RS-232C/LAN COMMAND

MV-400
Multi Viewer

Table of Contents

1. Communication Standards

1-1. RS-232C Interface Communication Standards

The communication standards when connecting the unit to a serial controller via RS-232C are as follows.

Baud rate	9,600bps
Data length	8 bit
Stop bit	1 bit
Parity	None
X parameter (flow control)	None

NOTE
For the details of the RS-232C interface connector and cable, refer to section 2-3-1-5. "RS-232C" in the MV-400 Operation Manual

1-2. LAN Interface Communication Standard

The communication standards when connecting the unit to a serial controller via LAN are as follows.

Item	Description
Compatible communication protocol	Data link layer: CSMA/CD Network layer: IP, ICMP, ARP, RARP Transport layer: TCP, UDP Application layer: socket
IP address	Set range: "0.0.0.0" to "255.255.255.255" (except "0.0.0.0" and "1.0.0.0") * Set from MENU screen of main unit. * The initial setting is "192.168.0.1".
Subnet mask (Mask length)	Set range: 0 - 31 * Set from MENU screen of main unit. * The initial setting is "24".
Multicast address	Set range: "224.0.0.0" to "239.255.255.255" (except "224.0.0.0" to "224.0.0.255") * Set from MENU screen of main unit, or by web browser or the LAN command. * The initial setting is "239.255.0.0".
Multicast port	Set range: 1024 - 65535 * Set from MENU screen of main unit, or by web browser or the LAN command. * The initial setting is "2100".
Gateway	Set range: "0.0.0.0" to "255.255.255.255" * Set from MENU screen of main unit. * "0.0.0.0" means that gateway is not set. * The initial setting is "0.0.0.0".

Item	Description
Port	2000: For receiving image data in video mode. 2001: For sending and receiving commands.
MAC address	Set at the factory (cannot be changed). * The contents can be verified from the MENU screen of the main unit.

NOTE
Refer to section 5-6. "LAN Setting" in the MV-400 Operation Manual for the details of setting on the main unit menu screen.

1-3. Notes for the LAN Interface

1) IP address, Subnet mask, Gateway and Port number settings must be suitable for your network system.

2) Consult your system administrator before setting IP address, Subnet mask, Gateway and Port number to avoid troubles, if configuring the system in the existing LAN.

3) The MV-400 cannot establish connection to multiple PCs via LAN.

4) Release the port at the MV-400 when terminating the control from the PC, so that the MV-400 can establish the connection again to the PC or to another PC.

5) The command port (number 2001) automatically shuts down the socket connection when it does not receive a command for 5 seconds.

6) If the security by ID and the password is set on, add the data shown below to the beginning of the command line.

Byte	Parameter	Command	Description
1	Number of characters	1 - 8	The number of ID characters.
*	ID characters	ASCII code Alphanumeric only (See table 1st + 2nd next page)	ID characters: Up to 8 characters.
*	Password data	0 - 9	First digit
		0 - 9	Second digit
		0 - 9	Third digit
		0 - 9	Fourth digit
		0 - 9	Fifth digit

* Total number of bytes depends on the set ID data.

Character Code Table

1st / 2nd	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	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											

Blank cells indicate unavailable character codes.

◆ **MV-400 command flow chart**

MV-400
Power on

Startup time
Approx. 6sec.

Socket
Not connected

MV-400 shuts down socket connection automatically if there is no command reception for 5 seconds.

Connect
PC and connector

Socket
Ready for command

Response message
Sent from MV-400

Command
Sent from PC

Process
command
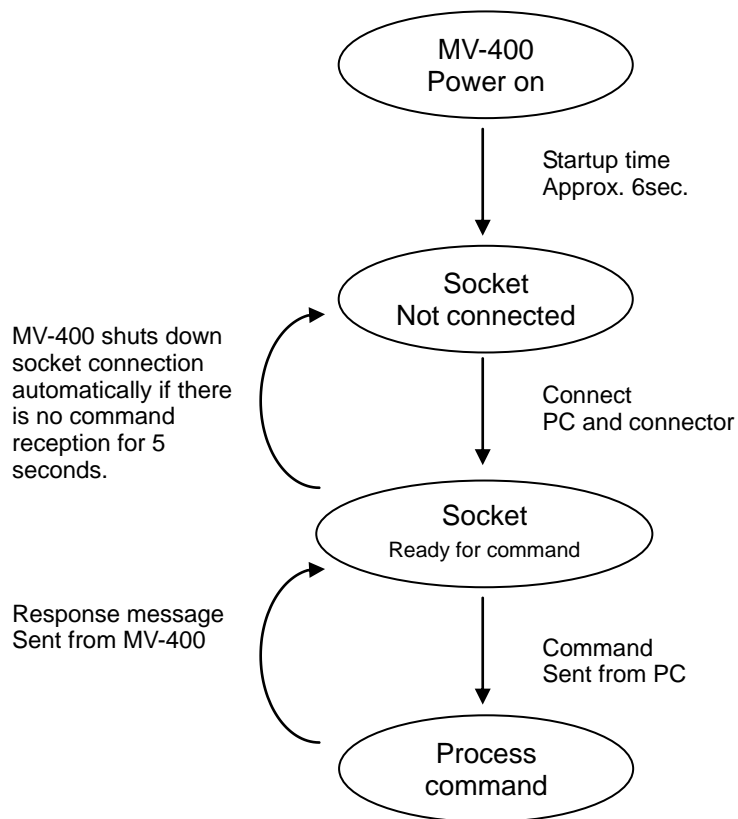
1-4. Command Protocol Format

The following command formats are used for commands issued from the serial controller via the RS-232C interface or LAN interface. Commands are issued from the control device in the formats as shown below. For the RS-232C interface, two types of communication protocols are available: the standard and the previous(MV-40F compatible) standard. Which to use is selected by the menu setting. (Refer to section 5-7. "SYSTEM (System Setting)" for selecting a protocol.)

