SONY

CAMERA CONTROL NETWORK ADAPTOR

CNA-1

TECHNICAL MANUAL English

1st Edition (Revised 2)

Table of Contents

Overview

Abstract

CNA-1 is a network point that works as a “Protocol converter”. It acts as an entrance to the Sony Camera Network System (CNS).
Your system can control a Sony Camera, and can be controlled from Sony Control Panels via CNA-1 with its communication protocol.

How does the CNA-1 work?

CNA-1 participates in CNS as another “Sony protocol capable” device.
It can talk to your system with a simple command protocol (Sony Simple Camera Protocol: SSCP), providing a simple communication mechanism for your system.
It mutually translates the protocol for a Sony Camera to SSCP.

Terminology

CNS: Sony Camera Network System

A network system consisting of Sony Cameras (Sony CCUs) and Sony Control Panels, connected to each other via TCP/IP.

SPP: Sony Proprietary Protocol

A communication protocol used by CNS devices.

SSCP: Sony Simple Camera Protocol

A communication protocol between CNA-1 and your system.

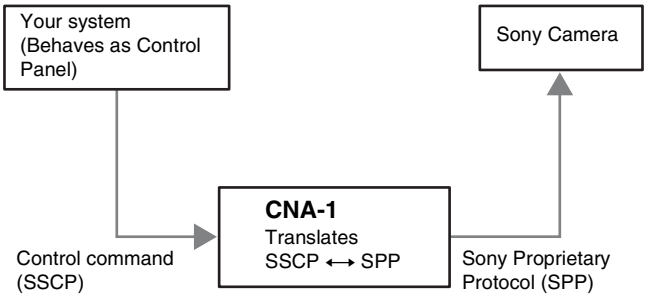
RCP-mode, CAM-mode:

An emulation mode of CNA-1.
CNA-1 acts as a Sony Control Panel in RCP-mode.
CNA-1 acts as a Sony Camera in CAM-mode.
This configuration can be selected using the Web configurator of CNA-1.

Application example

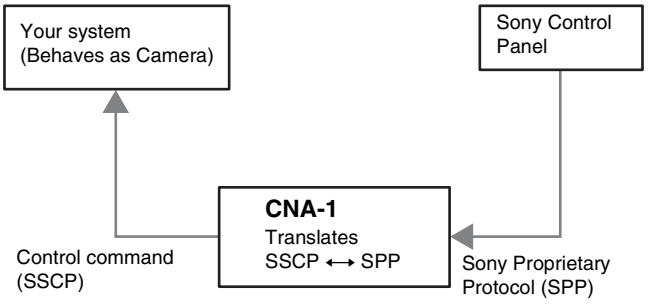
Sony camera control application

In this application, your system behaves as a controller for a Sony Camera.
Your system can control a Sony Camera via CNA-1 (RCP-mode configured) with SSCP.



Your system participates in CNS as “Sony Camera”

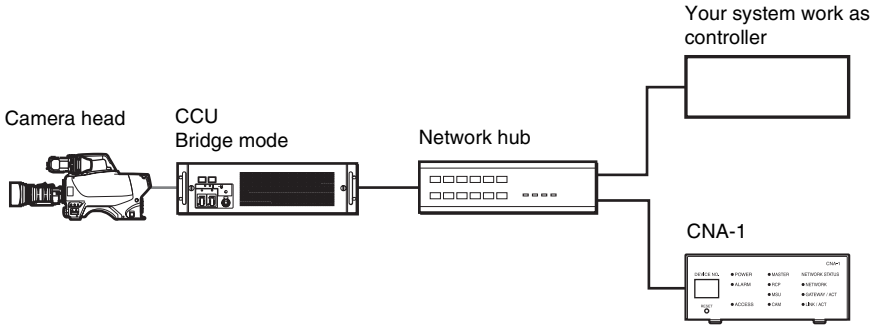
In this application, your system may behave as a Camera or other device similar to a camera.
Your system can be controlled from Sony Control Panels via CNA-1 (CAM-mode configured) with SSCP.



