

CCV Camera

PROGRAMMER'S MANUAL

VERSION 1.01/APRIL 2002

VICTOR COMPANY OF JAPAN, LIMITED
PROFESSIONAL PRODUCTS, SYSTEM & NETWORK SECTOR

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1 PREFACE

This manual defines the commands and communication protocol used by JVC CCV cameras (also referred to below simply as “camera” or “CAM”) for remote control of the camera by a controller (also referred to below simply as “CONT”) when using the control signal connection terminal of the camera. For thorough understanding, please read the instruction manual for each camera before reading this manual.

Note that details regarding commands for each separate camera are not included in this manual. Please refer to the command guide for each camera.

It is possible to control the following items by remote control. (Note that details differ depending on the camera.)

		Control items
Screen Angle Settings	Pan/Tilt Head Operations	PAN POSITION TILT POSITION
	Lens Operations	ZOOM POSITION FOCUS POSITION IRIS POSITION
	Position Operations	POSITION NUMBER
	Other	AUTO PATROL AUTO PAN AUTO FLIP
Video Settings	Brightness-related Settings	IRIS MODE BLC AGC MODE SHUTTER SPEED AVERAGE: PEAK
	Chroma-related Settings	WHITE BALANCE MODE MANUAL WHITE BALANCE COLOR GAIN
	Other	ENHANCE MODE V PHASE
Display Settings	Title Displays	CAMERA TITLE PRESET POSITION TITLE ALARM TITLE AREA TITLE
	Information Displays	EVENT DISPLAY ID DISPLAY INFORMATION DISPLAY
Saving Settings		POSITION POSITION DATA CAMERA DATA ALARM TITLE AUTO PATROL

2 THE SERIAL INTERFACE

Chapter 2 describes the connections and settings used between the camera and the controllers.

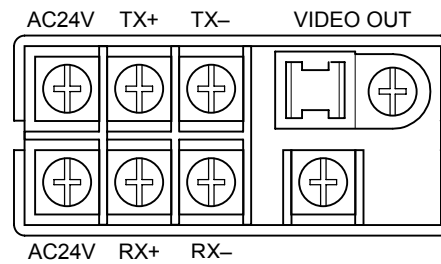
2.1 Connection Type and Communication Model

Any one of four communications models can be selected for the connection type between the controller and camera. The features of each of these are listed in the table below. Select the communications model best suited to your application.

Communications Model	Point-to-Point Simplex Communications Model	Point-to-Point Full Duplex Communications Model	Multi-Drop Simplex Communications Model	Multi-Drop Full Duplex Communications Model
Communications Protocol	JCCP-S	JCCP-F	JCBP-S	JCBP-F
Communications System	Asynchronous serial communications			
	RS-422A standard or RS-232C standard		RS-485 standard	
Number of cameras controlled by a single controller	1		1 to 32	
Ability to check operational status of camera	No	Yes	No	Yes
Reliability of communications	Normal	Very high	Normal	High
Efficient use of lines	Good	Very good	Poor	Good
System flexibility	Low	Low	High	Very high
Simplicity of software	Very easy	Very difficult	Easy	Difficult

2.2 Control Signal Connection Terminals

The camera is connected to the controller using the TX+, TX–, RX+ and RX– terminals on the ceiling mount terminal strip and the rear panel of the camera.



Example of terminal panel on a ceiling mount terminal strip

Make the following connections when connecting using the RS-422A or RS-485 standard. Since TX+ and TX– as well as RX+ and RX– are each balanced types, always connect them as pairs.

Terminal Name	Communication Direction	Controller Terminal Connected to
TX+	Camera Controller (TX+ and TX– balanced)	RX+
TX–		RX–
RX+	Camera Controller (RX+ and RX– balanced)	TX+
RX–		TX–

Some cameras can be connected using the RS-232C standard. When the RS-232C standard is used, the TX+, TX– and RX– terminals are used for GND, TXD and RXD. For details, please refer to the instruction manual of the camera.

Terminal Name	Actual Operations	Communication Direction	Controller Terminal Connected to
TX+	GND		GND
TX–	TXD	Camera Controller	RXD
RX+	-		
RX–	RXD	Camera Controller	TXD

2.3 Communications Settings

Communications settings include the following: Setting the communication system, setting the connection type, setting the communication ID and setting the terminals. The setting method differs depending on the camera. For details, see the instruction manual and command guide for each camera.

Setting Items	Possible Selections	Remarks
Communications System	Point-to-Point (RS-422A)	
	Multi-Drop (RS-485)	
	Point-to-Point (RS-232C)	Some cameras only
Connection Type	Full Duplex (DUPLEX)	
	Simplex (SIMPLEX)	
Communication ID (When using multi-drop)	0 to 99	The ones actually used are 1 to 32
RX+ and RX- terminals	OPEN (OFF)	
	110 Ω (ON)	

NOTE Communications settings are only detected when the power is turned on. If settings are changed, always be sure to activate them by turning the power off and then on again.

2.4 Serial Communications Specifications

The communications between the camera and the controller observe the following specifications.

Communications Model	Point-to-Point Simplex Communications	Point-to-Point Full Duplex Communications	Multi-Drop Simplex Communications	Multi-Drop Full Duplex Communications
Communications Protocol	JCCP-S	JCCP-F	JCBP-S	JCBP-F
Communications System	Asynchronous serial communications			
	RS-422A standard or RS-232C standard		RS-485 standard	
Communications Rate	9600 bits/s			
Data Length	8 bits			
Stop Bit	1 bit			
Parity	Even			

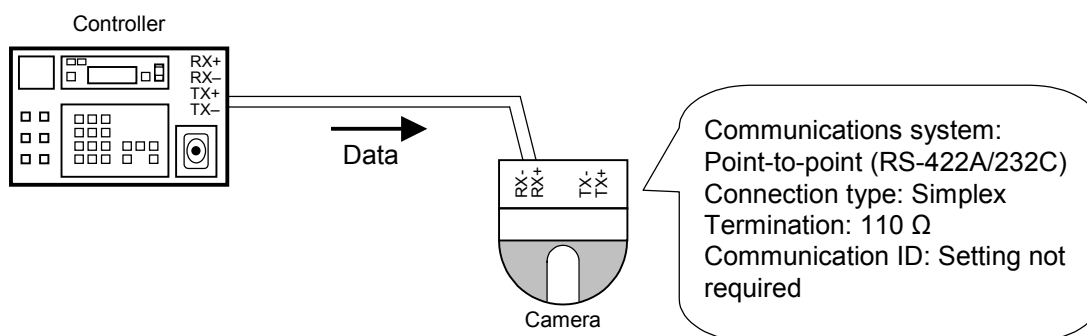
2.5 Connections and Settings

The example below shows settings and controller connections to a camera for four different types of communication model.

2.5.1 Point-to-Point Simplex Communications Model (JCCP-S)

The figure below illustrates a sample connection between a controller and camera. Only one camera can be connected to one controller. Since the data line from the camera to the controller is not connected, the operational status of the cameras cannot be checked by the controller.

Set the camera's communication settings to "point-to-point" (RS-422A or RS-232C) for the communication system and "simplex" for the connection type. Terminate the receiving terminal with 110 Ω (termination "ON") when using RS-422A. Termination is not necessary when using RS-232C. The communication ID does not need to be set, because an ID number is not needed. For the actual setting methods, please refer to the instruction manual and command guide for each camera.

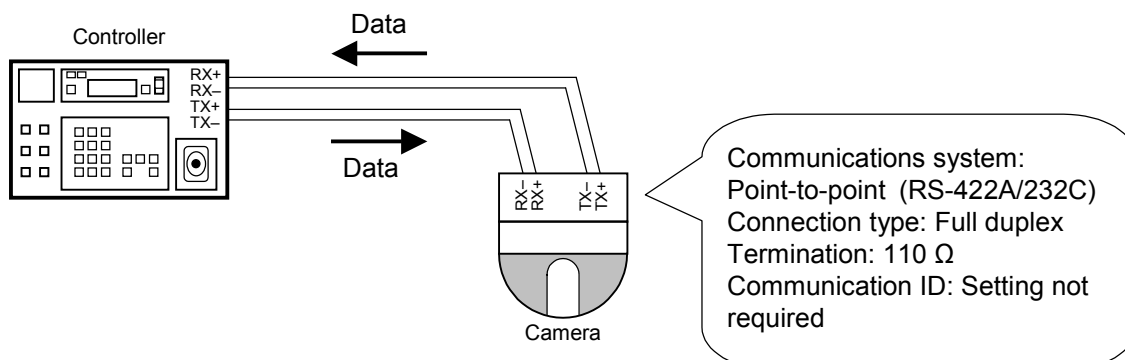


JCCP-S is a communications protocol which uses a point-to-point simplex communications model. A simple description of this protocol is given in Chapters 3 and 5 of this manual.

2.5.2 Point-to-Point Full Duplex Communications Model (JCCP-F)

The figure below illustrates a sample connection between a controller and camera. Only one camera can be connected to one controller. Since the data line from the camera to the controller is connected, the operational status of the cameras can be checked by the controller.

Set the camera's communication settings to "point-to-point" (RS-422A or RS-232C) for the communication system and "full duplex" for the connection type. Terminate the receiving terminal with 110 Ω (termination "ON") when using RS-422A. Termination is not necessary when using RS-232C. The communication ID does not need to be set, because an ID number is not needed. For the actual setting methods, please refer to the instruction manual and command guide for each camera.

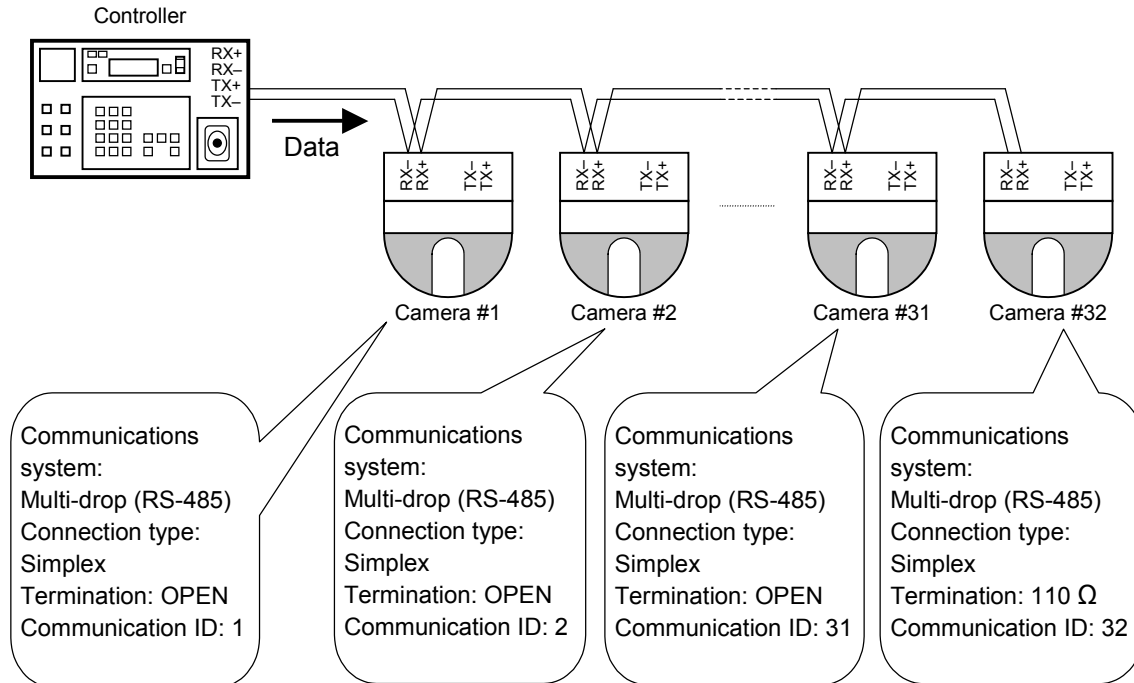


JCCP-F is a communications protocol which uses a point-to-point full duplex communications model. A simple description of this protocol is given in Chapters 3 and 5 of this manual.

2.5.3 Multi-Drop Simplex Communications Model (JCBP-S)

The figure below illustrates a sample connection between a controller and cameras. Up to 32 cameras can be connected to one controller. Various models of different types may be used together. Since the data line from the camera to the controller is not connected, the operational status of the cameras cannot be checked by the controller.

Set the camera's communication settings to "multi-drop" (RS-485) for the communication system and "simplex" for the connection type. Also, terminate the camera last connected with 110 Ω (termination ON) and leave the termination for all other cameras open (termination OFF). Set the ID number to any of 1 to 32. Note however that no more than one camera may have the same ID number. For the actual setting methods, please refer to the instruction manual and command guide for each camera.



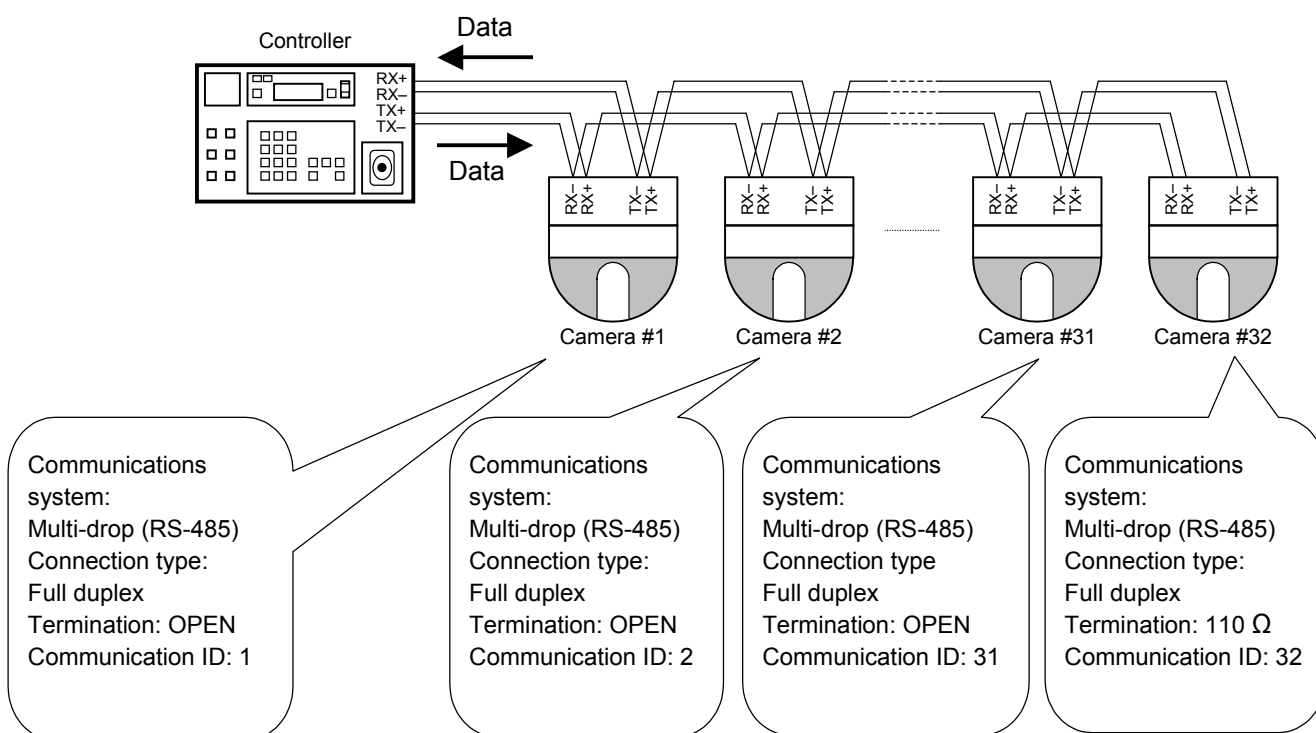
This is a sample setting for an ID switch. Control is made easier if IDs are set in the same order as the units are connected.

JCBP-S is a communications protocol which uses a multi-drop simplex communications model. A simple description of this protocol is given in Chapters 3 and 5 of this manual.

2.5.4 Multi-Drop Full Duplex Communications Model (JCBP-F)

The figure below illustrates a sample connection between a controller and cameras. Up to 32 cameras can be connected to one controller. Various models of different types may be used together. Since the data line from the camera to the controller is connected, the operational status of the cameras can be checked by the controller.