1-4-1. Standard Protocol

All command contents are transmitted and received in ASCII code. Follow the formats to make and send message commands. The command format is as shown in the table below.

◆ **Command Format**

Command code + Command parameter + CR + LF
  (2 byte)   (Byte that specified for each parameter)

(Works without LF as well)

Ex.: When sending a command to switch channels

Byte	Parameter	Command	Description
1	Command code	S	
2		C	
3	Output mode	0	SXGA mode
		1	Video mode
4-5	Camera channel	01–04	Channel no.: switch to CH1–4
6	End code	CR	
7		LF	

IMPORTANT
The MV-400 sends a response or a message when receiving a command. Do not send the next command before receiving the response or the message transmitted by the MV-400. Otherwise, the command cannot be read properly.

1-4-2. Previous Model Protocol

This protocol is compatible to that of For-A product multi viewer MV-40F.
All command contents are transmitted and received in ASCII code. Follow the formats to make and send message commands. The command format is as shown in the table below.
*MV-400 supported commands can be used.
*Previous model protocol is for RS-232C interface.

◆ **Command Format**

STX（02H） + Command parameter + ETX（03H）
(1 byte)   (Byte that specifies each parameter)   (1 byte)

Ex.: When sending a command to switch channels

Byte	Parameter	Command	Description
1	Start code	STX	（Hex: 02H）
2	Command code	S	
3		F	
4	Camera channel	1–4	Channel no.: switch to CH1–4
5	End code	ETX	（Hex: 03H）

IMPORTANT
The MV-400 sends a response or a message when receiving a command. Do not send the next command before receiving the response or the message transmitted by the MV-400. Otherwise, the command cannot be read properly.

1-5. Response Message Format

After sending commands, you will receive response messages from the MV-400.

1-5-1. Standard Protocol

◆ **Normal end**

Messages in the following format are returned after normal reception and processing.

Byte	Parameter	Message	Description
1	Message code	O	"OK"
2		K	
3	End code	CR	
4		LF	

◆ **Abnormal end**

If something prevents commands from being issued normally, messages in the following format are returned.

Byte	Parameter	Message	Description
1	Message code	E	"ERR"
2		R	
3		R	
4	End code	CR	
5		LF	

1-5-2. Previous Model Protocol

◆ **Normal end**

Messages in the following format are returned after normal reception and processing.

Byte	Parameter	Message	Description
1	Response code	ACK	(Hex: 06H)

◆ **Abnormal end**

If something prevents commands from being issued normally, messages in the following format are returned.

Byte	Parameter	Message	Description
1	Response code	NAK	(Hex: 15H)

1-6. Image Data Format for Video Output

Set frame rate for video transmission by the video output frame rate command. The frame rate should be set other than 0fps. 0fps is used to cancel the transmission.

IMPORTANT
To transmit video via LAN interface set FUNCTION to NETWORK. If the optional software is installed the video transfer function is available regardless of the FUNCTION setting. Refer to the section 5-7. "SYSTEM (SYSTEM Settings)" of the MV-400 Operation manual for the details. Refer to section 2-7. "Video Frame Rate Command" for the frame rate command details. The video output is available only via LAN interface. It is not available via RS-232C interface. The port number for the transmission is "2000."

(1) When the addition of ALARM/VIDEO LOSS information is off

◆ **Image data format**

Screen code + Data size + JPEG image data
(1 byte)   (4 byte)   (Variable length)
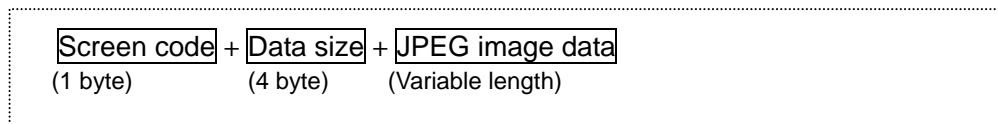
Screen code: The display mode for the transmitting JPEG image.

Data size: The size of the transmitting JPEG image data. JPEG image data size is the sum of 6th byte to the last byte.

JPEG Image data: The image data after compression. Data size varies. Refer to the written JPEG standard.

Byte	Parameter	Message	Description
1	Screen code	0x01	Full screen display of channel 1
		0x02	Full screen display of channel 2
		0x03	Full screen display of channel 3
		0x04	Full screen display of channel 4
		0x20	Quad screen display (Image size 640×480pixels)
		0x21	Quad screen display (Image size 1280×960pixels) * Available with the optional software
2-5	Data size	0 x xxxxxxxx	Data size of JPEG image data
6 . . (data size) +6	JPEG Image data	JPEG data	JPEG image data

IMPORTANT
Image data formats are all in binary data.

(2) When the addition of ALARM/VIDEO LOSS information is on

◆ **Image data format**

> Screen code + Alarm info + Video loss info + Data size + JPEG image data
> (1 byte)   (2 bytes)   (2 bytes)   (4 bytes)   (Variable length)
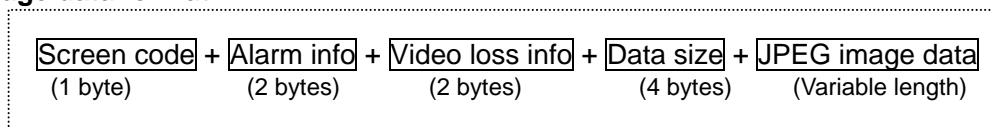
Alarm Info: Information of alarm input existence of each channel.
Video loss info: Information of video loss occurrence of each channel.

* When the addition of ALARM/VIDEO LOSS information is on, the MSB (Most Significant Bit) of screen code is 1.

