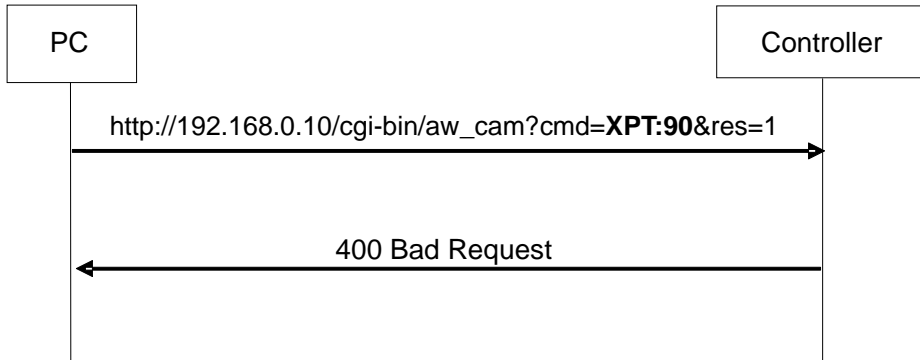


Fig.7.2-3 Error (outside acceptable range)

<Appendix>

【In case of AW-RP120】

The HTTP messages are described using the format for input to the address bar of the web browser as in the example given below.

(Example: `http://192.168.0.10/cgi-bin/aw_cam?cmd=%23XCN:01:1&res=1`)

The actual HTTP messages are in compliance with the HTTP1.1 communication specifications, and have the [Send] formats as given below.

[Send]

A command such as the ones listed below is sent after connection has been made to the specified port (default: 80) which has been set for the controller.

Method: GET

GET /cgi-bin/aw_cam?cmd=XCN:01:1&res=1 HTTP/1.1[CR][LF]	Request
Accept: image/gif, ... (omitted) ... , /*[CR][LF]	Header
Referer: http://192.168.0.10/[CR][LF]	
Accept-Language: en[CR][LF]	
Accept-Encoding: gzip, deflate[CR][LF]	
User-Agent: AW-Cam Controller[CR][LF]	
Host: 192.168.0.10[CR][LF]	
Connection: Keep-Alive[CR][LF]	
[CR][LF]	Blank line

[Receive]

A text-format message as shown below is received.

<Normal status response: Setting/Control commands>

HTTP/1.1 200 OK	Response
-----------------	----------

<Normal status response: Query commands>

HTTP/1.1 200 OK[CR][LF]	Response
[CR][LF]	Blank line
XQC:02:10:5[CR][LF]	Message body
[CR][LF]	Blank line

<Error status response: Setting/Control commands>

HTTP/1.1 200 OK ER3:XPT	Response
-------------------------	----------

【In case of AW-RP50】

The HTTP messages are described using the format for input to the address bar of the web browser as in the example given below.

(Example: `http://192.168.0.10/cgi-bin/aw_cam?cmd=%23XCN:01:1&res=1`)

The actual HTTP messages are in compliance with the HTTP1.1 communication specifications, and have the [Send] formats as given below.

[Send]

A command such as the ones listed below is sent after connection has been made to the specified port (default: 80) which has been set for the controller.

Method: GET

GET /cgi-bin/aw_cam?cmd=XCN:01:1&res=1 HTTP/1.1[CR][LF]	Request
Accept: image/gif, ... (omitted) ... , */*[CR][LF] Referer: http://192.168.0.10/[CR][LF] Accept-Language: en[CR][LF] Accept-Encoding: gzip, deflate[CR][LF] User-Agent: AW-Cam Controller[CR][LF] Host: 192.168.0.10[CR][LF] Connection: Keep-Alive[CR][LF]	Header
[CR][LF]	Blank line

[Receive]

A message with the command name and result value contained in the message body of the HTTP response message is received.

In this manual, this message is given as [200 OK "XCN:01:1"], but in actual fact commands such as the following ones are received..

HTTP/1.1 200 OK[CR][LF]	Response
Status: 200[CR][LF] Date: Mon, 05 Dec 2011 00:00:00 GMT[CR][LF] Server: ver2.4 rev0[CR][LF] Connection: Close[CR][LF] Content-Type: Text/plain[CR][LF] Set-Cookie: Session=0[CR][LF] Accept-Ranges: bytes[CR][LF] Cache-control: no-cache[CR][LF] Content-length: 7[CR][LF]	Header
[CR][LF]	※Size of message body Blank line
XCN:01:1	Message body