CNA-1 Configuration

Examples of system configurations

One camera control by your system

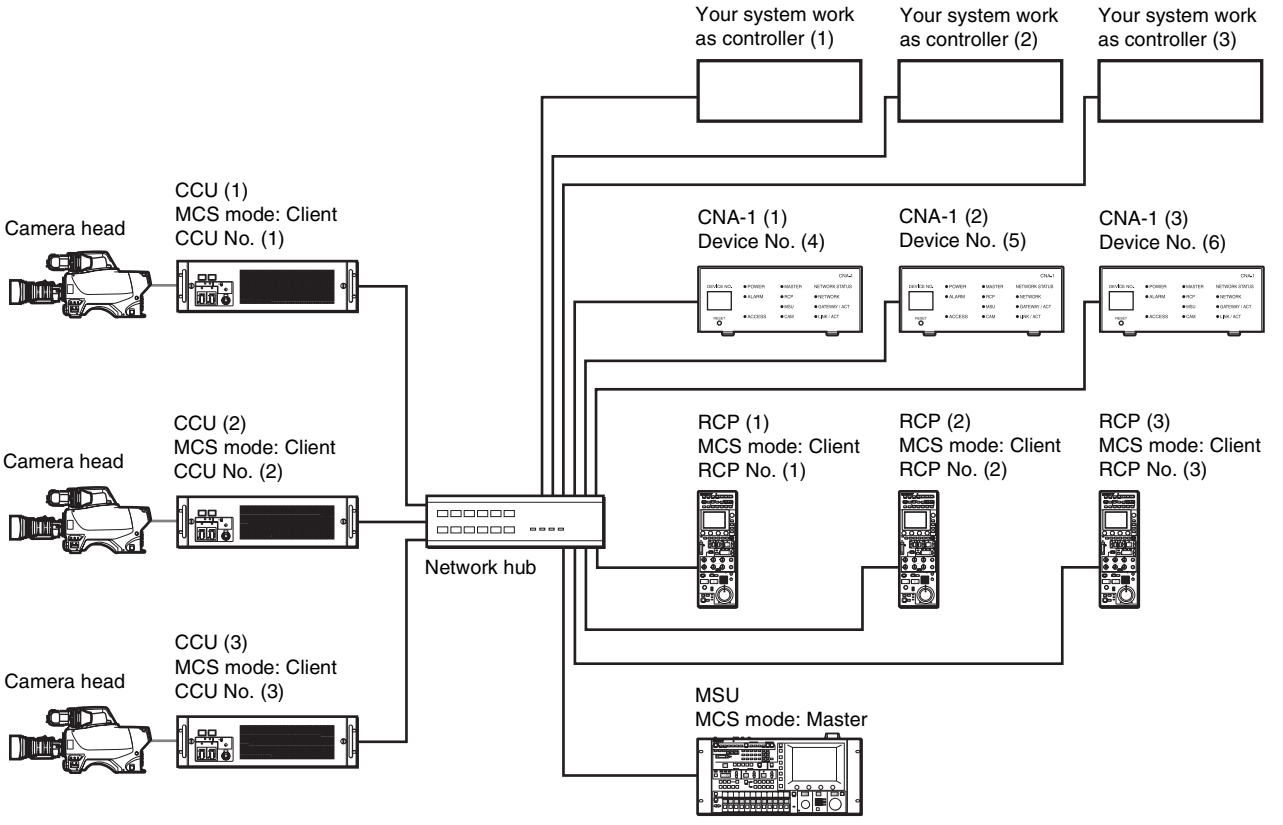


CNA-1 setup

For details of the following setting items, see “Operation Manual (page 17).”

CNS Configuration	CNS Mode	Bridge
	Master Mode	Disable
	Master IP Address	Variable
	Target IP Address	CCU’s IP Address
	Device No.	Variable
Gateway Configuration	Gateway Mode	Enable
	Emulation Mode	RCP

Multiple camera control application with your system



CNA-1 setup

For details of the following setting items, see “Operation Manual (page 17).”