Byte	Parameter	Message	Description
1	Screen code	0x81	Full screen display of channel 1
		0x82	Full screen display of channel 2
		0x83	Full screen display of channel 3
		0x84	Full screen display of channel 4
		0xA0	Quad screen display (Image size 640×480pixels)
		0xA1	Quad screen display (Image size 1280×960pixels) * Available with the optional software
2-3	Alarm information	0x0000 - 0x000F	Bit No.0 - 3 Bit value 0: No alarm Bit value 1: Alarm in progress
4-5	Video loss information	0x0000 - 0x000F	Bit No.0 - 3 Bit value 0: No video loss Bit value 1: Video loss in progress
6-9	Data size	0 x xxxxxxxx	Data size of JPEG image data
10 • • (data size) +10	JPEG Image data	JPEG data	JPEG image data

E.g. If there are alarm inputs to CH1 and CH4, the second and third bytes are 0x0009.

Channel No.	-	-	-	-	-	-	-	-	-	-	-	-	CH 4	CH 3	CH 2	CH 1
Bit No.	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Bit value	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Byte value	0				0				0				9			

IMPORTANT

Image data formats are all in binary data. See section 2-9, "Addition of Information on the Image Data Command" for the settings for the addition of ALARM/VIDEO LOSS information.

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2. Control Commands (Standard Protocol)

2-1. Full Screen Display Command

Shows channels assigned to SXGA or Video output in full screen mode.
With normal reception and processing, the response message is "OK."
"ERR" message is returned during MENU screen display.

Byte	Parameter	Command	Description
1	Command code	S	
2		C	
3	Output mode	0	SXGA mode
		1	Video mode
4-5	Camera channel no.	01–04	Display channel: CH1–4
6	End code	CR	
7		LF	

2-2. Split Screen Display Command

Shows channels assigned to SXGA or Video output in split screen type. Split screen type is as set in menu setting.
With normal reception and processing, the response message is "OK."
"ERR" message is returned during MENU screen display.

Byte	Parameter	Command	Description
1	Command code	S	
2		I	
3	Output mode	0	SXGA mode
		1	Video mode
4	End code	CR	
5		LF	

2-3. Auto Sequencing Start Command

Initiates auto sequencing full screen display of SXGA or Video output.
With normal reception and processing, the response message is "OK."
"ERR" message is returned during MENU screen display or alarms.

Byte	Parameter	Command	Description
1	Command code	A	
2		S	
3	Output mode	0	SXGA mode
		1	Video mode
4	End code	CR	
5		LF	

2-4. Alarm Reset Command

Resets the alarm. However, external alarm reset is enabled only when the input setting is "TRIG."
With normal reception and processing, the response message is "OK."
"ERR" message is returned during MENU screen display.

Byte	Parameter	Command	Description
1	Command code	A	
2		T	
3	End code	CR	
4		LF	

2-5. Alarm Input Command

Sends alarm input for each channel. However, external alarm input is enabled only when the input setting is "TRIG."
With normal reception and processing, the response message is "OK."
"ERR" message is returned when the external alarm input setting is "LEVEL" or displaying menu screen.

Byte	Parameter	Command	Description
1	Command code	A	
2		I	
3-4	Channel no.	01–04	Channel no: 1–4
5	End code	CR	
6		LF	

2-6. Video Output Command

Selects destination screen to output video.
With normal reception and processing, the response message is "OK."
"ERR" message is returned during MENU screen display.

Byte	Parameter	Command	Description
1	Command code	N	
2		C	
3-4	Display code	01	Display CH1 in full screen
		02	Display CH2 in full screen
		03	Display CH3 in full screen
		04	Display CH4 in full screen
		20	Quad screen (image size 640 x 480pixels)
		21	Quad screen (image size 1280 x 960pixels) *Available with optional software.
5	End code	CR	
6		LF	

2-7. Video Output Frame Rate Command

Sets video output frame rate.
With normal reception and processing, the response message is "OK."
"ERR" message is returned during MENU screen display.

Byte	Parameter	Command	Description
1	Command code	N	
2		F	
3	Frame rate	0	0fps (cancel video output)
		1	NTSC: 1fps, PAL: 1fps
		2	NTSC: 5fps, PAL: 4fps
		3	NTSC: 10fps, PAL: 8fps
		4	NTSC: 15fps, PAL: 12fps
		5	NTSC: 30fps, PAL: 25fps
		6	NTSC: 60fps, PAL: 50fps
4	End code	CR	
5		LF	

IMPORTANT
Set frame rate by the Video output frame rate command to transmit video. The frame rate should be set other than 0fps. 0fps is used to cancel the transmission. Depends on the video to output, JPEG compression ratio, connecting PC, or network environment, the specified frame rate would not be fulfilled. In such case change the compression ratio to size down the data to send and try again. During menu screen display, the video output is cancelled.

2-8. Video Output JPEG Compression Ratio Command

Sets video output frame ratio.
With normal reception and processing, the response message is "OK."
"ERR" message is returned during MENU screen display.

Byte	Parameter	Command	Description
1	Command code	N	
2		J	
3	JPEG compression ratio	0	Low image quality
		1	Average image quality
		2	High image quality
		3	Highest image quality
4	End code	CR	
5		LF	

2-9. Addition of Information on the Image Data Command

"ERR" message is returned during MENU screen display.

Byte	Parameter	Command	Description
1	Command code	I	
2		F	
3	Addition of ALARM/VIDEO LOSS information	0	Off
		1	On
4	Reserve	0	
5	Reserve	0	
6	Reserve	0	
7	End code	CR	
8		LF	

3. Status Requests (Standard Protocol)

3-1. Version Request Command

Requests the software version and hardware version of the MV-400.
Returns a [VA] version message after normal reception and processing.