Set the camera's communication settings to "multi-drop" (RS-485) for the communication system and "full duplex" for the connection type. Also, terminate the camera last connected with 110 Ω (termination ON) and leave the termination for all other cameras open (termination OFF). Set the ID number to any of 1 to 32. Note however that no more than one camera may have the same ID number. For the actual setting methods, please refer to the instruction manual and command guide for each camera.



This is a sample setting for an ID switch. Control is made easier if IDs are set in the same order as the units are connected.

JCBP-F is a communications protocol which uses a multi-drop full duplex communications model. A simple description of this protocol is given in Chapters 3 and 5 of this manual.

3 SUPERVISORY MESSAGES AND COMMANDS

Chapter 3 gives a simple description of messages used to control cameras.

Supervisory messages used to supervise communications and operation messages (**commands**) representing the details of what is to be controlled are used in controlling cameras.

3.1 Supervisory Messages

The following supervisory messages based on the JCCP protocol are used with cameras. Note that there are supervisory messages which are not used depending on the camera.

Segment	Name		Usability (: Can be used x : Cannot be used)			
	Symbol	Character values	JCCP-S	JCCP-F	JCBP-S	JCBP-F
Send request	Fixed length send request					
	ENQn	81h - 8Eh				
	Variable length send request					
	ENQv	8Fh				
Revised send request	Revised send request		x		x	x
	NRn	91h - 9Eh				
Acknowledge notification	Acknowledge notification		x		x	x
	ACK	A0h				
	Addressed acknowledge notification		x	x	x	(Camera Controller)
	ACK1	A1h				
	Reset notification with addressed acknowledge notification		x	x	x	(Camera Controller)
	ACK2	A2h				
	Alarm start notification with addressed acknowledge notification		x	x	x	(Camera Controller)
	ACK8	A8h				
	Alarm end notification with addressed acknowledge notification		x	x	x	(Camera Controller)
	ACK9	A9h				
Line control	Open all lines		x	x		(Controller Camera)
	BRC	B0h				
	Open specified line		x	x		(Controller Camera)
	SELECT	B1h				
	Check specified line		x	x	x	(Controller Camera)
User-defined codes	User-defined codes		x	(Camera Controller)	x	x
	USER0-15	D0h-DFh				
Realtime control	Reset notification		x		x	x
	RES	E0h				
Negative notification	Receive error notification		x		x	x
	FAIL	F0h				
	BUSY notification		x	(Camera Controller)	x	x
	BUSY	F1h				

3.1.1 Send Request

JCCP-S **JCCP-F** **JCBP-S** **JCBP-F**

Send requests are used under all the protocols when sending a command. For details, see Section 3.2.2.

3.1.2 Revised Send Request

JCCP-F

A revised send request is used under JCCP-F to inform the sender of an error when there was a logical error in the command. For details, see Section 3.2.8.

3.1.3 Acknowledge Notification

JCCP-F **JCBP-F**

An acknowledge notification is used under JCCP-F and JCBP-F (when full duplex protocols are used) to inform the sender that the command was received. Acknowledge notifications are classified into two types depending on the protocol being used.

(1) JCCP-F

An acknowledge notification under JCCP-F consists of the supervisory message "ACK" only.

Supervisory message
"ACK" (A0h)

(2) JCBP-F

An acknowledge notification under JCBP-F consists of three bytes: the addressed acknowledge notification supervisory message "ACK1" plus the group address "GROUP" plus the unit address "UADRS". Note however that if the camera has been reset (including times when its power has been turned on) "ACK2", a reset notification with addressed acknowledge notification, is used as the first acknowledge notification informing the unit simultaneously that the message has been received and that it has been reset.

Supervisory message	1st byte	2nd byte
"ACK1/2" (A1h/A2h)	"GROUP" (01h)	"UADRS" (**h)

GROUP (Group Address) The group address for cameras defined in this manual is 01h.

UADRS (Unit Address) Communication ID set for cameras: 1 – 32 01h – 20h

In addition, in the case of cameras which include an internal alarm function (such as an alarm input terminal or motion detection function), it is possible to simultaneously notify that an alarm has been received and the status of alarm operations by using alarm start notification with addressed acknowledge notification "ACK8" for the first acknowledge notification after an alarm has been generated and by using alarm end notification and addressed acknowledge notification "ACK9" for the first acknowledge notification after alarm operations have ended. Note, however, that alarm end notification is not performed when an alarm has been forcibly canceled by the controller. For details on which cameras do and do not include internal alarm functions, please refer to the instruction manual for each camera.

Supervisory message	1st byte	2nd byte
"ACK8/9" (A8h/A9h)	"GROUP" (01h)	"UADRS" (**h)

GROUP (Group Address) The group address for cameras defined in this manual is 01h.

UADRS (Unit Address) Communication ID set for cameras: 1 – 32 01h – 20h

3.1.4 Line Control



Line control is used under JCBP-S and JCBP-F (when multi-drop protocols are used) for target specification (open line), so that the controller may specify the camera or cameras to use as the target, and under JCBP-F for line checking, so that the controller may check the connection status of targets.

(1) Target specification

The following three methods of specifying a target are available.

Specifying a single target

This method is usually used for target specification when controlling a single target. This method consists of three bytes: the open specified line supervisory message "SELECT" plus the group address "GROUP" plus the unit address "UADRS".

Supervisory message	1st byte	2nd byte
"SELECT" (B1h)	"GROUP" (01h)	"UADRS" (*h)

GROUP (Group Address) The group address for cameras defined in this manual is 01h.

UADRS (Unit Address) Communication ID of camera being specified:
1 – 32 01h – 20h

Specify all cameras

This method is used to make all cameras connected to the controller (except cameras not defined in this manual) perform the same operation at the same time. This method consists of three bytes: the open specified line supervisory message "SELECT" plus the group address "GROUP" plus the unit address "UADRS".

Supervisory message	1st byte	2nd byte
"SELECT" (B1h)	"GROUP" (01h)	"UADRS" (7Fh)

GROUP (Group Address) The group address for cameras defined in this manual is 01h.

UADRS (Unit Address) The unit address 7Fh is used when specifying all cameras.

Specify all targets

This is used in special situations when using JCBP-S where a point-to-point simplex line is used between the controller and the camera. In this case, the specification consists only of the open specified line supervisory command "BRC". Care is necessary when using "BRC" when there is more than one target connected as all targets will perform the same operation regardless of the group address or unit address specified for the target.

Supervisory message
"BRC" (B0h)

(2) Checking lines

The specification used for checking lines consists of three bytes: the check specified line supervisory message "POLL" plus the group address "GROUP" plus the unit address "UADRS". Lines cannot be checked under JCBP-S.

Supervisory message	1st byte	2nd byte
"POLL" (B2h)	"GROUP" (01h)	"UADRS" (*h)

GROUP (Group Address) The group address for cameras defined in this manual is 01h.

UADRS (Unit Address) Communication ID of camera for which line confirmation is being performed: 1 – 32 01h – 20h

3.1.5 User-Defined Codes



User-defined codes are only used under JCCP-F, and consist only of the user-defined code supervisory message "USER0-15". The manner in which user-defined codes are used differs depending on each camera. For details, please refer to the command guide for each camera.

Supervisory message
"USER0-15" (D0h-DFh)

3.1.6 Realtime Control



When JCCP-F is used, the realtime control reset notification is used to inform the controller that the camera has been reset (including when power has been turned on). Reset notification consists only of the reset notification supervisory message "RES". Note that under JCBP-F, "ACK2", reset notification with addressed acknowledge notification, is used to inform the controller of a reset.

Supervisory message
"RES" (E0h)

3.1.7 Negative Notification



There are two types of negative notification which are both used only under JCCP-F: receive error notification, which is used to notify the other hardware that there has been a receive error; and BUSY notification, which is used to notify the other hardware that a send message and receive message occurred at the same time.

(1) Receive error notification

Receive error notification is used to inform the sender that a receive error has occurred. This notification consists only of the receive error notification supervisory message "FAIL".

Supervisory message
"FAIL" (F0h)

(2) BUSY notification

BUSY notification is used to inform the controller that the camera attempted to send at the same time a message was being received. This notification consists only of the BUSY notification supervisory message "BUSY".

Supervisory message
"BUSY" (F1h)

3.2 Command Configuration

3.2.1 Command Types

The following two types of commands are available for communications between cameras and the controller.

Command type	Communication direction	Contents	Remarks
READ command	Controller Camera	Requests the camera's operational status	Cannot be used under JCCP-S or JCBP-S (simplex communications).
WRITE commands	Camera Controller	Operational status of the camera is notified in response to requests (READ command).	
		The camera itself notifies the controller of its own operational status.	Can be used only under JCCP-F.
	Controller Camera	Specifies a camera operation	

NOTE

When a READ command is sent under JCBP-F with multiple targets specified and a WRITE command is simultaneously sent from multiple targets, a collision will occur on the communications line causing a breakdown in communications. In order to avoid this type of communications breakdown, when multiple targets are simultaneously specified for cameras (using "SELECT" B1h, "GROUP" 01h and "UADRS" 7Fh, or "BRC" B0h), notification (response) in response to a READ command is not performed.

3.2.2 Sending Commands

Commands are sent together with send request supervisory messages. One of two types of supervisory message is used depending on the byte length of the command.

(1) Fixed length send requests ENQn

This is used when a command consists of 1 to 14 bytes. Here, n represents the byte length of the command, where 81h to 8Eh are used as the actual code.

Supervisory message	Command
"ENQn" (8nh)	n bytes (1≤n≤14)

(2) Variable length send requests ENQv

This is used when a command consists of 15 to 126 bytes. The supervisory message 8Fh is used. Also, a byte count, "BC", is inserted between the supervisory message and the command to indicate the byte length of the command. The value of BC includes the one byte of BC itself added to the byte length of the command, so is n' + 1, where n' is the byte length of the command only.

Supervisory message	Byte count	Command
"ENQv" (8Fh)	"BC" (n' + 1)h	n' bytes (15≤n'≤126)

(3) Notes on using send requests

In actual practice, variable length send requests can be sent even for commands under 14 bytes in length by using a smaller byte count. However, this worsens efficiency of line use since the length of the message will be longer than the equivalent fixed length send request because of the extra byte used for the byte count. Be sure to use fixed length send requests as much as possible for commands consisting of 14 or fewer bytes.

Ex. The following two commands have the same meaning.

Using ENQv	ENQ	BC	Command (4 bytes)			
	8Fh	05h	43h	13h	01h	48h
Using ENQn	ENQ	Command (4 bytes)				
	84h	43h	13h	01h	48h	

3.2.3 Command Configuration 1 Command Types by Configuration

Commands have three types of configuration depending on the application of the command. The most significant bit (MSB) of each byte making up a command must be "0" under the JCCP standard.

- (1) Commands for Starting Mode Level Operations (VALUE00–03, VALUE-CM and TRIGGER Commands)

Commands are made up of three parts: a command code, "CMD", an operational item, "ITEM", and item value, "VALUE". "CMD" and "ITEM" are each one byte in length, while "VALUE" can be anywhere from zero to several bytes in length depending on the application. For details, see Section 3.2.5.

Command code	Operational item	Item value		
"CMD"	"ITEM"	"VALUE"	...	"VALUE"

- (2) Commands for Handling Character Strings (STRING/STRINGW Commands)

Commands are made up of three parts: a command code, "CMD", an operational item, "ITEM", and character, "CHAR". "CMD" and "ITEM" are each one byte in length, while "CHAR" can be anywhere from zero to several bytes in length depending on the application. For details, see Section 3.2.6.

Command code	Operational item	Character		
"CMD"	"ITEM"	"CHAR"	...	"CHAR"

- (3) Command for Transferring Contents of Memory (DUMP64 Command)

This command is made up of five parts: a command code, "CMD", an operational item, "ITEM", packet numbers, "PKT-H" and "PKT-L", data, "DATA", and checksum, "SUM". "CMD", "ITEM", "PKT-H" and "PKT-L" are each one byte in length, while "DATA" can be 0 or 80 bytes in length depending on the application. "SUM" is only required when "DATA" is 80 bytes. For details, see Section 3.2.7.

Command code	Operational item	Packet number		Data			Checksum
“CMD”	“ITEM”	“PKT-H”	“PKT-L”	“DATA”	...	“DATA”	“SUM”

3.2.4 Command Configuration 2 Common Aspects of Each Command

- (1) Command Code "CMD"

Gives command attributes and type. 17 types of command codes are used by cameras defined in this manual.

Attributes \ Type		Code	
		READ command	WRITE command
Commands related to mode and/or level	VALUE00	00h	40h
	VALUE01	01h	41h
	VALUE02	02h	42h
	VALUE03	03h	43h
General-purpose commands used in common by each camera	VALUE-CM	0Bh	4Bh
Commands for starting operations	TRIGGER	05h	45h
Commands used to handle character strings	STRING	06h	46h
	STRINGW		47h
Command used to transfer contents of memory (Cannot be used under JCCP-S and JCBP-S.)	DUMP64	0Ah	4Ah

- (2) Operational Item "ITEM"

The item to be operated is specified using a code from 00h to 7Fh. For details on the code used for each item, please refer to the command guide for each camera.

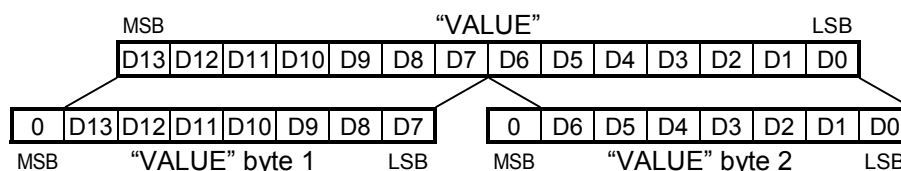
Note that since the VALUE-CM command is used in common by each camera, that the correspondence between codes and items is pre-determined. For details, please see Chapter 4.

3.2.5 Command Configuration 3 VALUE00–03, VALUE-CM, and TRIGGER Commands

(1) Item Values “VALUE”

Item value is used by the VALUE00–03 commands, VALUE-CM command, and TRIGGER command. It is used by the VALUE00–03 commands and VALUE-CM command for details regarding operation (mode and level) and used by the TRIGGER command to represent operation parameters. “VALUE” bytes are not necessary for READ commands. There are also instances when “VALUE” bytes are not necessary for TRIGGER WRITE commands. Please refer to the command guide for each camera and Chapter 5 of this manual for the correspondence between code values and operation details and operation parameters.

Note that one byte can only represent values from 00h to 7Fh since the MSB of “VALUE” byte must be zero. It is therefore necessary to split VALUE into more than one byte as shown below when representing a value of 80h or higher.



NOTE

Under this protocol, the single VALUE byte “03h” has the same meaning as the three VALUE bytes “00h, 00h, 03h”. Note however that use of redundant VALUE bytes like this worsens efficiency of line use. Be sure to use the fewest number of VALUE bytes possible when representing values.

Ex. The following two commands have the same meaning.

Redundant VALUE bytes	ENQ	CMD	ITEM	VALUE (3 bytes)		
	85h	43h	13h	00h	00h	03h
Optimized VALUE	ENQ	CMD	ITEM	VALUE		
	83h	43h	13h	03h		

(2) Configuration of the READ Command

The READ command is made up of two parts only: a command code, “CMD”, and an operational item, “ITEM”. There is no need for a “VALUE” byte.

Command code	Operational item
“CMD”	“ITEM”

Ex. When requesting the status of the item defined by ITEM 25h using the VALUE03 command

ENQ	CMD	ITEM
82h	03h	25h

(3) Configuration of the WRITE Command

WRITE commands are made up of three parts: a command code, “CMD”, an operational item, “ITEM”, and item value, “VALUE”.

Command code	Operational item	Item value		
“CMD”	“ITEM”	“VALUE”	...	“VALUE”

Ex. When notifying status 85h in response to the request sent in Example (2)

ENQ	CMD	ITEM	VALUE	
84h	43h	25h	01h	05h

Note that sometimes the TRIGGER command does not require the use of the “VALUE” byte.

Command code	Operational item
“CMD”	“ITEM”

Ex. When starting the operation defined by ITEM 08h using the TRIGGER command

ENQ	CMD	ITEM
82h	45h	08h

3.2.6 Command Configuration 4 STRING/STRINGW Commands

(1) Characters "CHAR"

"CHAR" represents characters used with the STRING and STRINGW commands. "CHAR" bytes are not used with READ commands. One of two types of character codes, A or B, can be used to represent characters. The TRIGGER command **CHARACTER CODE** can be used to select which character code to use. Codes correspond to characters as follows. (Some characters cannot be used depending on the camera model.)