CNS Configuration	CNS Mode	MCS
	Master Mode	Disable
	Master IP Address	Master MSU’s IP address
	Target IP Address	Variable
	Device No.	Depends on RCPs connected to the network.
Gateway Configuration	Gateway Mode	Enable
	Emulation Mode	RCP

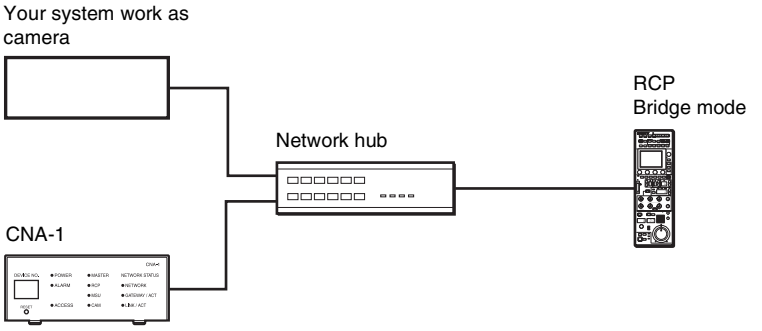
Device No. Configuration for CNA-1

In this case, Device number of CNA-1 must be set to different number from RCPs connected to the network. CNA-1 will be recognized as one of RCP and CNA-1’s Device number is handled as RCP number in CNS.
In default setting of RCP assignment, RCP can control CCU (and camera) which has same number from RCP number.

Ex. RCP No. (1) can control CCU No. (1)

CNA-1 (1)-(3) has Device number (4)-(6). In this setting, CNA-1 cannot control any CCU (and camera) (4)-(6) because CCU (4)-(6) is not connected in this network.
For control (1)-(3) camera by CNA-1 (1)-(3), CNA-1 must be assigned to CCU (and camera) (1)-(3) by RCP assignment function provided from MSU. MSU will find CNA-1 as RCP (4)-(6).
For detail of RCP assignment function, see MSU’s Operation Manual.

Your system controlled by Sony RCP peer-to-peer



CNA-1 setup

For details of the following setting items, see “Operation Manual (page 17).”

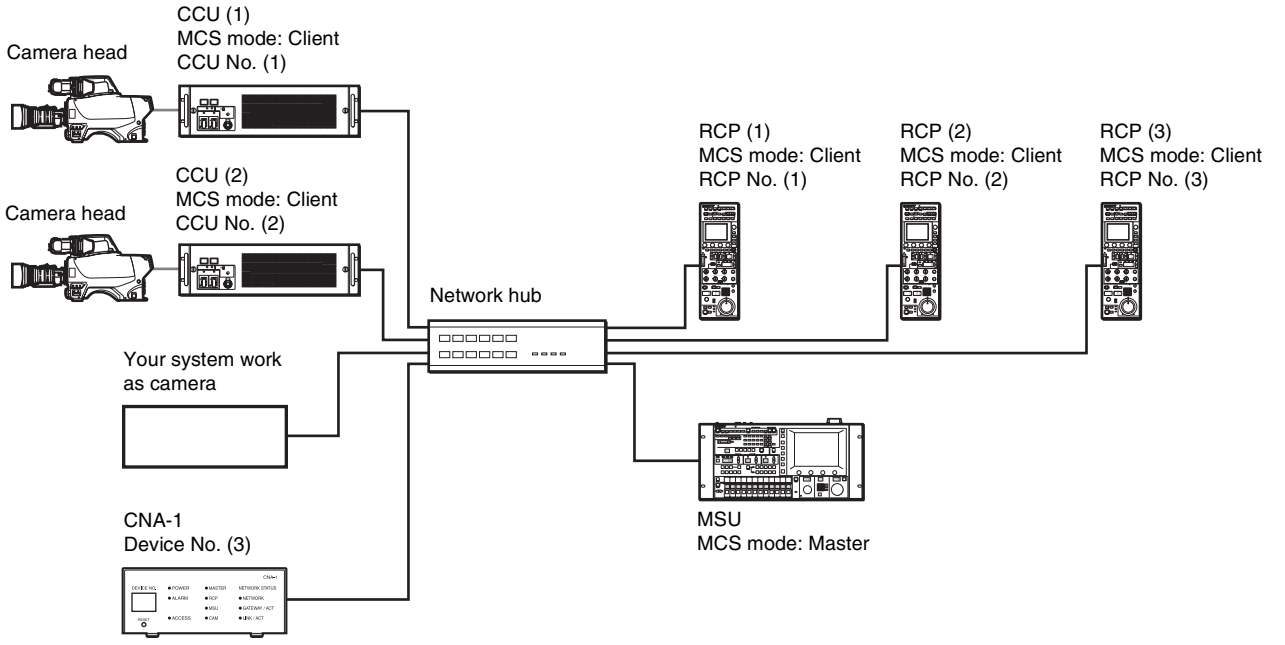
CNS Configuration	CNS Mode	Bridge
	Master Mode	Disable
	Master IP Address	Variable
	Target IP Address	Variable
	Device No.	Variable
Gateway Configuration	Gateway Mode	Enable
	Emulation Mode	CAM