◆ ［**VR**］ **Request command**

Byte	Parameter	Command	Description
1	Command code	V	
2		R	
3	End code	CR	
4		LF	

◆ ［**VA**］ **Responce message**

Byte	Parameter	Message	Description
1	Message code	V	
2		A	
3-5	Software version	XXX	Software version (X.XX)
6-8	Hardware version	YYY	Hardware version (Y.YY)
9	End code	CR	
10		LF	

3-2. Video Format Request Command

Requests the status of current VIDEO format.
Returns a [FA] output status message after normal reception and processing.

◆ ［**FR**］ **Request command**

Byte	Parameter	Command	Description
1	Command code	F	
2		R	
3	End code	CR	
4		LF	

◆ ［**FA**］ **Responce message**

Byte	Parameter	Message	Description
1	Message code	F	
2		A	
3	Video format	0	NTSC
		1	PAL
4	End code	CR	
5		LF	

3-3. Output Mode Request Command

Requests the status of current output mode as in SXGA or VIDEO output.
Returns an [OA] monitor display status message after normal reception and processing.

◆ ［OR］ **Request command**

Byte	Parameter	Command	Description
1	Command code	O	
2		R	
3	Output mode	0	SXGA mode
		1	Video mode
4	End code	CR	
5		LF	

◆ ［OA］ **Responce message**

Byte	Parameter	Message	Description
1	Message code	O	
2		A	
3	Display mode	0	Standard mode
		1	Alarm display mode
		2	MENU mode
4	Display screen *MENU is fixed to 0	0	Full screen
		1	Split screen
5	Output mode	0	SXGA mode
		1	Video mode
6	Auto sequencing	0	OFF
		1	ON
7-8	Display channel	01–04	Channel no. 1–4 *Split screen and menu display are indicated as 01
9	End code	CR	
10		LF	

3-4. Alarm Information Request Command

Requests the current alarm and video loss information. Channel numbers are given in hexadecimal. Returns an [AA] alarm status message after normal reception and processing.

◆ ［**AR**］ **Request comman**

Byte	Parameter	Command	Description
1	Command code	A	
2		R	
3	End code	CR	
4		LF	

◆ ［**AA**］ **Response message**

Byte	Parameter	Message	Description
1	Message code	A	
2		A	
3-6	Alarm information	0000–000F	Bit no.0-3 Bit value 0: No alarm Bit value 1: Alarm in progress *Bits 4-15 are fixed to 0.
7-10	Video loss information	0000–000F	Bit no.0 - 3 Bit value 0: No video loss Bit value 1: Video loss in progress *Bits 4-15 are fixed to 0.
11	End code	CR	
12		LF	

Example 1: When channel 1 and 4 have alarm inputs, the bytes 3 to 6 are **0009**.

Channel no.	-	-	-	-	-	-	-	-	-	-	-	-	CH 4	CH 3	CH 2	CH 1
Bit no.	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Bit value	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Byte value	0				0				0				9			

3-5. Fan Alarm Status Request Command

Requests the fan alarm status.
Returns a [RA] fan alarm status message after normal reception and processing.

◆ ［**RF**］ **Request command**

Byte	Parameter	Command	Description
1	Command code	R	
2		F	
3	End code	CR	
4		LF	

◆ ［**RA**〕 **Response message**

Byte	Parameter	Message	Description
1	Message code	R	
2		A	
3	Fan alarm status	0	No fan alarm
		1	Fan alarm
4	End code	CR	
5		LF	

3-6. Video Output Status Request Command

Requests the video output status.
Returns a [NA] fan alarm status message after normal reception and processing.

◆ ［**NR**〕 **Request command**

Byte	Parameter	Command	Description
1	Command code	N	
2		R	
3	End code	CR	
4		LF	

◆ ［**NA**〕 **Response message**

Byte	Parameter	Message	Description
1	Message code	N	
2		A	
3-4	Display screen	01	Channel 1 in full screen
		02	Channel 2 in full screen
		03	Channel 3 in full screen
		04	Channel 4 in full screen
		20	Quad screen (image size 640 x 480pixels)
		21	Quad screen (image size 1280 x 960pixels) *Available with optional software.
5	Frame rate	0	0fps (No video output)
		1	NTSC: 1fps, PAL: 1fps
		2	NTSC: 5fps, PAL: 4fps
		3	NTSC: 10fps, PAL: 8fps
		4	NTSC: 15fps, PAL: 12fps
		5	NTSC: 30fps, PAL: 25fps
		6	NTSC: 60fps, PAL: 50fps
6	JPEG compression ratio	0	Low image quality
		1	Average image quality
		2	High image quality
		3	Highest image quality
7	End code	CR	
8		LF	

3-7. Addition of Information on the Image Data Status Request Command

Requests the status of addition of alarm/video loss information on the image data.
Returns a [IA] addition of information status message after normal reception and processing.

◆ **[IR]　Request command**

Byte	Parameter	Command	Description
1	Command code	I	
2		R	
3	End code	CR	
4		LF	

◆ 〔**IA**〕　**Response message**

Byte	Parameter	Message	Description
1	Message code	I	
2		A	
3	Addition of ALARM/VIDEO LOSS information	0	Off
		1	On
4	Reserve	0	
5	Reserve	0	
6	Reserve	0	
7	End code	CR	
8		LF	

4. Menu Setting Control (Standard Protocol)

4-1. Command Format

All menu settings are performed using the [MN] command code. Identify each menu by the menu code and specify the settings.

All command contents are transmitted and received in ASCII code. Follow the formats to make and send message commands. The command format is as shown in the table below.

◆ **Command format**

MN + Menu code + Command parameter + CR + LF
(2 byte)(1 byte/see below) (Byte that specifies each parameter)

(Works without LF as well)

The menu codes are as follows.