Code A

Upper 4 bits

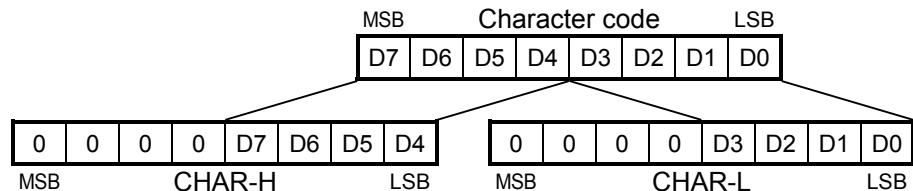
	0	1	2	3	4	5	6	7	8-F
0	SP	0		P					
1		1	A	Q					
2		2	B	R					
3		3	C	S					
4		4	D	T					
5		5	E	U					
6		6	F	V					
7	'	7	G	W					
8		8	H	X					
9		9	I	Y					
A	:	J	Z						
B			K						
C	,		L						
D	-		M						
E	.		N						
F	/		O						

Code B

Upper 4 bits

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		â	SP	0		P		p								
1	Ä	ê		1	A	Q	a	q								
2	Ö	î		2	B	R	b	r								
3	Ü	ô		3	C	S	c	s								
4	Â	û		4	D	T	d	t								
5	Ê	á		5	E	U	e	u								
6	Î	é		6	F	V	f	v								
7	Ô	í	'	7	G	W	g	w								
8	Û	ó		8	H	X	h	x								
9	Ç	ú		9	I	Y	i	y								
A	Ñ	à	:	J	Z	j	z									
B	ä	è			K	ñ	k									
C	ë	ì	,		L	ß	l									
D	ï	ò	-		M	ç	m									
E	ö	ù	.		N	ï	n									
F	ü	ç	/		O		o									

When using the STRING command, each character is represented by one byte. Note that one byte can only represent values from 00h to 7Fh since the MSB of "CHAR" byte must be zero. Use the STRINGW command when character codes being used include values of 80h or higher. When the STRINGW command is used, character codes are split into two bytes, CHAR-H and CHAR-L, as shown below in order to represent a single character by two bytes.



NOTE

Under the protocol, if the character string does not include a character code of 80h or higher, it is no different than using the STRINGW command. However, the byte length of "CHAR" in the case of the STRINGW command is two times longer than with the STRING command, so its use results in poorer line performance. Be sure to use the fewest number of CHAR bytes possible when representing values.

Ex. The following four commands have the same meaning.

STRINGW
(Code A)

ENQ	CMD	ITEM	CHAR (4 bytes)			
86h	47h	01h	02h	02h	01h	01h

STRINGW
(Code B)

ENQ	CMD	ITEM	CHAR (4 bytes)			
86h	47h	01h	04h	02h	03h	01h

STRING
(Code A)

ENQ	CMD	ITEM	CHAR (2 bytes)	
84h	46h	01h	22h	11h

STRING
(Code B)

ENQ	CMD	ITEM	CHAR (2 bytes)	
84h	46h	01h	42h	31h

(2) Configuration of the READ Command

The READ command is made up of two parts only: a command code, "CMD", and an operation item, "ITEM". "CHAR" bytes are not needed. In addition, since the STRINGW command cannot be used with the READ command, the command code, "CMD", is always 06h.

Command Code	Operational Item
"CMD"	"ITEM"

Ex. When requesting the character string defined by ITEM 02h

ENQ	CMD	ITEM
82h	06h	02h

(3) Configuration of the WRITE Command

Commands are made up of three parts: a command code, "CMD", an operation item, "ITEM", and character, "CHAR".

Command Code	Operational Item	Item Value		
"CMD"	"ITEM"	"CHAR"	...	"CHAR"

Ex. When notifying the character string "CAMERA 1" using the character code B with the STRINGW command in response to the request sent in Example (2)

ENQ	BC	CMD	ITEM	CHAR					
8Fh	11h	47h	02h	04h	03h	04h	01h	04h	0Dh

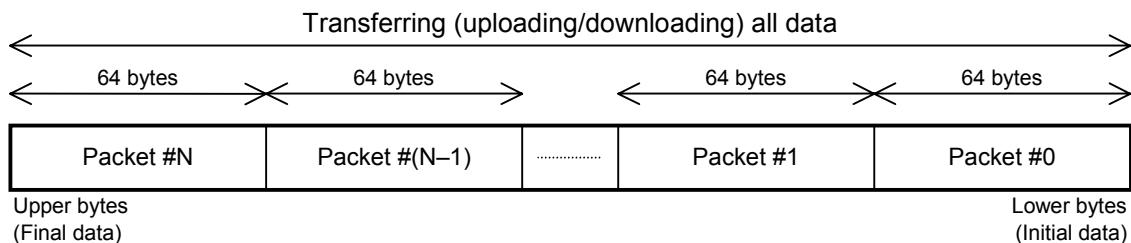
CHAR									
04h	05h	05h	02h	04h	01h	02h	00h	03h	01h

In order to show an actual example of using the STRINGW command, the STRINGW command is used with a character string which does not include character codes of 80h or higher. Actually, line efficiency is improved by using STRING command because it has a shorter byte length for "CHAR".

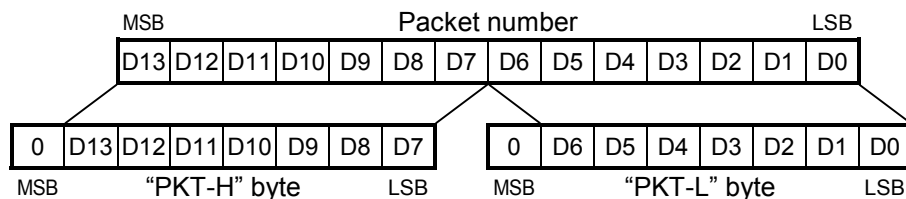
ENQ	CMD	ITEM	CHAR							
89h	46h	02h	43h	41h	4Dh	45h	52h	41h	20h	31h

3.2.7 Command Configuration 5 DUMP64 Command

(1) Packet Number "PKT-H" or "PKT-L"



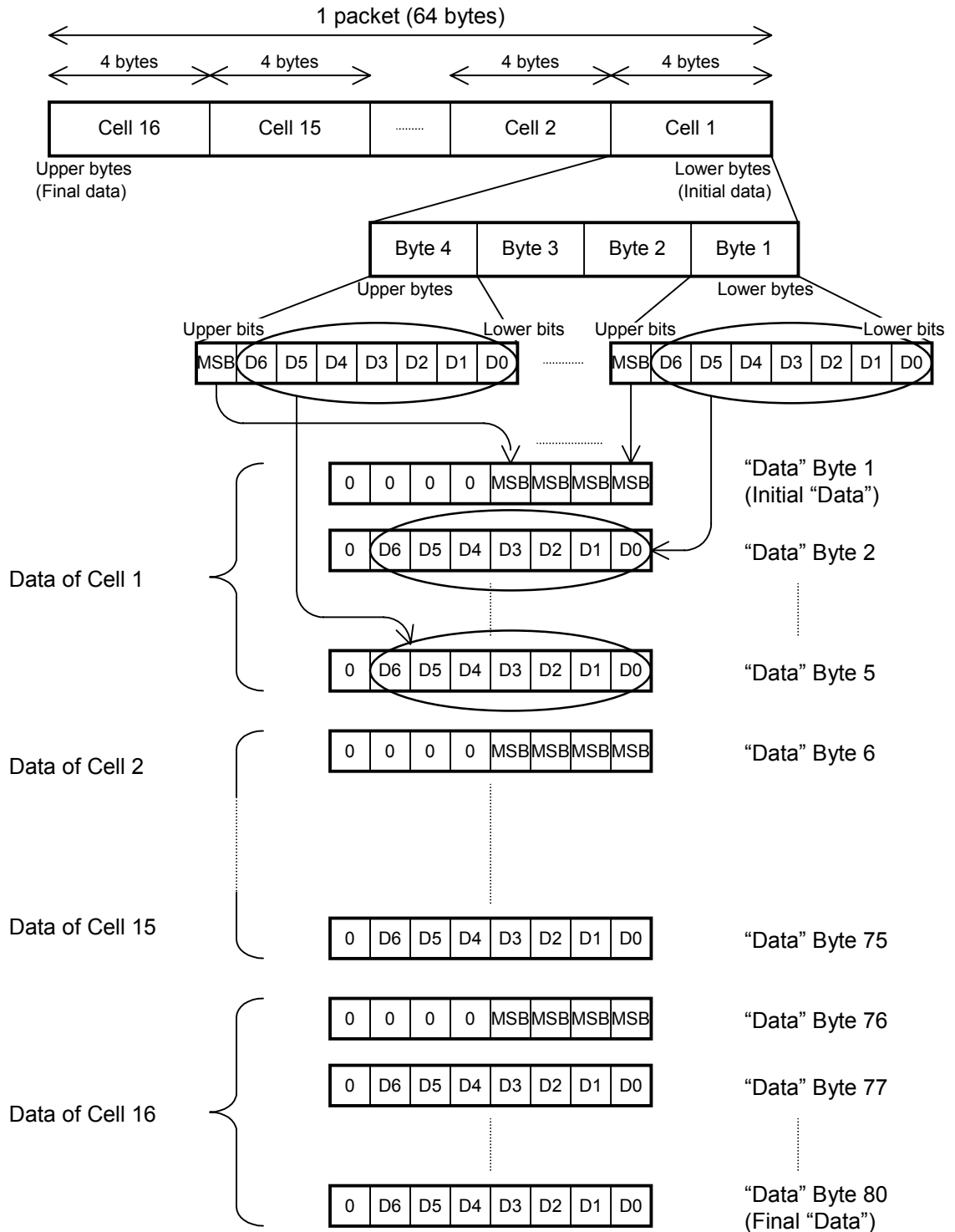
The DUMP64 command is used to transfer (upload/download) the entire contents of memory by splitting it up into packets of 64-bytes each. The number assigned to the packet (64-byte data) in order 0, 1, 2... from the lower byte is the packet number. This packet number is split into two bytes in a manner similar to the item value, "VALUE", (See Section 3.2.5) and the upper byte is contained in the "PKT-H" byte, while the lower byte is contained in the "PKT-L" byte. The maximum amount of data which can be transferred is 16384 packets = 1,048,576 bytes (1MB) because only packet numbers up to 16383 can be expressed. If there is no need to divide data into packets (all data = 64 bytes) or if a packet numbers can be expressed in one byte (true for packet numbers 127 and lower), then the "PKT-H" byte and "PKT-L" byte are necessary.



(2) Data "DATA"

This is the data to be transferred (uploaded/downloaded). "DATA" bytes are not needed in the case of the READ command (used for requesting data transfer).

The MSB of the "DATA" bytes must be "0". Since only values from 00h to 7Fh can be expressed using one byte, it is necessary to convert transfer data into communication data, "DATA". Conversion is performed as shown in the figure below by splitting the packet into a four-byte data cell beginning from the lower byte. The four-byte data cell is converted into 5-byte communication data, "DATA", with the most significant bit (MSB) of each byte in the data cell making up one byte and the remaining 7 bits of each byte making up the other bytes. 64 bytes (1 packet) of transfer data are converted into 80 bytes of communication data, "DATA".



- ### (3) Checksum "SUM"

Lower 7 bits of the value calculated by adding all “DATA” bytes. The checksum added on the receiving side is compared to checksum sent from the sending side to confirm that the transfer data has been received properly. The “SUM” byte is unnecessary with the READ command (used for data transfer requests).

- (4) Configuration of the READ Command (used for data transfer requests)

The “DATA” and “SUM” bytes are unnecessary when requesting a data transfer.

Command Code	Operational Item	Packet number	
"CMD"	"ITEM"	"PKT-H"	"PKT-L"

Ex. When requesting Packet 2 data transfer of data defined by ITEM 03h (256 bytes of data made up of 00h, 01h, 02h, ..., FDh, FEh, FFh)

ENQ	CMD	ITEM	PKT-H	PKT-L
84h	0Ah	03h	00h	02h

- (5) Configuration of the WRITE Command (used for data transfer)

Command Code	Operational Item	Packet number		Data (80 byte)			Checksum
"CMD"	"ITEM"	"PKT-H"	"PKT-L "	"DATA"	...	"DATA"	"SUM"

Ex. When transferring Packet 2 data (64 bytes of data made up of 80h, 81h, 82h, ..., BDh, BEh, BFh) in response to the request sent in Example (4)

ENQ	BC	CMD	ITEM	PKT-H	PKT-L
8Fh	56h	4Ah	03h	00h	02h

DATA (Cell 1)					DATA (Cell 2)				
0Fh	00h	01h	02h	03h	0Fh	04h	05h	06h	07h
DATA (Cell 3)					DATA (Cell 4)				
0Fh	08h	09h	0Ah	0Bh	0Fh	0Ch	0Dh	0Eh	0Fh
DATA (Cell 5)					DATA (Cell 6)				
0Fh	10h	11h	12h	13h	0Fh	14h	15h	16h	17h
DATA (Cell 7)					DATA (Cell 8)				
0Fh	18h	19h	1Ah	1Bh	0Fh	1Ch	1Dh	1Eh	1Fh
DATA (Cell 9)					DATA (Cell 10)				
0Fh	20h	21h	22h	23h	0Fh	24h	25h	26h	27h
DATA (Cell 11)					DATA (Cell 12)				
0Fh	28h	29h	2Ah	2Bh	0Fh	2Ch	2Dh	2Eh	2Fh
DATA (Cell 13)					DATA (Cell 14)				
0Fh	30h	31h	32h	33h	0Fh	34h	35h	36h	37h
DATA (Cell 15)					DATA (Cell 16)				
0Fh	38h	39h	3Ah	3Bh	0Fh	3Ch	3Dh	3Eh	3Fh
					SUM				
0Fh	38h	39h	3Ah	3Bh	0Fh	3Ch	3Dh	3Eh	3Fh
					50h				

3.2.8 Revising Commands



If there is a logical error in a command sent from the controller when using JCCP-F, the camera will send a revised send request. A revised send request is configured so that it may be determined which part of the original command contained the error. The revised send request, "NRn", is used as the supervisory message, where n represents the byte length of the command just as it does with "ENQn".

- (1) When there is no processing corresponding to "CMD" (when "CMD" contains the error)
In this case, the request consists of the revised send request supervisory message "NRn" plus the command code "CMD".

Supervisory message	1st byte
"NR1" (91h)	Command Code "CMD"

CMD (Command Code) The "CMD" value received is used as-is.

- (2) When there is no item corresponding to "ITEM" (when "ITEM" contains the error)
In this case, the request consists of the revised send request supervisory message "NRn" plus the command code "CMD" and operational item "ITEM".

Supervisory message	1st byte	2nd byte
"NR2" (92h)	Command Code "CMD"	Operational Item "ITEM"

CMD (Command Code) The "CMD" value received is used as-is.

ITEM (Operational Item) The "ITEM" value received is used as-is.

- (3) When "VALUE" is out of range (when "VALUE" contains the error)
In this case, the request consists of the revised send request supervisory message "NRn" plus the command code "CMD", operational item "ITEM" and item value "VALUE" bytes.

Supervisory message	1st byte	2nd byte	3rd byte	...	(N-th byte)
"NR3-14" (93h-9Eh)	Command Code "CMD"	Operational Item "ITEM"	Item Value "VALUE"		

CMD (Command Code) The "CMD" value received is used as-is.

ITEM (Operational Item) The "ITEM" value received is used as-is.

VALUE (Item Value) The corresponding minimum VALUE if the value received was out-of-range because it was too small
The corresponding maximum VALUE if the value received was out-of-range because it was too large

NOTE

Depending on the item, the range for "VALUE" may not be continuous. If this is the case, "VALUE" used in the revised send request may not be within the maximum/minimum value of the corresponding range. Please refer to the Command Guide for each camera.

- (4) When there is no character corresponding to "CHAR" (when "CHAR" contains the error)
In this case, the camera does not send a revised send request. If there is no character that corresponds to "CHAR", that character is left blank.
- (5) When "PKT-H" and/or "PKT-L" are out of range (When there is an error with "PKT-H" and/or "PKT-L")
In this case, the camera does not send a revised send request. If "PKT-H" and/or "PKT-L" are out of range, the command is ignored. For details, see Section 5.5.3 and 5.5.5.

(6) When "SUM" indicates an error (When there is an error with "SUM")

During download

If "SUM" sent from the camera, does not match the checksum calculated by adding the bytes of "DATA", the controller does not return a revised send request, but rather requests data transfer again using the READ command of DUMP64. For details, please refer to Section 5.5.4.