RCP setup

For details of the following setting items, see RCP’s Operation Manual.

CNS Configuration	CNS Mode	Bridge
	Bridge Mode: Connection mode	Semi-Auto
	Bridge Mode: Target	CNA-1’s IP address

Your system participates in CNS as one of Sony camera



CNA-1 setup

For details of the following setting items, see “Operation Manual (page 17).”

CNS Configuration	CNS Mode	MCS
	Master Mode	Disable
	Master IP Address	Master MSU’s IP address
	Target IP Address	Variable
	Device No.	Depends on CCUs connected to the network.
Gateway Configuration	Gateway Mode	Enable
	Emulation Mode	CAM

Device No. Configuration for CNA-1

In this case, Device number of CNA-1 must be set to different number from CCUs connected to the network. CNA-1 will be recognized as one of camera and CNA-1’s Device number is handled as CCU number in CNS.
CNA-1’s Device number is set to (3). Therefore, MSU can find CNA-1 as Camera (3) and also RCP (3) can control CNA-1 as Camera (3).

System/Command log configuration

CNA-1 can record system event log and SSCP command log. This utility function assists you to develop and validate software for your system.

Log format

CNA-1 records log using Syslog format.

To display the Log menu

Access to the following URL by a PC with its web browser.

"http://(CNA-1's IP address)/admin/log.html"

For details on how to access the menu, see "Operation Manual (page 16)"

Log menu

1 Log Configuration

System Log:

Set the log function to on/off

Command Log:

Set the SSCP command log function to on/off

Log Level:

Select the minimum message severity level to record in CNA-1

* If you plan to record command log, do not set the level to "Notice" or higher.

Show All System Log button:

Click to show all system log and command log stored in CNA-1's RAM.

Show All Command Log button:

Click to show only command log stored in CNA-1's RAM.

* If there is a large amount of log stored in RAM, displaying log list operation may take long time depending on the network and performance of the PC.

2 Log Storage Configuration

Storage:

Select storage for log.

Next File every ** KB, Ring buffer with ** Files:

Select log rotation number and size of file.

Eject button:

Eject the inserted USB flash drive.

3 Sever Log

Server Log:

Set the Server log function to on/off

Server IP Address:

Set the IP address of a server which can receive log from CNA-1.

Server UDP Port:

Set the UDP port of a server.