Menu Code	Description	Reference
1	TIME SETUP	"4-2-1"
2	ALARM/VIDEO LOSS	"4-2-2"
3	TITLE	"4-2-3"
4	TITLE POSITION	"4-2-4"
5	DISPLAY	"4-2-5"
6	DISPLAY TYPE	"4-2-6"
7	SYSTEM	"4-2-7"
0	MULTICAST ADDRESS / PORT	"4-2-8"

IMPORTANT
"ERR" is returned when a setting command is received while displaying MENU screen.

4-2. Menu Setting Commands

4-2-1. TIME Setting Command

Sets parameter for TIME SETUP menu. Enter time values in decimal number.
"ERR" message is returned during alarm operations.

Byte	Parameter	Command	Description
1	Command code	M	
2		N	
3	Menu code	1	TIME SETUP setting
4-5	Auto sequencing interval	01–60	1–60sec
6-7	Split screen auto reset time	00–60	00 : OFF, 1–60sec
8-9	Alarm reset time	01–60	1–60sec
10–11	Video loss reset time	01–60	1–60sec
12	End code	CR	
13		LF	

4-2-2. ALARM/VIDEO LOSS Setting Command

Sets parameter for Alarm/Video loss menu.
"ERR" message is returned during alarm operations.

Byte	Parameter	Command	Description
1	Command code	M	
2		N	
3	Menu code	2	Alarm/Video loss setting
4	Alarm input	0	Trigger input
		1	Level input
5	Alarm display mode	0	FULL
		1	SPLIT
6	Alarm ON/OFF（SXGA）	0	OFF
		1	ON
7	Video loss ON/OFF（SXGA）	0	OFF
		1	ON
8	Alarm ON/OFF (Video)	0	OFF
		1	ON
9	Video loss ON/OFF (Video)	0	OFF
		1	ON
10	End code	CR	
11		LF	

4-2-3. TITLE Setting command

Sets parameter for Title Set of Title/Position menu.
"ERR" message is returned during alarm operations.

Byte	Parameter	Command	Description
1	Command code	M	
2		N	
3	Menu code	3	Title setting
4–5	Title setting channel	01-04	Channel no. 1–4
6	Title data	ASCII code（See table $1^{st} + 2^{nd}$ below）	1st character (from the left of the screen)
7			2nd character
8			3rd character
9			4th character
10			5th character
11			6th character
12			7th character
13			8th character
14	End code	CR	
15		LF	

Character Code Table

1st / 2nd	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			SP	0		P							タ	ミ		
1			!	1	A	Q					。	ア	チ	ム		
2				2	B	R						イ	ツ	メ		
3				3	C	S						ウ	テ	モ		
4				4	D	T					、	エ	ト	ヤ		
5				5	E	U					・	オ	ナ	ユ		
6				6	F	V					ヲ	カ	ニ	ヨ		
7				7	G	W					ア	キ	ヌ	ラ		
8			(	8	H	X					イ	ク	ネ	リ		
9			)	9	I	Y					ゥ	ケ	ノ	ル		
A				:	J	Z					ェ	コ	ハ	レ		
B			+		K						ォ	サ	ヒ	ロ		
C					L						ャ	シ	フ	ワ		
D			-		M						ュ	ス	ヘ	ン		
E					N						ョ	セ	ホ	゛		
F			/	?	O						ッ	ソ	マ	゜		

Blank cells indicate unavailable character codes.

4-2-4. TITLE POSITION Setting Command

Sets parameter for Title Position of Title/Position menu.
Enter title position values in decimal number.
"ERR" message is returned during alarm operations.

Byte	Parameter	Command	Description
1	Command code	M	
2		N	
3	Menu code	4	Title position setting
4	Display screen	0	FULL
		1	QUAD
5-6	Vertical position	(See table below)	Vertical line setting
7-8	Horizontal position		Horizontal line setting
9	End code	CR	
10		LF	

Title position setting range table

Display screen		Vertical position	Horizontal position
FULL	NTSC	00–13	00–36
	PAL	00–16	
QUAD	NTSC	00–08	00–13
	PAL	00–10	

4-2-5. DISPLAY Setting Command

Sets parameter for Display menu.
Enter setting values in decimal number.
"ERR" message is returned during alarm operations.

Byte	Parameter	Command	Description
1	Command code	M	
2		N	
3	Menu code	5	Display setting
4	Split screen setting (SXGA)	0	QUAD: quad screen
		1	V2: V 2 split screen (R/L)
5	Title display ON/OFF (SXGA)	0	OFF
		1	ON
6	Tally display ON/OFF (SXGA)	0	OFF
		1	ON
7	Border display ON/OFF (SXGA)	0	White (WHT)
		1	Black (BLK)
		2	None (OFF)
8	Split screen setting (Video)	0	QUAD: Quad screen
		1	V2-1: V 2 split screen (R/L)
		2	H2-1: H 2 split screen (T/B)
		3	V2-2: Reduced V 2 split screen
		4	H2-2: Reduced H 2 split screen
9	Title display ON/OFF (Video)	0	OFF
		1	ON
10	Mark display ON/OFF (Video)	0	OFF
		1	ON
11	Border display ON/OFF (Video)	0	White (WHT)
		1	Black (BLK)
		2	None (OFF)
12	End code	CR	
13		LF	

4-2-6. DISPLAY TYPE Setting Command

Sets channel assignment and display position for Display menu when 2 split screen display is selected for Display Type.
Enter setting values in decimal number.
"ERR" message is returned during alarm operations.