During upload

If the "SUM" sent from the controller does not match the checksum calculated by adding the bytes of "DATA", the camera does not return a revised send request and ignores the command. The controller can confirm "SUM" errors by using the VALUE-CM DUMP64 CHECK ERROR command to read data on the camera. For details, please refer to Chapter 4, Section (7) and Section 5.5.6.

4 VALUE-CM COMMAND

The VALUE-CM command is a general-purpose command used in common by each camera, but includes commands which cannot be used with some cameras. Please check the Command Guide for each camera.

		Command Code CMD	
VALUE-CM		READ:0Bh WRITE:4Bh	
	ITEM	Name	VALUE Range
1	00h	DUMP64 ITEM	00h–7Fh
2	01h	DUMP64 READY	00h, 01h
3	02h	DUMP64 START	00h
4	03h	DUMP64 END	00h
5	04h	DUMP64 MAXPKT	00h–3FFFh
6	05h	DUMP64 TIMEOUT	00h–3FFFh
7	06h	DUMP64 CHECK ERROR	00h, 01h

(1) DUMP64 ITEM

VALUE-CM command CMD READ:0Bh WRITE:4Bh ITEM:00h

Application This command is used to set or check “ITEM” of DUMP64 commands (VALUE-CM DUMP64 READY/START/END/MAXPKT/TIMEOUT/CHECK ERROR commands).

VALUE Indicates “ITEM” of the DUMP64 command. (00h–7Fh)
00h–7Fh “ITEM” of the DUMP64 command 00h–7Fh

Usage When specifying “ITEM” with a DUMP64-related command
Specifies “ITEM” of the DUMP64 command using “VALUE”. CONT CAM

ENQ	CMD	ITEM	VALUE
83h	4Bh	00h	00h–7Fh



“ITEM” specified by the camera using “VALUE” is the target of DUMP64 commands.

When checking “ITEM” with a DUMP64 command (Cannot be used under JCCP-S and JCBP-S.)

Requests the target “ITEM” of the DUMP64 command.

CONT CAM

ENQ	CMD	ITEM
82h	0Bh	00h



The target “ITEM” of the DUMP64 command is notified from the camera.

CAM CONT

ENQ	CMD	ITEM	VALUE
83h	4Bh	00h	00h–7Fh

Remarks For information on how to actually use this command, please refer to Section 5.5.

Operations are **not guaranteed** if “ITEM” of the DUMP64 command specified by this command differs from “ITEM” of the actual DUMP64 command.

(2) DUMP64 READY

VALUE-CM command **CMD READ:0Bh WRITE:4Bh**

ITEM:01h

Application This command is used when checking whether or not data transfer (reception) is possible using the DUMP64 command. (Cannot be used under JCCP-S and JCBP-S.)

VALUE Indicates whether or not data transfer (reception) is possible. (00h, 01h)
 00h Data transfer (reception) impossible
 01h Data transfer (reception) possible

Usage

Requests whether or not data transfer (reception) is possible.

CONT

CAM

ENQ	CMD	ITEM
82h	0Bh	01h

Whether or not data transfer (reception) is possible is notified from the camera.

CAM

CONT

ENQ	CMD	ITEM	VALUE
83h	4Bh	01h	00h, 01h

Remarks

For information on how to actually use this command, please refer to Section 5.5.

“ITEM” of the targeted DUMP64 command is specified using the VALUE-CM **DUMP64 ITEM** command. Operations are **not guaranteed** if the “ITEM” of the DUMP64 command specified using the VALUE-CM **DUMP64 ITEM** command does not match “ITEM” of the actual DUMP64 command.

(3) DUMP64 START

VALUE-CM command **CMD WRITE:4Bh**

ITEM:02h

Application Declares the start of data transfer using the DUMP64 command.

VALUE Indicates the status of data transfer. (00h)
 00h Data transfer start

Usage

Declares the start of data transfer using the DUMP64 command.

CONT

CAM

ENQ	CMD	ITEM	VALUE
82h	4Bh	02h	00h

The camera enters “data receive standby” status.

Remarks

For information on how to actually use this command, please refer to Section 5.5.

This command is used together with the VALUE-CM **DUMP64 END** command.

Once data transfer is complete, always sent the **DUMP64 END** command. Camera operations are **not guaranteed** if the **DUMP64 END** command has not been sent.

Camera operations are **not guaranteed** if data transfer using the DUMP64 command is received before this command is received.

“ITEM” of the targeted DUMP64 command is specified using the VALUE-CM **DUMP64 ITEM** command. Operations are **not guaranteed** if the “ITEM” of the DUMP64 command specified using the VALUE-CM **DUMP64 ITEM** command does not match “ITEM” of the actual DUMP64 command.

(4) DUMP64 END

VALUE-CM command **CMD WRITE:4Bh**

ITEM:03h

Application Declares the end of data transfer using the DUMP64 command.

VALUE Indicates the status of data transfer. (00h)
00h Data transfer end

Usage

Declares the end of data transfer using the DUMP64 command.

CONT

CAM

ENQ	CMD	ITEM	VALUE
82h	4Bh	03h	00h



“Data receive standby” status of the camera is released and the camera is automatically restarted in order to enable data which has been received.

Remarks

For information on how to actually use this command, please refer to Section 5.5.

This command is used together with the VALUE-CM **DUMP64 START** command. Camera operations are **not guaranteed** if this command is received while the **DUMP64 START** command has not been received.

“ITEM” of the targeted DUMP64 command is specified using the VALUE-CM **DUMP64 ITEM** command. Operations are **not guaranteed** if the “ITEM” of the DUMP64 command specified using the VALUE-CM **DUMP64 ITEM** command does not match “ITEM” of the actual DUMP64 command.

(5) DUMP64 MAXPKT

VALUE-CM command **CMD READ:0Bh WRITE:4Bh**

ITEM:04h

Application This command is used when checking the maximum packet number used by the DUMP64 command. (Cannot be used under JCCP-S and JCBP-S.)

VALUE Indicates the maximum packet number. (00h–3FFFh)

Usage

Requests the maximum packet number.

CONT

CAM

ENQ	CMD	ITEM
82h	0Bh	04h



The maximum packet number is notified from the camera.

CAM

CONT

ENQ	CMD	ITEM	VALUE
83h	4Bh	04h	00h–7Fh

VALUE
00h–7Fh

ENQ	CMD	ITEM	VALUE	
84h	4Bh	04h	01h–7Fh	00h–7Fh

VALUE
80h–3FFFh

Remarks

For information on how to actually use this command, please refer to Section 5.5.

“ITEM” of the targeted DUMP64 command is specified using the VALUE-CM **DUMP64 ITEM** command. Operations are **not guaranteed** if the “ITEM” of the DUMP64 command specified using the VALUE-CM **DUMP64 ITEM** command does not match “ITEM” of the actual DUMP64 command.

(6) DUMP64 TIMEOUT

VALUE-CM command **CMD READ:0Bh WRITE:4Bh** **ITEM:05h**

Application This command is used to confirm the re-send timeout period when using the DUMP64 command recommended for the camera. (Cannot be used under JCCP-S and JCBP-S.)

VALUE Indicates the re-send timeout period. (00h–3FFFh)
 00h 0 [ms]
 |
 3FFFh 16383 [ms] Varies in units of 1[mS]

Usage

Requests the re-send timeout period when using a DUMP64 command.

CONT

CAM

ENQ	CMD	ITEM
82h	0Bh	05h



The re-send timeout period is notified from the camera.

CAM

CONT

ENQ	CMD	ITEM	VALUE
83h	4Bh	05h	00h–7Fh

VALUE
00h–7Fh

ENQ	CMD	ITEM	VALUE	
84h	4Bh	05h	01h–7Fh	00h–7Fh

VALUE
80h–3FFFh

Remarks

Since the DUMP64 command is not covered by the re-send timeout period defined in Sections 5.2.3 and 5.4.3, it is necessary to use this command to confirm the camera side setting. Camera operations are **not guaranteed** if the DUMP64 command is re-sent before the re-send timeout period recommended for the camera has elapsed or if a new packet of data has been transferred. For information on how to actually use this command, please refer to Section 5.5.

“ITEM” of the targeted DUMP64 command is specified using the VALUE-CM **DUMP64 ITEM** command. Operations are **not guaranteed** if the “ITEM” of the DUMP64 command specified using the VALUE-CM **DUMP64 ITEM** command does not match “ITEM” of the actual DUMP64 command.

(7) DUPM64 CHECK ERROR

VALUE-CM command **CMD READ:0Bh WRITE:4Bh** **ITEM:06h**

Application This command is used to check whether or not a checksum error has occurred during upload. (Cannot be used under JCCP-S and JCBP-S.)

VALUE Indicates whether or not a checksum error has occurred. (00h, 01h)

00h No error
01h Error

Usage

Requests whether or not a checksum error has occurred.

CONT

CAM

ENQ	CMD	ITEM
82h	0Bh	06h



Checksum error status is notified from the camera.

CAM

CONT

ENQ	CMD	ITEM	VALUE
83h	4Bh	06h	00h, 01h

Remarks

For information on how to actually use this command, please refer to Section 5.5.

This covers all upload data from after the VALUE-CM **DUMP64 START** command was issued. When the VALUE-CM **DUMP64 START** command is sent again, error status returns to "No error".

Error status continues to indicate an error even if data for which an error occurred is uploaded normally a second time.

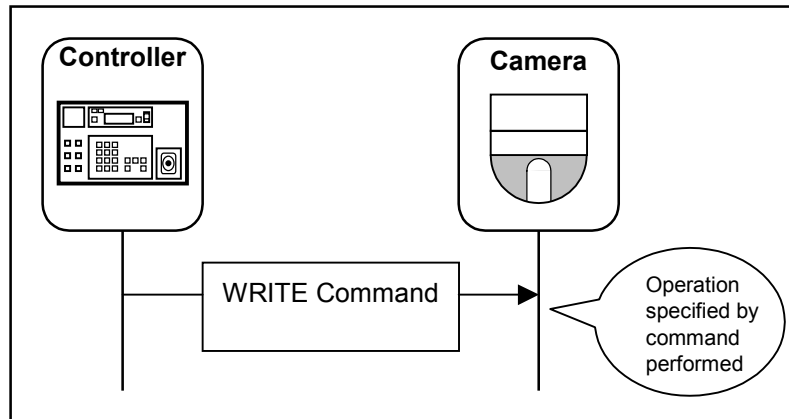
5 COMMAND TRANSMISSION PROCEDURES

This chapter describes the general communications format used under each protocol.

5.1 JCCP-S

5.1.1 Specifying Camera Operations

A WRITE command is sent to cameras to specify camera operations. When a camera receives a WRITE command from the controller, it performs the operation specified by the command.

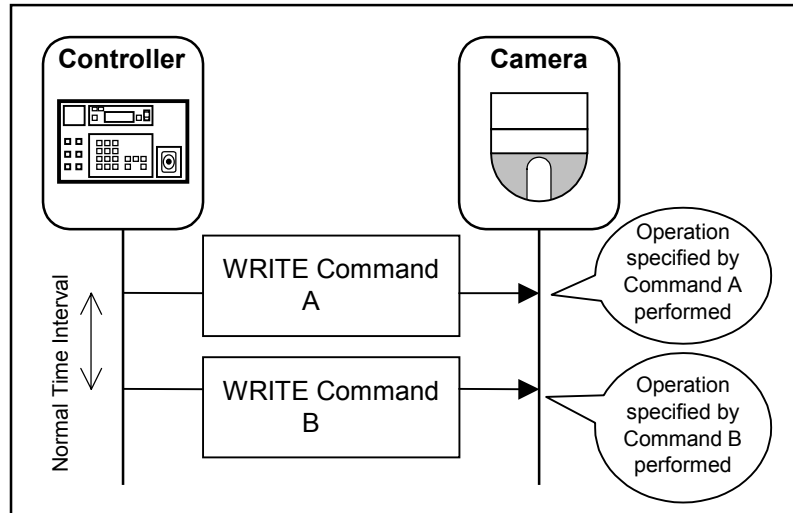


Commands received by a camera are destroyed in the following cases.

- When a READ command is received
- When a receive error occurs
- When there is an error in the received command
- When a command defined separately for a given camera has been received (Please refer to the Command Guide for each camera.)

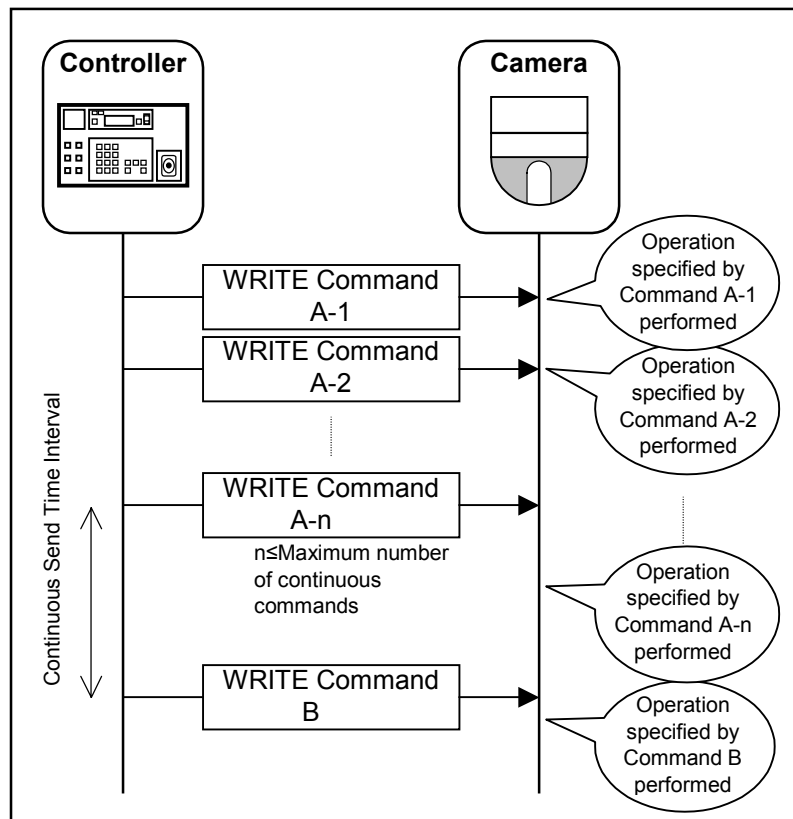
5.1.2 Specifying Camera Operations Continuously

Since receive notification from the camera is not necessary under JCCP-S, it is possible under this protocol to endlessly send continuous commands. However, since there are actual limits in terms of the processing capacity of the cameras, be sure after sending a command to wait a set time interval (normal time interval) before sending the next command.



Normal Time Interval	20 msec or more
----------------------	-----------------

In addition, when multiple commands are used to perform related operations, it is possible to send up to a maximum number of continuous commands without any interval between them. In this case, after the last command sent continuously, a longer than normal time interval (continuous send time interval) is required before sending the next command.



Maximum number of continuous commands	5 commands
Continuous send time interval	100 msec or more

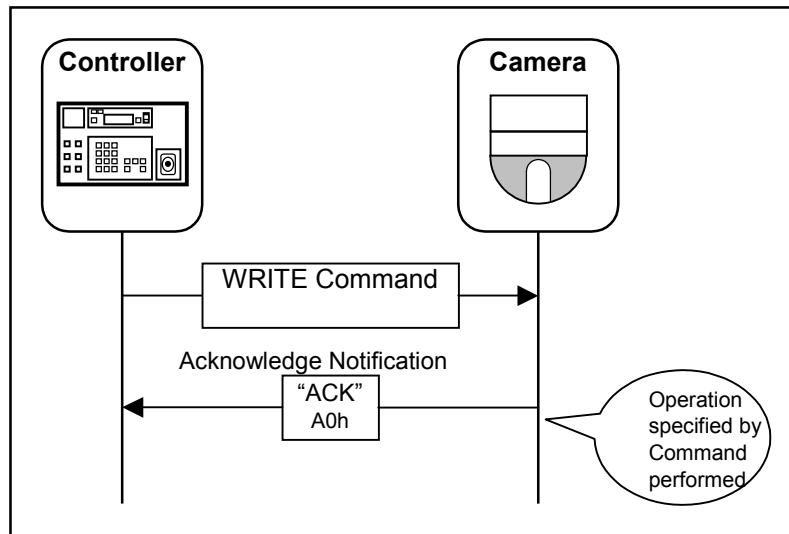
NOTE

- The specifications given concerning time interval and number of continuous commands are for the typical command. Some commands which do not fit within this standard are defined separately in the Command Guide for each camera.