Notes on using USB flash drive

- Do not operate CNA-1 with USB flash drive.
  USB flash drive is development use only.
  Log processing with USB flash drive may interfere with CNA-1's SSCP connection if an inserted USB flash drive has some malfunction or does not have enough capability of data writing speed.
- Sony USB flash drive USM*GLX series are recommended.
  USB drives other than those recommended may not be recognized when connected to the USB connector.
  USB drives must be formatted with the FAT16 or FAT32 file system. Recommended Sony USB drives are preformatted, and can be used without any prior setup.

Sony Simple Camera Protocol

Introduction

Overview

Sony Simple Camera Protocol (SSCP) is a communication protocol between your system and CNA-1. It is an ASCII character based protocol via TCP/IP. The port number of TCP is configurable.
It has no complex mechanism such as Application-level session control, Keep-alive, Device identification or Authentication. Therefore, your system can control Sony Cameras, or can be controlled from Sony Control Panels, using just send/receive command(s) without any complex procedure.

Overall operation

Basically, CNA-1 listens to a specified TCP port and awaits a connection from your system. When a connection is established, CNA-1 is ready to send and receive control commands immediately.
The connection behavior varies based on its emulation mode. (See connection section.)

Specification

Network

Link layer:
Ethernet, 100BASE-TX
Network layer:
IPv4
Transport Layer:
TCP
Port number is configurable other than 7700 (CNA-1 reserved) or well known ports (1-1023)

Data structure

Packet:
Variable length depends on MTU configuration.
MTU value of CNA-1 is 1500 bytes. It is preferred that MTU of your system is configured less than 1500.
Data:
ASCII character codes:
- Available ASCII printable characters:
  – Lower alpha: “a” .. “z”
  – Higher alpha: “A” .. “Z”
  – Digit: “0” .. “9”
  – Others: “,” (comma)
- Available ASCII control characters:
  – New line: “\n”, “\r”

Note

If a packet includes unavailable characters or bytes, it is handled as an invalid packet and discarded.

Command

A command is described by Hexadecimal data assembled by ASCII characters above.

Lower and upper case alphabetical/numeric:
2 characters requires 1 byte
Comma:
Delimiter of each byte
New line:
Termination of a command, “\n”, “\r” and “\n\r” are available.

Example: (Set Master Black to 0):
“23,a9,00,00\n”

Constructing a command by multi-packet is possible.
Example:
“23,” Packet1
“a9” Packet2
“,00,00” Packet3
“\n” Packet4
CNA-1 will concatenate packets (1-4) and recognize that as “23,a9,00,00\n”.

Multiple commands in a packet is possible.
Example (Set White Balance R-ch, G-ch, B-ch to 0 at the same time):
“23,01,00,00\n23,02,00,00\n23,03,00,00\n”

Important limitation

Maximum command length: 168 byte (characters) / packet
If CNA-1 cannot find the terminator (New line) after it receives 168 bytes, it will discard the received data.
Minimum inter-packet (including complete command(s)) interval: 50 msec
This limitation is important to avoid Camera malfunctions. An overly short inter-packet gap can impose a heavy load on a Camera’s processor, and interfere with its processing. It is possible that unexpected Camera errors might occur.
If your system needs to send a number of commands, the commands must be concatenated and put in a packet.
In an application including periodic scan for Camera status, it is recommended that the inter-packet-interval is set to as long as possible, for effective Camera operation.
Terminator:
CNA-1 only sends “\n” as terminator even if it receives “\r” and “\n\r”.

Connection

CNA-1 configured for RCP mode

1 CNA-1 searches for a Sony Camera or Sony CCU by CNS configuration.

2 When CNA-1 connects to that, CNA-1 listens to specified TCP port and awaits a connection from your system.

3 Your system ready to connect to CNA-1

Note

If CNA-1 loses its CNS connection (to Camera or CCU), it terminates the connection with your system, and returns to (1).

CNA-1 configured for CAM mode

1 After booting CNA-1, it listens to the specified TCP port, and awaits connection from your system immediately.

2 Your system connects to CNA-1.

3 When connection is established, CNA-1 searches a CNS by its configuration and participate in CNS as one of a Sony Camera.