1) SXGA mode

Byte	Parameter	Command	Description
1	Command code	M	
2		N	
3	Menu code	6	Display Type setting
4	Output mode	0	SXGA mode
5	2 split screen type	1	V2: H 2 split screen
6–7	Sub-screen 1 Channel assignment	01–04	Channel no.: 1–4
8–9	Sub-screen 2 Channel assignment	01–04	Channel no.: 1–4
10	End code	CR	
11		LF	

2) Video mode (Reduced V 2 split screen or Reduced H 2 split screen)

Byte	Parameter	Command	Description
1	Command code	M	
2		N	
3	Menu code	6	Display Type setting
4	Output mode	1	Video mode
5	2 split screen type	3	V2-2: Reduced V 2 split screen
		4	H2-2: Reduced H 2 split screen
6–7	Sub-screen1 Channel assignment	01–04	Channel no.: 1–4
8–9	Sub-screen2 Channel assignment	01–04	Channel no.: 1–4
10	End code	CR	
11		LF	

3) Video mode (V 2 split screen or H 2 split screen)

Byte	Parameter	Command	Description
1	Command code	M	
2		N	
3	Menu code	6	Display Type setting
4	Output mode	1	Video mode
5	2 split screen type	1	V2-1: V 2 split screen (R/L)
		2	H2-1: H 2 split screen (T/B)
6-7	Sub-screen1 Channel assignment	01–04	Channel no.: 1–4
8-9	Sub-screen2 Channel assignment	01–04	Channel no.: 1–4
10–11	Sub-screen1 Display setting	See table below	1/2 screen position setting
12–13	Sub-screen2 Display setting	See table below	1/2 screen position setting
14	End code	CR	
15		LF	

1/2 screen Display image area setting range table

Screen type		Display setting
V2-1: Vertical 2 split screen		01–88
H2-1: Horizontal 2 split screen	NTSC	01–60
	PAL	01–72

IMPORTANT
"ERR" message is returned for assigning same channel to both sub-screens.

4-2-7. SYSTEM Setting Command

Sets parameters for System menu.
"ERR" message is returned during alarm operations.

Byte	Parameter	Command	Description
1	Command code	M	
2		N	
3	Menu code	7	System setting
4	Switch lock	0	OFF
		1	ON
5	Output mode	0	SXGA output
		1	Video output via LAN
		2	SXGA output & Video output via LAN *Available with optional software.
6	End code	CR	
7		LF	

4-2-8. Multicast Address / Port Setting Command

Sets the multicast address and port for LAN menu.
Enter setting values in decimal number.
"ERR" message is returned during alarm operations.

Byte	Parameter	Command	Description
1	Command code	M	
2		N	
3	Menu code	0	Multicast address and port setting
4	First octet	224 - 239	First octet setting
	Delimiter	. (dot)	
	Second octet	0 - 255	Second octet setting
	Delimiter	. (dot)	
	Third octet	0 - 255	Third octet setting
	Delimiter	. (dot)	
	Fourth octet	0 - 255	Fourth octet setting
	Delimiter	: (Colon)	
	Port number	1024 - 65535	Port number setting
	End code	CR	
		LF	

* The number of data bytes differs depending on set value of address or port.

IMPORTANT
The setting range for the multicast address is from "224.0.1.0" to "239.255.255.255". This operation is not supported for RS-232C interface.

4-3. Menu Setting Status Request Commands

4-3-1. TIME SETUP Setting Status Request Command

Requests the setting status of Time Setup parameters.
Setting values are given in decimal.

◆ ［**MR**］ **Request command**

Byte	Parameter	Command	Description
1	Command code	M	
2		R	
3	Menu code	1	TIME SETUP setting
4	End code	CR	
5		LF	

◆ ［**RS**］ **Response message**

Byte	Parameter	Message	Description
1	Command code	R	
2		S	
3	Menu code	1	TIME SETUP setting
4–5	Auto sequencing interval	01–60	1–60 seconds
6-7	Split screen auto reset time	00–60	00: OFF, 1–60 seconds
8–9	Alarm reset time	01–60	1–60 seconds
10–11	Video loss reset time	01–60	1–60 seconds
12	End code	CR	
13		LF	

4-3-2. ALARM/VIDEO LOSS Setting Status Request Command

Requests the setting status of Alarm/Video Loss parameters.

◆ ［**MR**］ **Request command**

Byte	Parameter	Command	Description
1	Command code	M	
2		R	
3	Menu code	2	Alarm/Video loss setting
4	End code	CR	
5		LF	

◆ ［**RS**］ **Response message**

Byte	Parameter	Message	Description
1	Command code	R	
2		S	
3	Menu code	2	Alarm/Video loss setting
4	Alarm input mode	0	Trigger input
		1	Level input
5	Alarm display mode	0	FULL
		1	SPLIT
6	Alarm ON/OFF (SXGA)	0	OFF
		1	ON
7	Video loss ON/OFF (SXGA)	0	OFF
		1	ON
8	Alarm ON/OFF (Video)	0	OFF
		1	ON
9	Video loss ON/OFF (Video)	0	OFF
		1	ON
10	End code	CR	
11		LF	

4-3-3. TITLE Setting Status Request Command

Request the setting status of Title parameters in Title/Position menu.

◆ ［MR］ **Request command**

Byte	Parameter	Command	Description
1	Command code	M	
2		R	
3	Menu code	3	Title setting
4–5	Title display channel	01–04	Channel no.: 1–4
6	End code	CR	
7		LF	

◆ ［RS］ **Response message**

Byte	Parameter	Message	Description
1	Command code	R	
2		S	
3	Menu code	3	Title setting
4	Title data	ASCII code (See section 4-2-3 Title Setting Command, Character Code Table 1st+2nd" for ASCII code)	1st character (from the left of the screen)
5			2nd character
6			3rd character
7			4th character
8			5th character
9			6th character
10			7th character
11			8th character
12	End code	CR	
13		LF	

4-3-4. TITLE POSITION Setting Status Request Command

Request the setting status of Title Position in Title/Position menu.
The setting values are given in decimal.