5.2 JCCP-F

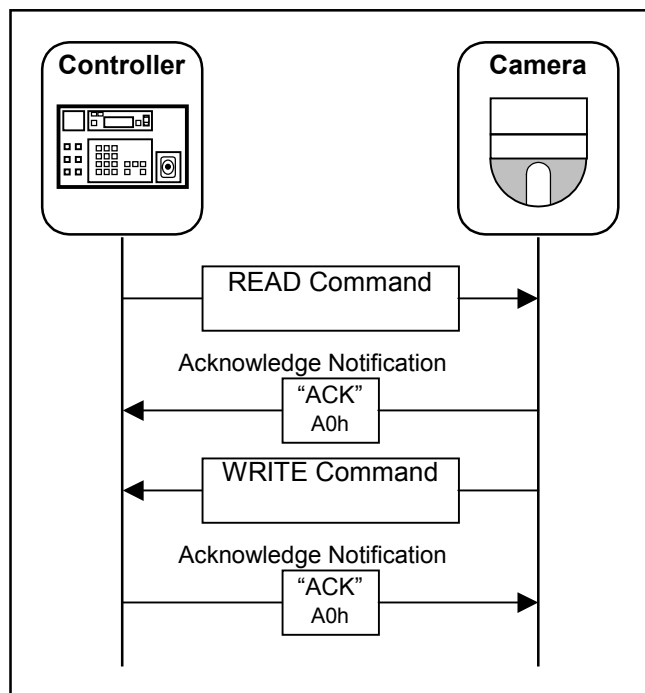
5.2.1 Specifying Camera Operations

A WRITE command is sent to cameras to specify camera operations. When a camera receives a WRITE command from the controller, it notifies the controller that it has received the command (acknowledge notification) and then performs the operation specified by the command.



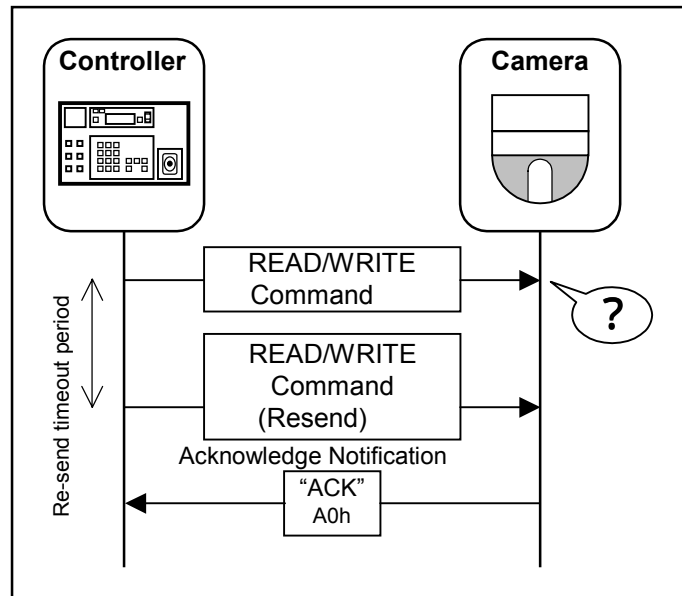
5.2.2 Obtaining a Camera's Status

A READ command is sent to cameras to obtain their status. When a camera receives a READ command from a controller, it notifies the controller that it has received the command (acknowledge notification) and then sends a WRITE command in response to that READ command. When the controller receives the response it sends a notification (acknowledge notification) to the camera that the response has been received.



5.2.3 When a Camera Does Not Return an Acknowledge Notification

If the controller does not receive an acknowledge notification from a camera in response to a READ or WRITE command within a timeout period the controller must resend the command. The command is resent until an acknowledge notification is received from the camera or until a specified number of retries have been reached.



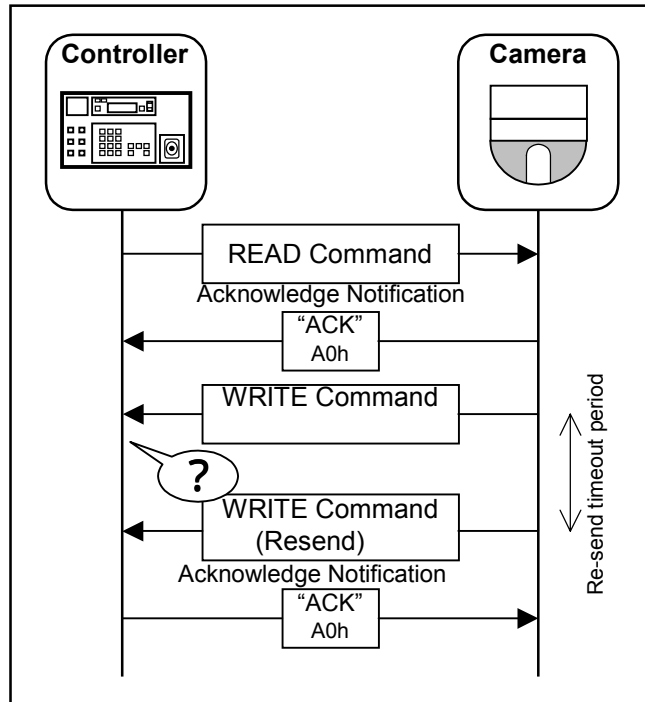
Controller's re-send timeout period	140 msec or more
Controller's specified number of resends	Unspecified

NOTE

- The controller's re-send timeout period is defined for typical commands, but the DUMP64 command does not fit within this standard. The re-send timeout period of the DUMP64 command can be confirmed using the VALUE-CM **DUMP64 TIMEOUT** command.

5.2.4 When the Controller Does Not Send an Acknowledge Notification

If the camera does not receive an acknowledge notification from the controller in response to a WRITE command within a timeout period it will resend the WRITE command. The command is resent until an acknowledge notification is received from the controller or until a specified number of retries have been reached.



Camera's re-send timeout period

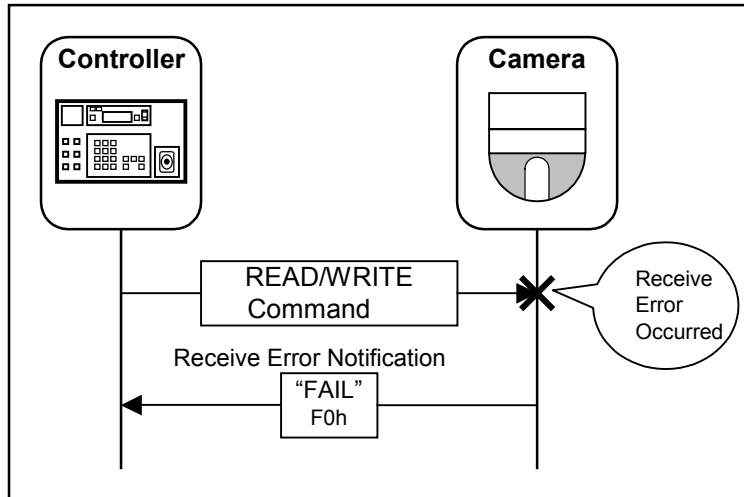
Please refer to the Command Guide for each camera.

Camera's specified number of resends

5 times (excluding first send)

5.2.5 When a Receive Error Occurs

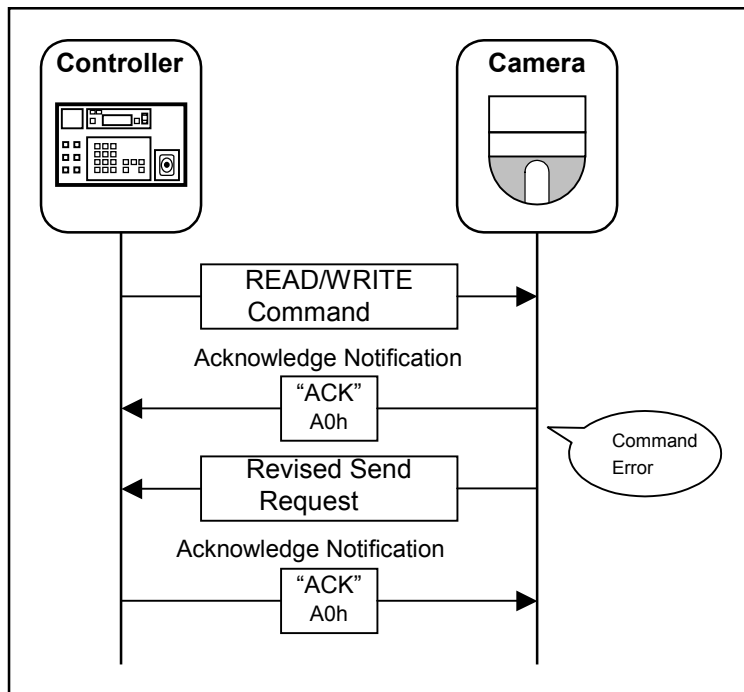
If a receive error occurs when receiving a command the camera will send a "FAIL" notifying the controller that a receive error has occurred.



5.2.6 When a Command Contains an Error

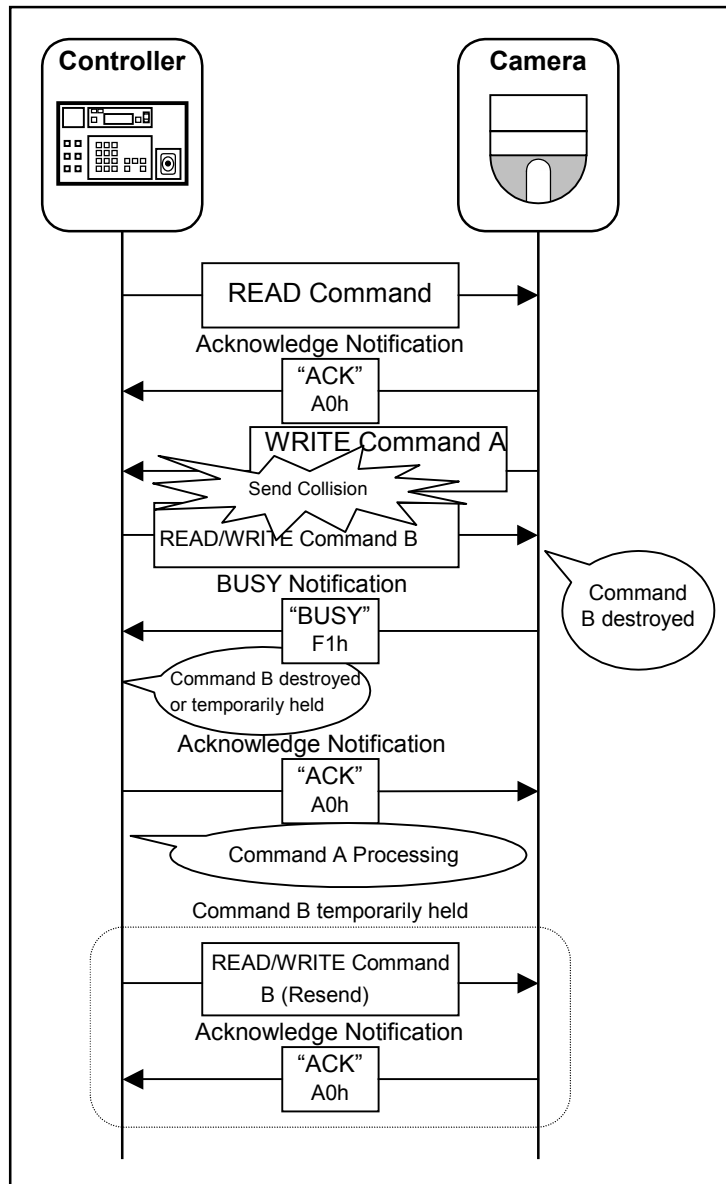
If a command from the controller contains an error such that the camera cannot respond to the command or perform the associated operation, it will send a revised send request notifying the controller of the command error.

When the controller receives revised send request from camera, it returns an acknowledge notification to the camera.



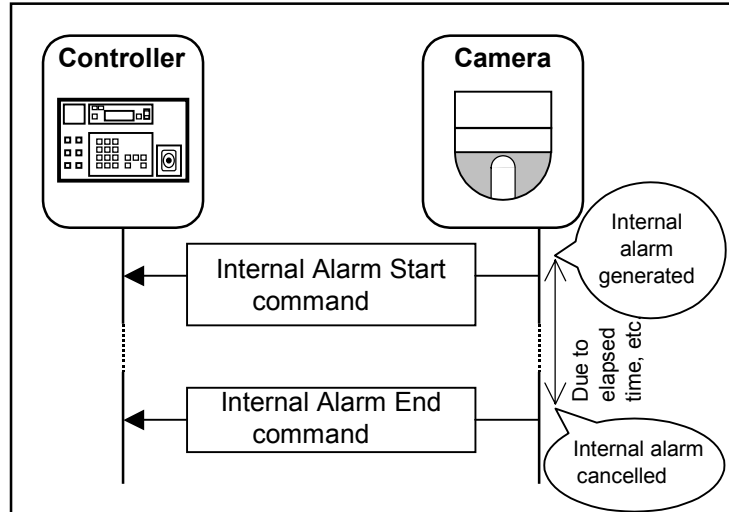
5.2.7 When the Controller and Camera Send Commands Simultaneously

If a WRITE command from the camera is sent at the same time as a command from the controller, the command from the camera has priority. The camera destroys the command received and send a "BUSY" to notify the controller. When the controller receives a "BUSY", it will destroy or temporarily hold the sent command, send an acknowledge notification, and perform the processing corresponding to the received command. If it temporarily holds the command, it will resend it when processing is finished.



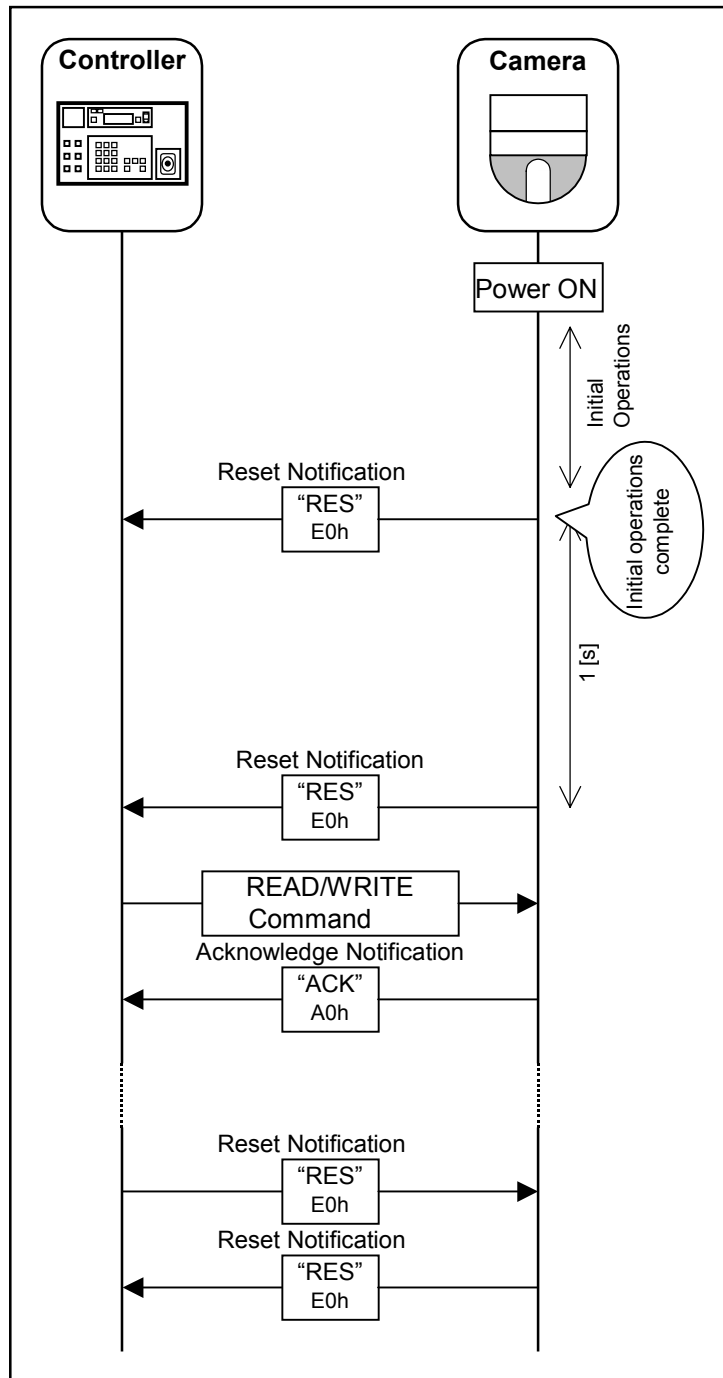
5.2.8 When Camera is in Alarm Status

In the case of cameras which include an internal alarm function (such as an alarm input terminal or motion detection function), an internal alarm generates and an Internal Alarm Start command is sent to notify the controller that an internal alarm has generated. In addition, if the internal alarm is cancelled due to elapsed time or other reason, the Internal Alarm End command is sent to notify the controller that the internal alarm has been cancelled. Note that there is no notification of internal alarm cancellation if the alarm has been forcibly cancelled by the controller. For details on which cameras do and do not include internal alarm functions, please refer to the instruction manual for each camera.