Note

If CNA-1 loses connection with your system, it closes the session to CNS, and returns to (1).

Examples of using commands

For details of commands, see “Details of Command” and “List of available commands”.

Master Gain control (Inc/Dec command)

Get current Gain value

Send: “20,01,00\n” => Receive: “21,01,02\n” (Reply current status from Camera)

Increase Gain

Send: “21,01,80\n” => Receive: “21,01,03\n” (in case of current parameter being 02)

Reduce Gain

Send: “21,01,40\n” => Receive: “21,01,01\n” (in case of current parameter being 02)

Set Gain value directory

Send: “21,01,01\n” => Receive: “21,01,01\n”

Control several Camera functions (Bit command)

Get current function states (ON or OFF) at CHU_FUNCTION01

Send: “20,81,00\n” => Receive: “21,81,31\n” “31” is handled as bits-array: “00110001” means:

- Knee Saturation (Bit7) = OFF
- Auto Knee (Bit6) = OFF
- Knee (Bit5) = ON
- Gamma (Bit4) = ON
- Flare (Bit3) = OFF
- S-EVS (Bit2) = OFF
- ECS (Bit1) = OFF
- Shutter (Bit0) = ON

Invert function states

Send: “20,81,33\n” (00110011) => Receive: “21,81,02\n” (in above condition)

- Knee Saturation (Bit7) = OFF (0 no operation)
- Auto Knee (Bit6) = OFF (0 no operation)
- Knee (Bit5) = OFF (1 ON to OFF)
- Gamma (Bit4) = OFF (1 ON to OFF)
- Flare (Bit3) = OFF (0 no operation)
- S-EVS (Bit2) = OFF (0 no operation)
- ECS (Bit1) = ON (1 OFF to ON)
- Shutter (Bit0) = OFF (1 ON to OFF)

Set function states

Send: “21,81,31\n” (00110001) => Receive: “21,81,31\n” (in above condition)

- Knee Saturation (Bit7) = OFF
- Auto Knee (Bit6) = OFF
- Knee (Bit5) = ON
- Gamma (Bit4) = ON
- Flare (Bit3) = OFF
- S-EVS (Bit2) = OFF
- ECS (Bit1) = OFF
- Shutter (Bit0) = ON

Set function status with bit-mask

Send: “29,81,03,11\n” (00000011 & 00010001) =>
Receive: “21,81,21\n” (in above condition)

- Knee Saturation (Bit7) = OFF (0-0 no operation)
- Auto Knee (Bit6) = OFF (0-0 no operation)
- Knee (Bit5) = ON (0-0 no operation)
- Gamma (Bit4) = OFF (0-1 Effective OFF)
- Flare (Bit3) = OFF (0-0 no operation)
- S-EVS (Bit2) = OFF (0-0 no operation)
- ECS (Bit1) = OFF (1-0 no operation)
- Shutter (Bit0) = ON (1-1 Effective ON)

Control White Balance R-Channel of Camera (Word command)

Get current value

Send: “22,01,00,00\n” => Receive:“23,01,01,40\n”
Current value is “01,40” = 0x0140 (16bits Hex)

Add/Subtraction control

Send: “22,01,00,01\n” => Receive: “23,01,01,41\n” (Add +0001)
Send: “22,01,ff,ff\n” => Receive: “23,01,01,3f\n” (Subtraction -0001)

Set value directory

Send: “23,01,00,01\n” => Receive: “23,01,00,01\n”

Details of Command

Command has 2 parts, “Command group: CMD-GP” and “Parameter: PARAM”.
CMD-GP is a byte at the head of a command. PARAM is one or a number of bytes describing the contents of a command. The length of PARAM is dependent on CMD-GP.