◆ 〔**MR**〕 **Request command**

Byte	Parameter	Command	Description
1	Command code	M	
2		R	
3	Menu code	4	Title position setting
4	Display screen	0	FULL
		1	QUAD
5	End code	CR	
6		LF	

◆ 〔**RS**〕 **Response message**

Byte	Parameter	Message	Description
1	Command code	R	
2		S	
3	Menu code	4	Title position setting
4–5	Vertical position	See table below	Vertical line setting
6–7	Horizontal position		Horizontal line setting
8	End code	CR	
9		LF	

Title position setting range table

Item code		Vertical position	Horizontal position
FULL	NTSC	00–13	00–36
	PAL	00–16	
QUAD	NTSC	00–08	00–13
	PAL	00–10	

28

4-3-5. DISPLAY Setting Status Request Command

Requests the setting status of Display parameters.
The setting values are given in decimal.

◆ ［**MR**］ **Request command**

Byte	Parameter	Command	Description
1	Command code	M	
2		R	
3	Menu code	5	Display setting
4	End code	CR	
5		LF	

◆ ［**RS**］ **Response message**

Byte	Parameter	Message	Description
1	Command code	R	
2		S	
3	Menu code	5	Display setting
4	Split screen setting （SXGA）	0	QUAD: quad screen
		1	V2: V 2 split screen (R/L)
5	Title display ON/OFF （SXGA）	0	OFF
		1	ON
6	Tally display ON/OFF （SXGA）	0	OFF
		1	ON
7	Border display ON/OFF （SXGA）	0	White (WHT)
		1	Black (BLK)
		2	None (OFF)
8	Split screen setting (Video)	0	QUAD: Quad screen
		1	V2-1: V 2 split screen (R/L)
		2	H2-1: H 2 split screen (T/B)
		3	V2-2: Reduced V 2 split screen
		4	H2-2: Reduced H 2 split screen
9	Title display ON/OFF (Video)	0	OFF
		1	ON
10	Mark display ON/OFF (Video)	0	OFF
		1	ON
11	Border display ON/OFF (Video)	0	White (WHT)
		1	Black (BLK)
		2	None (OFF)
12	End code	CR	
13		LF	

4-3-6. DISPLAY TYPE Setting Status Request Command

Request the setting status of channel assignments and display when Display Type in Display menu is set to 2-split screen.

◆ 〔**MR**〕 **Request command**

1) SXGA mode

Byte	Parameter	Command	Description
1	Command code	M	
2		R	
3	Menu code	6	Display type setting
4	Output mode	0	SXGA mode
5	Split screen type	1	V2-1: V 2 split screen (R/L)
6	End code	CR	
7		LF	

2) Video mode

Byte	Parameter	Command	Description
1	Command code	M	
2		R	
3	Menu code	6	Display type setting
4	Output mode	1	Video mode
5	Split screen type	1	V2-1: V 2 split screen (R/L)
		2	H2-1: H 2 split screen (T/B)
		3	V2-2: Reduced V 2 split screen
		4	H2-2: Reduced H 2 split screen
6	End code	CR	
7		LF	

◆ ［RS］ **Response message**

1) SXGA mode

Byte	Parameter	Message	Description
1	Command code	R	
2		S	
3	Menu code	6	Display type setting
4-5	Screen1 Channel setting	01–04	Channel no.: 1–4
6-7	Screen2 Channel setting	01–04	Channel no.: 1–4
8	End code	CR	
9		LF	

2) Video mode (Reduced V2 split screen or Reduced H2 split screen)

Byte	Parameter	Message	Description
1	Command code	R	
2		S	
3	Menu code	6	Display type setting
4-5	Screen1 Channel setting	01–04	Channel no.: 1–4
6-7	Screen2 Channel setting	01–04	Channel no.: 1–4
8	End code	CR	
9		LF	

3) Video mode (V2 split screen or H2 split screen)

Byte	Parameter	Message	Description
1	Command code	R	
2		S	
3	Menu code	6	Display type setting
4-5	Screen1 Channel setting	01–04	Channel no.: 1–4
6-7	Screen2 Channel setting	01–04	Channel no.: 1–4
8-9	Screen1 Display setting	See table below	1/2 screen view area setting
10-11	Screen2 Display setting		1/2 screen view area setting
12	End code	CR	
13		LF	

1/2 screen view area setting range table

Split screen type		Display setting
V2-1: V 2 split screen (R/L)		01–88
H2-1: H 2 split screen (T/B)	NTSC	01–60
	PAL	01–72

31

4-3-7. SYSTEM Setting Status Request Command

Requests the setting status of Display parameters.

◆ ［MR］**Request command**

Byte	Parameter	Command	Description
1	Command code	M	
2		R	
3	Menu code	7	System settings
4	End code	CR	
5		LF	

◆ ［RS］ **Response message**

Byte	Parameter	Message	Description
1	Command code	R	
2		S	
3	Menu code	7	System settings
4	Switch lock	0	OFF
		1	ON
5	Operation mode	0	SXGA output
		1	Video output via LAN
		2	SXGA output & Video output via LAN *Available with optional software.
6	Protocol	0	Standard protocol
		1	Previous protocol
7	Fan alarm status	0	No fan alarm
		1	Fan alarm
8-10	Software version	XXX	Software version (X.XX)
11-12	Hardware version	YYY	Hardware version (Y.YY)
13	End code	CR	
14		LF	

4-3-8. Multicast Address / Port Setting Status Request Command

Requests the setting status of Multicast address and port of LAN menu.
The setting values are given in decimal.

◆ 〔**MR**〕 **Request command**

Byte	Parameter	Command	Description
1	Command code	M	
2		R	
3	Menu code	0	Multicast address and port setting
4	End code	CR	
5		LF	

◆ 〔**RS**〕 **Response message**

Byte	Parameter	Message	Description
1	Command code	R	
2		S	
3	Menu code	0	Multicast address and port setting
*	First octet	224 - 239	First octet setting
	Delimiter	. (dot)	
	Second octet	0 - 255	Second octet setting
	Delimiter	. (dot)	
	Third octet	0 - 255	Third octet setting
	Delimiter	. (dot)	
	Fourth octet	0 - 255	Fourth octet setting
	Delimiter	: (Colon)	
	Port number	1024 - 65535	Port number setting
	End code	CR	
		LF	

* The number of data bytes differs depending on set value of address or port.