5.2.9 If the camera has been reset

The camera performs initial operations when their power is turned on. Once initial operations are finished, the camera will send a reset notification "RES" to inform the controller that initial operations are complete. "RES" will be send repeatedly once per second until a command from the controller is received.



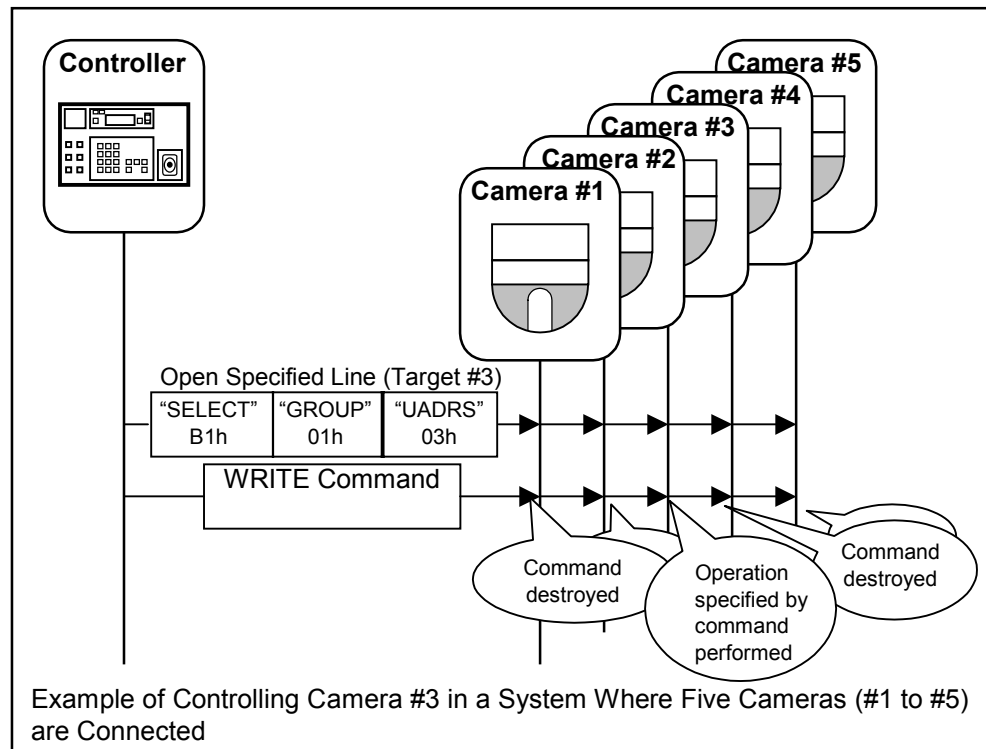
In addition, if a reset notification is received from the controller at a time other than during initial operations, the camera will send a reset notification just once.

5.3 JCBP-S

JCBP-S is a protocol used when multiple cameras are connected to a single controller. The controller must therefore specify the camera or cameras which are to be the target of a command before it sends that command. The specified cameras will then perform the operation corresponding to the command following the target specification sent by the controller. Cameras which are not specified will destroy all commands received until they are specified.

5.3.1 Specifying Camera Operations

A WRITE command is sent to cameras to specify camera operations. When a camera receives a WRITE command from the controller, it performs the operation specified by the command.

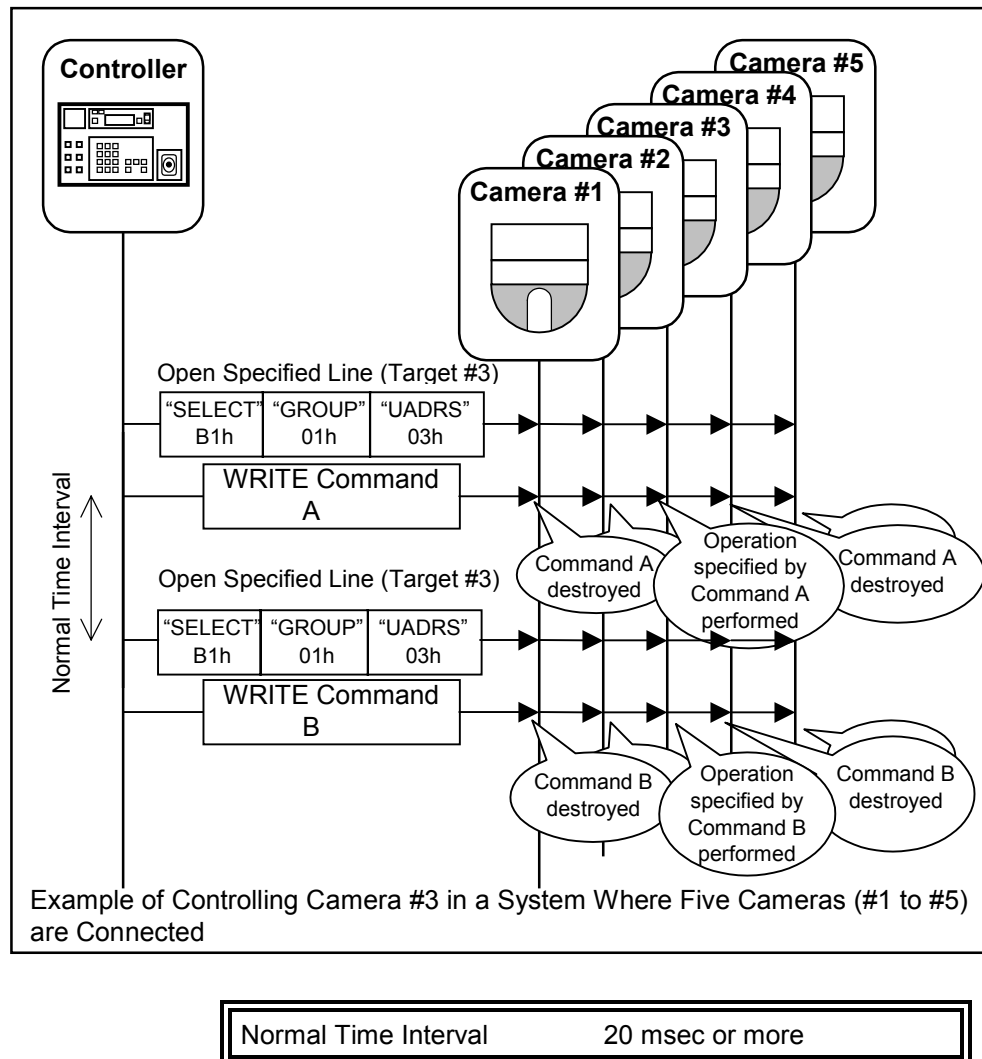


Commands received by a camera are destroyed in the following cases.

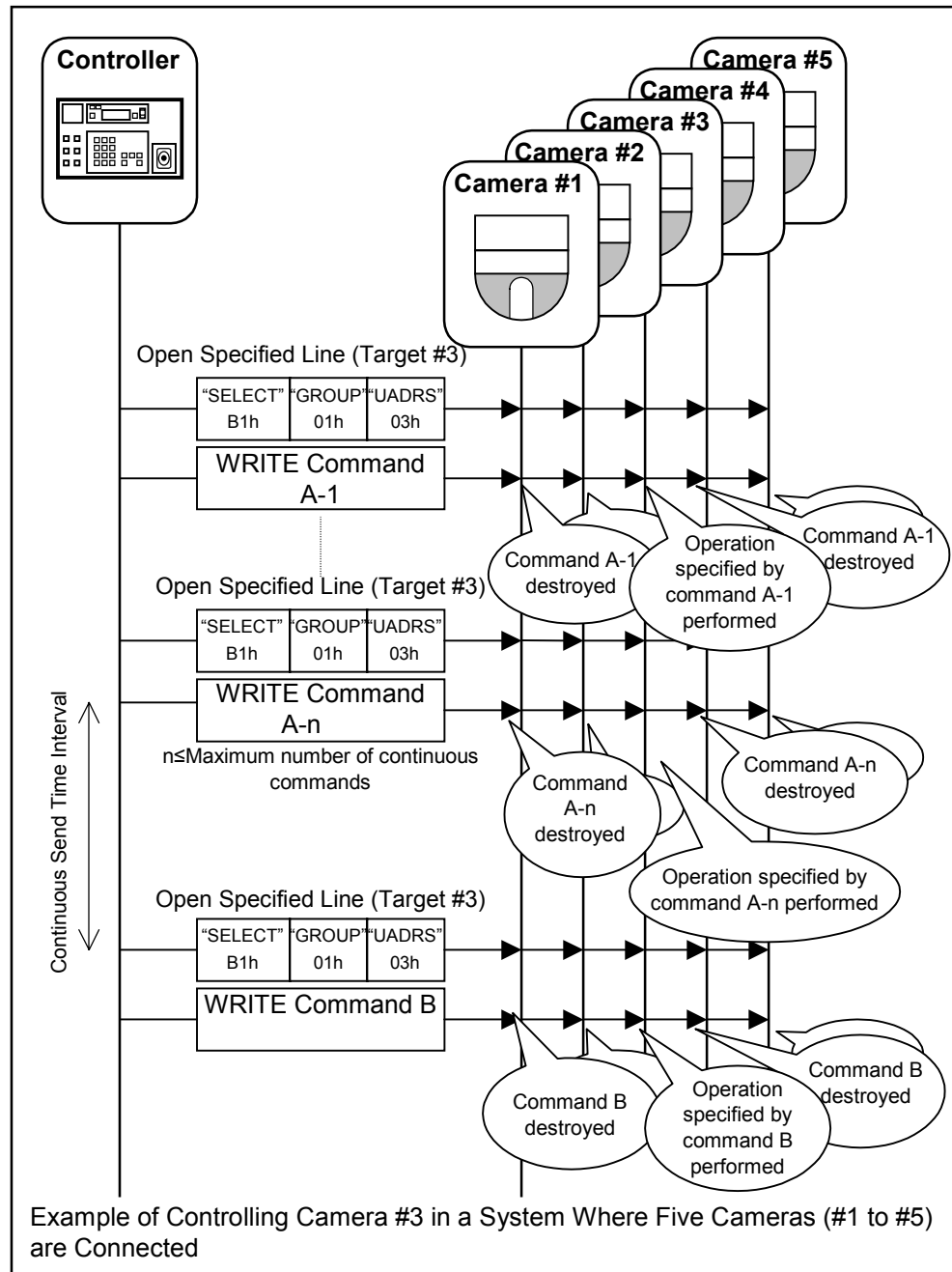
- When a READ command is received
- When a receive error occurs
- When there is an error in the received command
- When a command defined separately for a given camera has been received (Please refer to the Command Guide for each camera.)

5.3.2 Specifying Camera Operations Continuously

Since receive notification to the controller from cameras is not necessary under JCBP-S, it is possible under this protocol to endlessly send continuous commands. However, since there are actual limits in terms of the processing capacity of the cameras, be sure after sending a command to wait a set time interval (normal time interval) before sending the next command.



In addition, when multiple commands are used to perform related operations, it is possible to send up to a maximum number of continuous commands without any interval between them. In this case, after the last command sent continuously, a longer than normal time interval (continuous send time interval) is required before sending the next command.



Maximum number of continuous commands	5 commands
Continuous send time interval	100 msec or more

NOTE

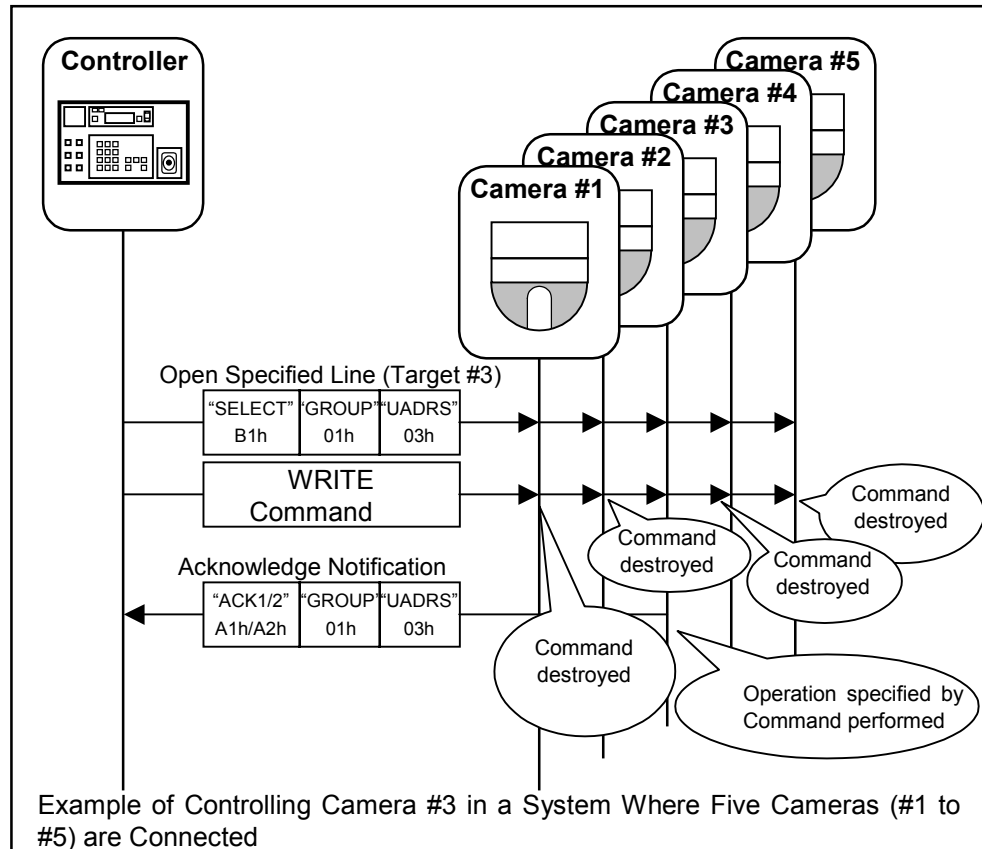
- The specifications given concerning time interval and number of continuous commands are for the typical command. Some commands which do not fit within this standard are defined separately in the Command Guide for each camera.
- It is not necessary to wait a certain time interval before sending a command to a different target.

5.4 JCBP-F

JCBP-F is a protocol used when multiple cameras are connected to a single controller. The controller must therefore specify the camera or cameras which are to be the target of a command before it sends that command. The specified cameras will then perform the operation corresponding to the command following the target specification sent by the controller. Cameras which are not specified will destroy all commands received until they are specified.

5.4.1 Specifying Camera Operations

A WRITE command is sent to cameras to specify camera operations. When a camera receives a WRITE command from the controller, it notifies the controller that it has received the command (acknowledge notification) and then performs the operation specified by the command.



In the following cases, the camera returns a acknowledge notification, but destroys the command.

- When there is an error in the received command
- When a command defined separately for a given camera has been received (Please refer to the Command Guide for each camera.)

A command will also be destroyed but without a acknowledge notification being returned when a receive error occurs.

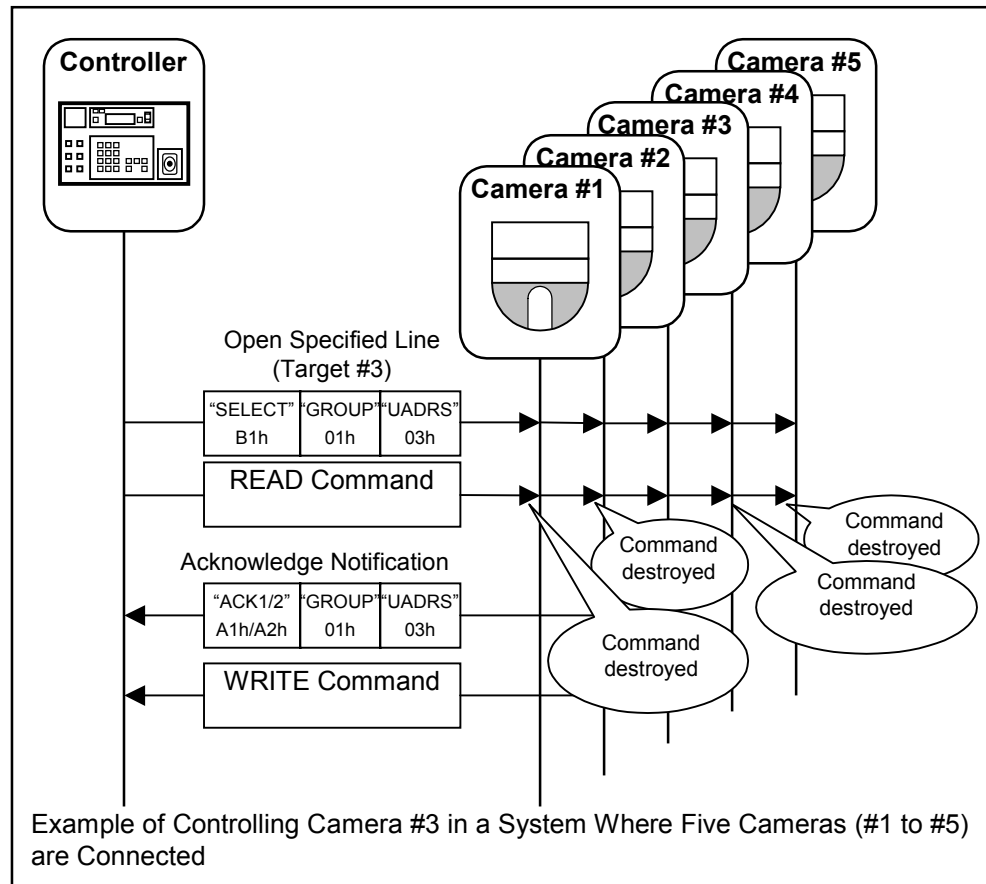
When multiple targets are specified by the controller (using "SELECT" B1h, "GROUP" 01h, "UADRS" 7Fh or "BRC" B0h), the camera performs the operation specified by command without returning an acknowledge notification to the controller.

5.4.2 Obtaining a Camera's Status

A READ command is sent to cameras to obtain their status. When a camera receives a READ command from a controller, it notifies the controller that it has received the command (acknowledge notification) and then sends a WRITE command in response to that READ command. Even though the controller receives this response it does not need to notify the camera that the response was received.

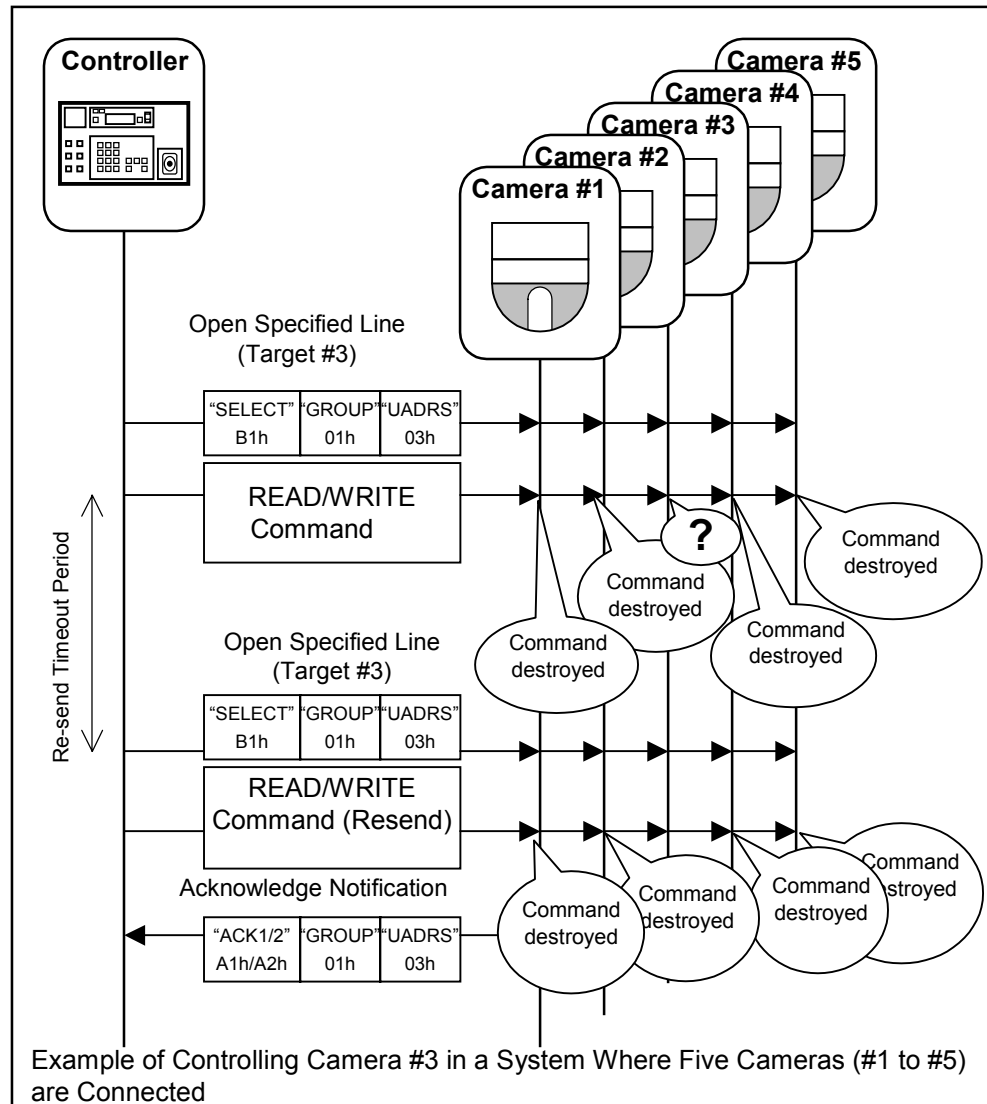
Although the camera returns an acknowledge notification even when the command it received contains an error, the command itself is destroyed. A command will also be destroyed but without an acknowledge notification being returned when a receive error occurs.

If a command has been received with the controller specifying multiple targets ("SELECT" B1h, "GROUP" 01h, "UADRS" 7Fh or "BRC" B0h), the camera returns neither an acknowledge notification nor a WRITE command.



5.4.3 When a Camera Does Not Return an Acknowledge Notification

If the controller does not receive an acknowledge notification from a camera in response to a READ or WRITE command within a timeout period the controller must resend the command. The command is resent until an acknowledge notification is received from the camera or until a specified number of retries have been reached.



Controller's re-send timeout period	140 msec or more
Controller's specified number of resends	Unspecified

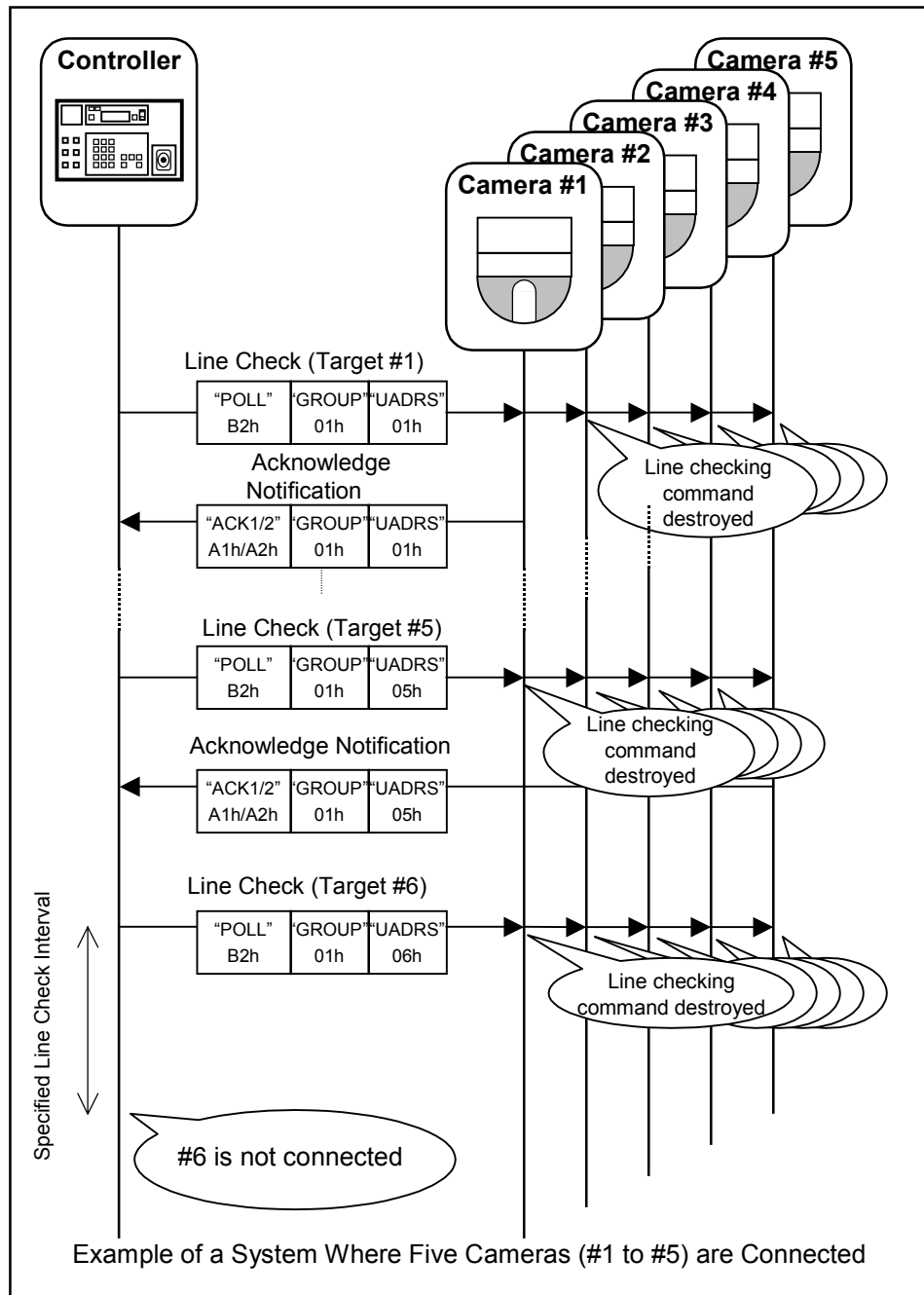
NOTE

- The controller's re-send timeout period is defined for typical commands, but the DUMP64 command does not fit within this standard. The re-send timeout period of the DUMP64 command can be confirmed using the VALUE-CM **DUMP64 TIMEOUT** command.

Although the camera returns a WRITE command in response to the READ command from the controller, in this case it is not necessary for the controller to return an acknowledge notification to the camera. Cameras therefore do not resend commands.

5.4.4 Checking the Connection Status of a Target

Under JCBP-F, it is possible to check the connection status of the specified target using line checking. When the camera receives a line checking command from the controller, it notifies (acknowledge notification) the controller that it has received the command. If the controller sends a line checking command but it does not receive this acknowledge notification within a specified time, it will assume that the specified target is not connected to the line.



Specified line check interval 140 msec or more

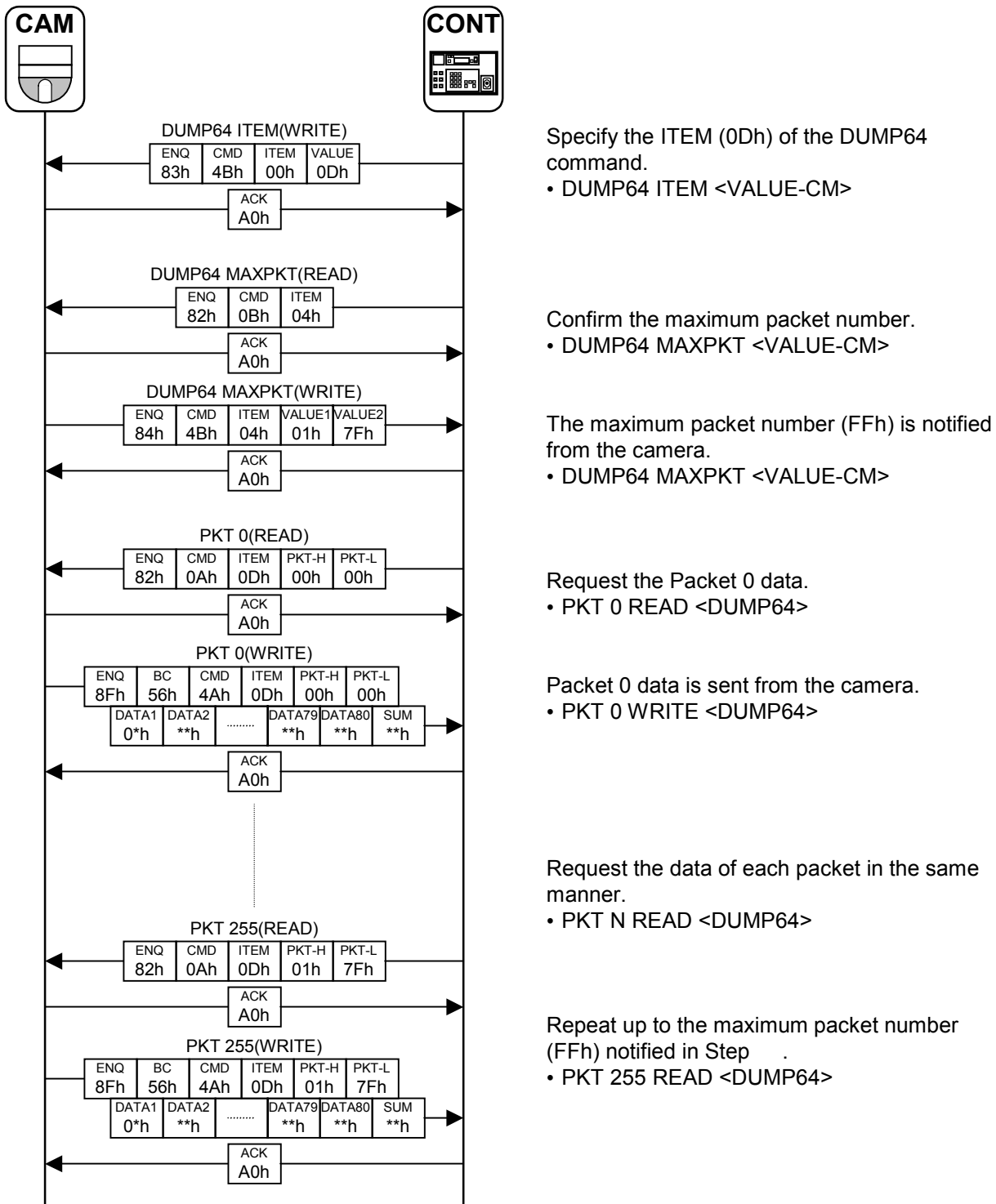
5.5 Loading Memory Data (JCCP-F, JCBP-F)

Although the DUMP64 command is used to load memory data, it must be used together with VALUE-CM DUMP64-related commands in order to handle large-volume data. An example of how to use this command (when 16 KB of data is specified using ITEM 0Dh) is given below. Please follow the procedure given.