IMPORTANT
This operation is not supported for RS-232C interface.

33

5. Control Command (Previous Model Protocol)

5-1. Full Screen Display Command

Shows channels assigned to Video output in full screen mode.
With normal reception and processing, the response message is "ACK".
"NAK" message is returned during MENU screen display.

Byte	Parameter	Command	Description
1	Start code	STX	(HEX: 02H)
2	Command code	S	
3		F	
4	Camera channel	1–4	Channel no.: 1–4
5	End code	ETX	(HEX: 03H)

5-2. Quad Screen Display Command

Shows channels assigned to Video output in quad screen mode.
With normal reception and processing, the response message is "ACK".
"NAK" message is returned during MENU screen display.

Byte	Parameter	Command	Description
1	Start code	STX	(HEX: 02H)
2	Command code	S	
3		4	
4	End code	ETX	(HEX: 03H)

5-3. 2-Split Screen Display Command

Shows channels assigned to Video output in 2-split screen type.
With normal reception and processing, the response message is "ACK".
"NAK" message is returned during MENU screen display.

Byte	Parameter	Command	Description
1	Start code	STX	(HEX: 02H)
2	Command code	S	
3		D	
4	Split screen type	1	V2-1: V 2 split screen (R/L)
		2	H2-1: H 2 split screen (T/B)
5	End code	ETX	(HEX: 03H)

5-4. Auto Sequencing Start Command

Initiates auto sequencing full screen display of Video output.
With normal reception and processing, the response message is "ACK".
"NAK" message is returned during MENU screen display or alarms.

Byte	Parameter	Command	Description
1	Start code	STX	(HEX: 02H)
2	Command code	S	
3		A	
4	Screen	F	Full screen auto sequencing
5	End code	ETX	(HEX: 03H)

5-5. 1/2 Screen View Area Setting Command

Sets areas on original outputs to be displayed in the 1/2 screens.
Initiates auto sequencing full screen display of Video output.
With normal reception and processing, the response message is "ACK".
"NAK" message is returned during MENU screen display or when received split screen type command is inappropriate.

Byte	Parameter	Command	Description
1	Start code	STX	(HEX: 02H)
2	Command code	D	
3		M	
4	Split screen type	1	V2-1: V 2 split screen (R/L)
		2	H2-1: H 2 split screen (T/B)
5-6	Screen1 Display setting	See table below	1/2 screen view area setting
7-8	Screen2 Display setting		1/2 screen view area setting
9	End code	ETX	(HEX: 03H)

1/2 screen view area setting range table

Split screen type		Display setting
V2-1: V 2 split screen (R/L)		01–88
H2-1: H 2 split screen (T/B)	NTSC	01–60
	PAL	01–72

5-6. Alarm Reset Command

Resets the alarm reset. However, external alarm reset is enabled only when the input setting is "TRIG."
With normal reception and processing, the response message is "ACK."
"NAK" message is returned during MENU screen display.

Byte	Parameter	Command	Description
1	Start code	STX	(HEX: 02H)
2	Command code	A	
3		R	
4	End code	ETX	(HEX: 03H)

6. Status Requests (Previous Protocol)

6-1. Screen Display Status Request Command

Requests the status of current video output.
"NAK" message is returned during MENU screen display.

◆ ［**?G**］ **Request command**

Byte	Parameter	Command	Description
1	Start code	STX	(HEX: 02H)
2	Command code	?	
3		G	
4	End code	ETX	(HEX: 03H)

◆ **Response message**

Byte	Parameter	Message	Description
1-2 or 1-3	Status message	SF1–SF4	Full screen CH1–4
		S4	Quad split screen
		SD1	V2-1: V 2 split screen (R/L)
		SD2	H2-1: H 2 split screen (T/B)
		SD3	V2-2: Reduced V 2 split screen
		SD4	H2-2: Reduced H 2 split screen
		SAF	Full screen auto sequencing

6-2. Display Mode Status Request Command

Requests the status of current display mode.

◆ 〔**?M**〕 **Request command**

Byte	Parameter	Command	Description
1	Start code	STX	(HEX: 02H)
2	Command code	?	
3		M	
4	End code	ETX	(HEX: 03H)

◆ **Respose message**

Byte	Parameter	Message	Description
1-2	Display Mode	MD	Standard mode
		MS	MENU mode
		MA	Alarm display mode

6-3. 1/2 Screen View Area Request Command

Requests the status of current 1/2 screen view area setting. With normal reception and processing, the response message is "ACK". "NAK" message is returned during MENU screen display or when received split screen type command is inappropriate.

◆ 〔**?M**〕 **Request command**

Byte	Parameter	Command	Description
1	Start code	STX	(HEX: 02H)
2	Command code	?	
3		D	
4	Split screen type	1	V2-1: V 2 split screen (R/L)
		2	H2-1: H 2 split screen (T/B)
5	End code	ETX	(HEX: 03H)

◆ **Response message**

Byte	Parameter	Message	Description
1	Command code	D	
2	Split screen type	1	V2-1: V 2 split screen (R/L)
		2	H2-1: H 2 split screen (T/B)
3-4	Screen1 Display setting	See table below	1/2 screen view area
5-6	Screen2 Display setting		1/2 screen view area

1/2 screen view area range table

Split screen type		Display setting
V2-1: V 2 split screen (R/L)		01–88
H2-1: H 2 split screen (T/B)	NTSC	01–60
	PAL	01–72

Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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