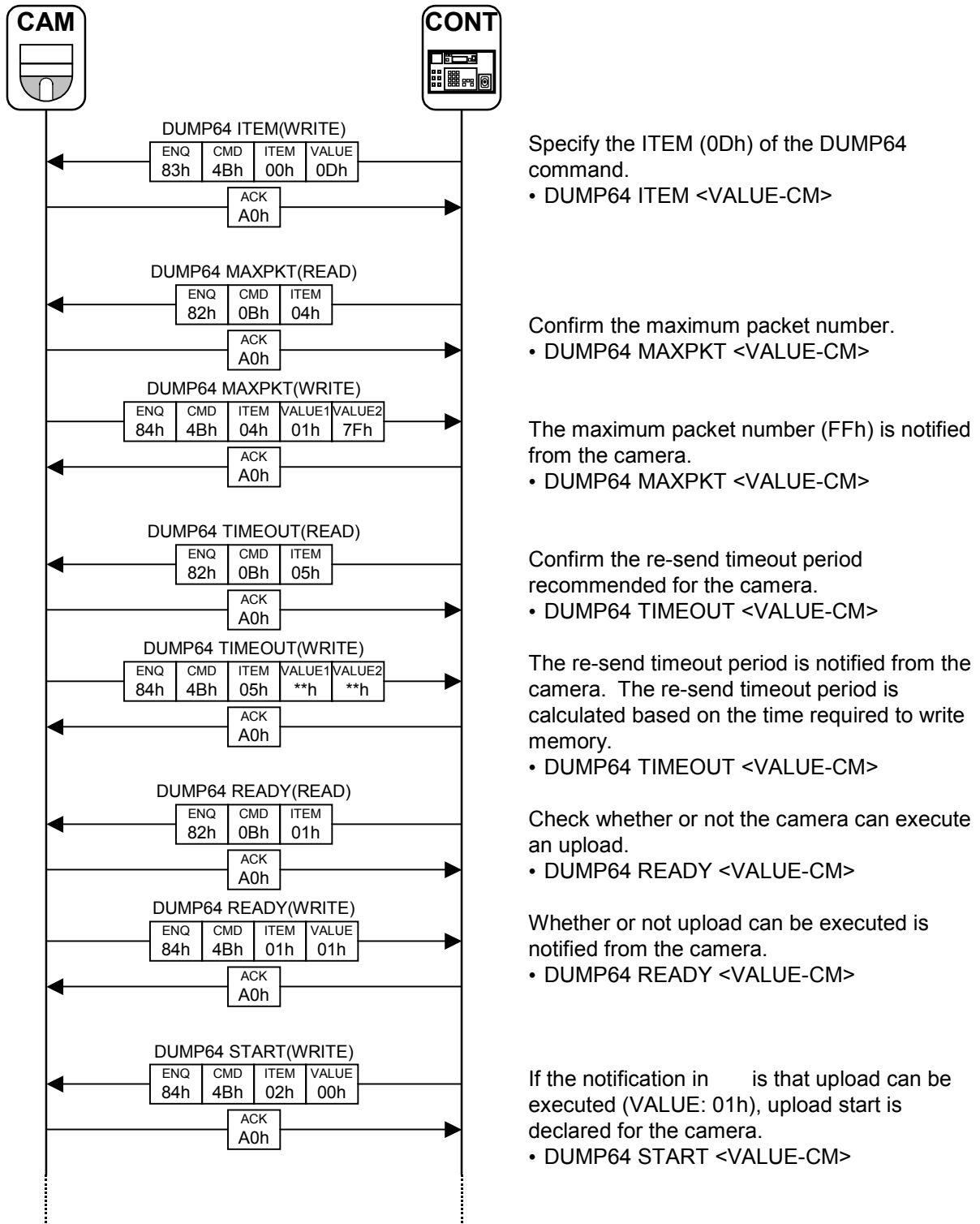
Memory data cannot be loaded under the JCCP-S and JCBP-S standards.

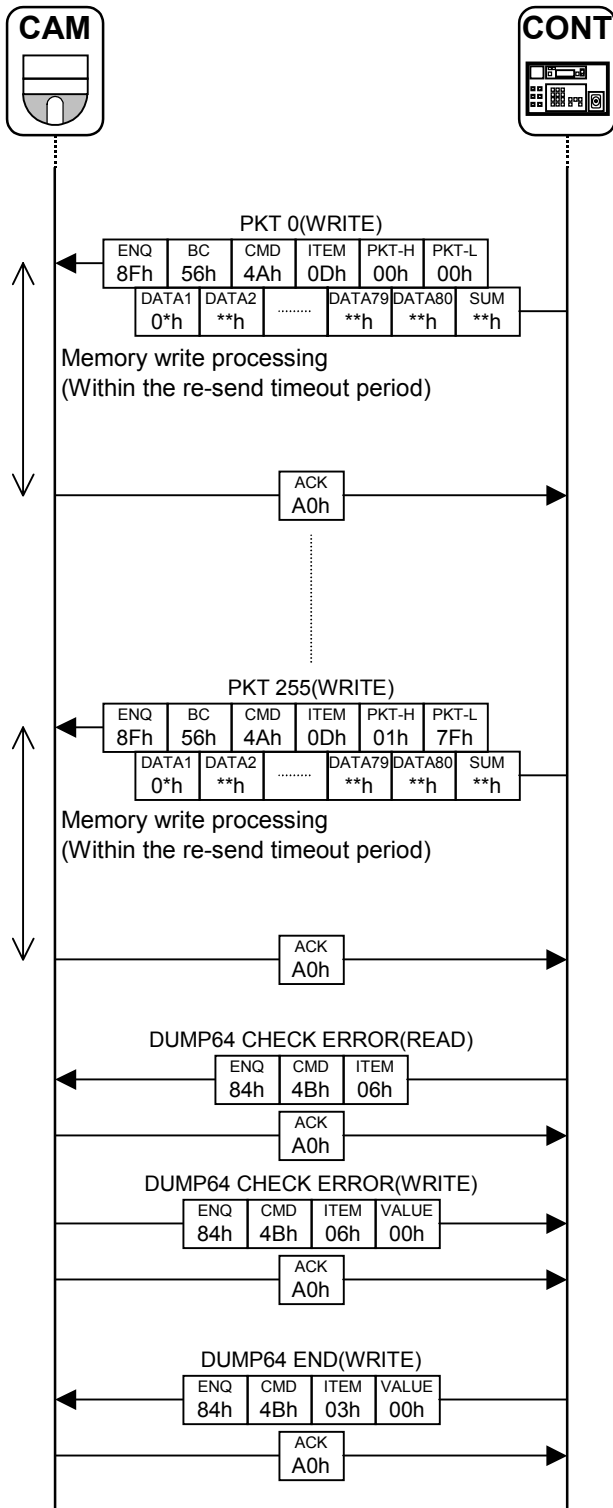
The following example is for operations under the JCCP-F standard. When using the JCBP-F standard, be sure to follow Section 5.4 and add a target specification and acknowledge notification.

5.5.1 Obtaining (Downloading) Memory Data from the Camera



5.5.2 Writing (Uploading) Memory Data to the Camera





Packet 0 data is transferred to the camera.

- PKT 0 WRITE <DUMP64>

The camera sends an acknowledge notification after the received data is written into memory. Even if the re-send timeout period notified in Step has elapsed, the controller re-sends data only if an acknowledge notification is not returned.

Transfer data for each packet in a similar manner once an acknowledge notification has been sent.

- PKT N WRITE <DUMP64>

Repeat up to the maximum number of packets (FFh) notified in Step .

- PKT 255 WRITE <DUMP64>

Check that there has not been a checksum error once the acknowledge notification for the maximum packet number has been returned.

- DUMP64 CHECK ERROR <VALUE-CM>

The fact there has not been a checksum error is notified from the camera. (See Section 5.5.6.)

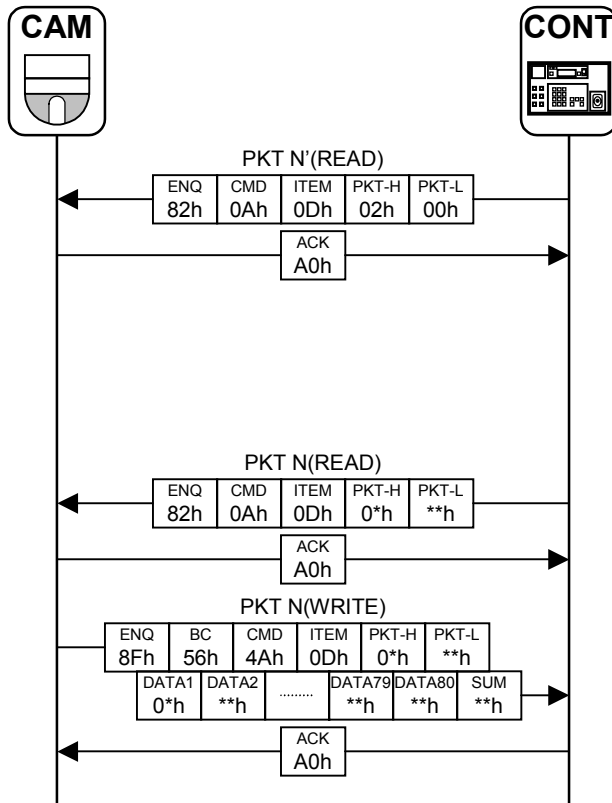
- DUMP64 CHECK ERROR <VALUE-CM>

Upload end is declared for the camera.

- DUMP64 END <VALUE-CM>

The camera is automatically restarted in order to enable the uploaded data.

5.5.3 If the Packet Number is Out of Range During Download



Request data for Packet N' (N' > 255).

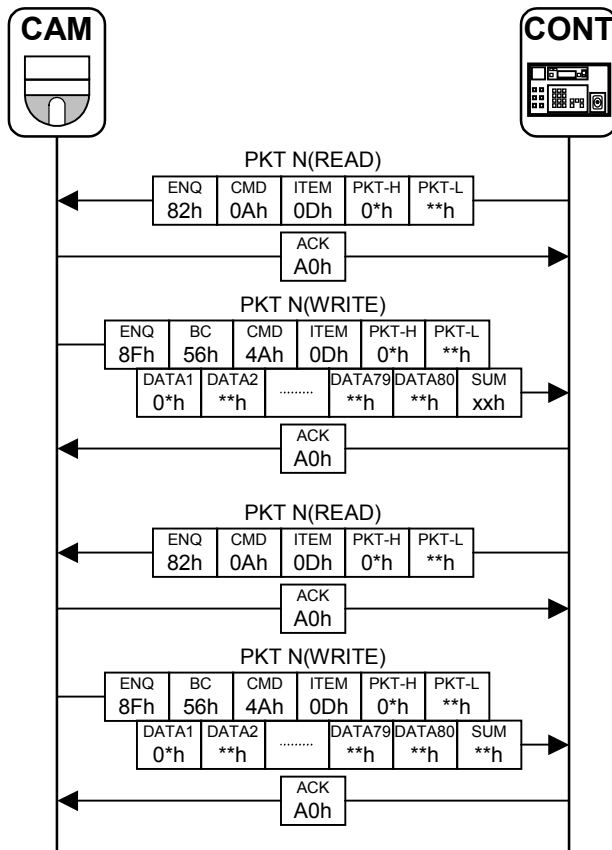
- PKT N' READ <DUMP64>

The command in Step is **ignored** because the packet number is out of range. A revised send request is not sent.

If data has not been sent from the camera even though a set amount of time has elapsed, the controller determines that there is an error in the packet number. If required, please request the data using the correct packet number.

- PKT N READ <DUMP64>

5.5.4 Checksum Errors During Download



Request data for Packet N.

- PKT N READ <DUMP64>

Data for Packet N is transferred from the camera.

- PKT N WRITE <DUMP64>

If the "SUM" received in Step does not match the checksum calculated by adding the bytes of "DATA", a request for data for Packet N is made again.

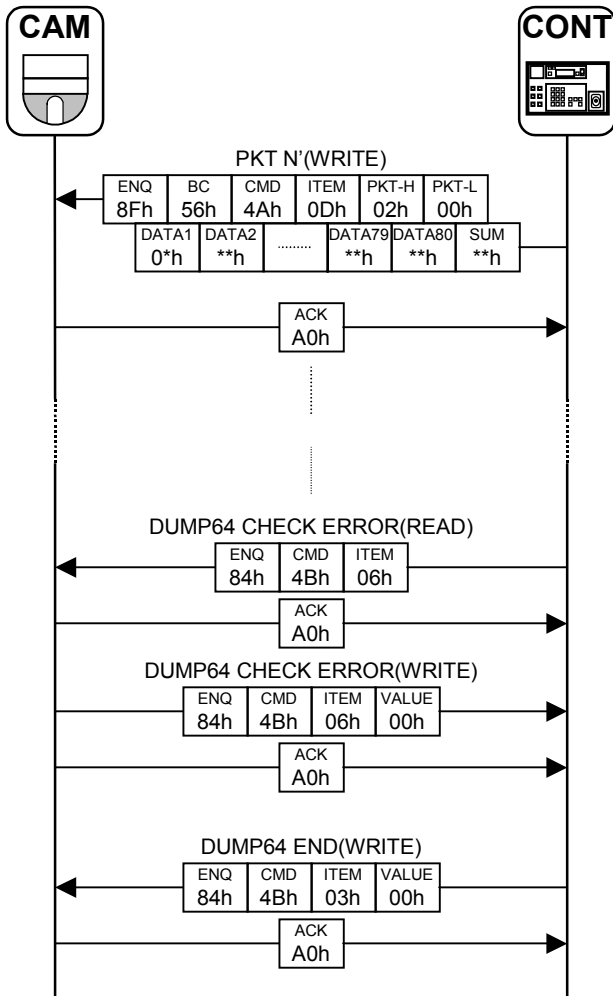
- PKT N READ <DUMP64>

Data for Packet N is sent from the camera.

- PKT N READ <DUMP64>

This repeats until "SUM" and the checksum calculated based on "DATA" match.

5.5.5 If the Packet Number is Out of Range During Upload



Data for Packet N' (N' > 255) is transferred to the camera.

- PKT N' WRITE <DUMP64>

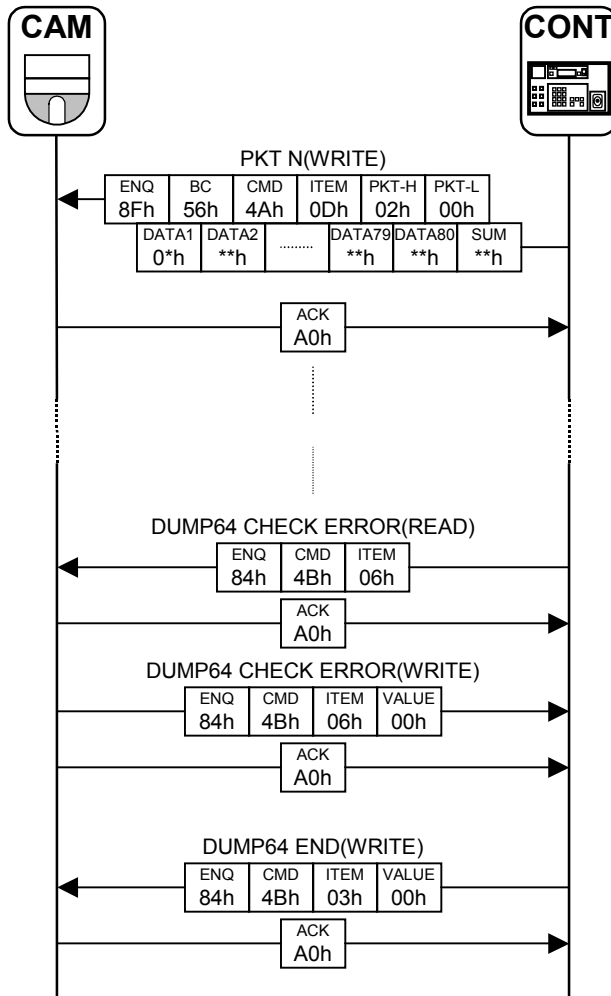
The camera returns an acknowledge notification without writing data that has been sent into memory because the packet number is out of range.

If there are packets which have not been correctly written because the packet number was out of range, this is not clarified when checking for checksum errors (equivalent to in Section 5.5.2).

- DUMP64 CHECK ERROR <VALUE-CM>

It is possible to accurately confirm upload data by downloading the data using information in Section 5.5.1 after the camera has been restarted.

5.5.6 Checksum Errors During Upload



Transfer data for Packet N to the camera.

- PKT N WRITE <DUMP64>

If “SUM” received in Step does not match the checksum calculated by adding the bytes of “DATA”, the camera returns an acknowledge notification without writing received data to memory.

If there are packets which have not been correctly written, this is clarified (VALUE: 01h) when checking for checksum errors (equivalent to in Section 5.5.2.)

- DUMP64 CHECK ERROR <VALUE-CM>

Upload data again using information found in Section 5.5.2 after the camera has been restarted.

When checking for checksum errors in Step it is impossible to know which packet number has generated a checksum error. It is possible to re-upload only those packets which were not uploaded correctly by downloading data according to information found in Section 5.5.1 and checking it.