“[CMD-GP],[PARAM0],[PARAM1],[PARAM2],...,[PARAM N]\n”

Example: “23,a9,00,00\n”

CMD-GP: “23”

Adjust the word-size parameter of Camera

PARAM: “a9,00,00”

PARAM0:

“a9” Parameter address of Master Black of Camera

PARAM1-2:

“00,00” 2 bytes parameter value of Master Black (PARAM0)

Types of the command

There are several types of commands and formats, depending on CMD-GP or combination of CMD-GP and PARAM0.

[CMD-GP]:
Categorizes a command into “Byte type”, “Word type”, “Other type”, and appends a control method “Relative” or “Absolute”
[CMD-GP] + [PARAM0]:
Categorizes “Byte type command” into “Byte command”, “Bit command”, “Inc/Dec command”

Almost all commands have two different control types: “Relative” and “Absolute” assigned to a different CMD-GP (see the List of available commands)

Example: Master Black control
- Relative control: “22,a9,00,01\n” This command “adds” 0x0001 to the current parameter
- Absolute control: “23,a9,00,01\n” This command “sets” 0x0001 to the parameter (overwrite)

Byte command

Controls or Queries a byte-size parameter of a Camera.

Format:
- “[CMD-GP],[PARAM0],[PARAM1]\n”
- PARAM0: Parameter address
- PARAM1: Value

Relative control:
It means a status query.
PARAM1 is ignored and does not affect the status of the Camera.

Absolute control:
Set the parameter of Camera specified by the PARAM0 address to PARAM1, or a response of the value of the parameter from the Camera.

Bit command

Controls or Queries the ON or OFF state of a function of a Camera using bit (0 or 1).

Format:
- “[CMD-GP],[PARAM0],[PARAM1]\n”
- PARAM0: Parameter address
- PARAM1: Value affects each bit

Relative control:
Inverts the function state specified by the PARAM0 address ON to OFF, or OFF to ON when bit is set to 1. If PARAM1 bits are all set to 0, it means a status query.

Absolute control:
Set the state at the PARAM0 address to PARAM1 or a response of the value of the parameter from the Camera.

Inc/Dec command

Increments or decrements a Camera parameter and also adjusts a value directory.

Format:
- “[CMD-GP],[PARAM0],[PARAM1]\n”
- PARAM0: Parameter address
- PARAM1: Value

PARAM1
bit7-6: Inc/Dec control
[00] Set a value directory or status query
[01] Increment the parameter specified by the PARAM0 address
[10] Decrement the parameter specified by the PARAM0 address
[11] N/A
bit5-0: Value of the parameter

Relative control:
bit5-0 is ignored.
bit7-6 [00] or [10] or [01]: Parameter (bit5-0) query.
bit7-6 [11]: Maximum value query for the parameter (bit5-0).

Absolute control:
bit7-6:
[00]: Set the parameter specified by the PARAM0 address to bit5-0.
[01]: Decrement the parameter. bit5-0 is ignored.
[10]: Increment the parameter. bit5-0 is ignored.
[11]: Maximum value reply from a Camera. Do not use this bit pattern to control.
bit5-0: Value of the parameter.

Word command

Adjust a word-size parameter of a Camera, or status response of it.

Format:
“[CMD-GP],[PARAM0],[PARAM1],[PARAM2]\n”
PARAM0: Parameter address
PARAM1-2: Value 16bit
PARAM1: Higher byte
PARAM2: Lower byte

Relative control:
PARAM1-2 [0x0000]:Parameter query.
[Others]: Add PARAM1-2 to the current parameter.

Absolute control:
Set the parameter to PARAM1-2.

Other command

Depends on CMD-GP, details are described in the list of commands.

Rules

Request and Response

Requests and response correspond loosely.
There is no one to one mapping between requests and responses: “No reply” means “I can’t process such a command”.
Do not send anything if an error has occurred. Errors must be handled the same as “No command”.

Responses from a Camera can be sent to your system anytime without a request from your system. The status of Camera can be changed by itself (Auto iris function, etc.), changed by a camera operator’s hand manually or changed by another control panel connected to the Camera. The Camera sends status changes to all connected controllers.
Your system can ignore any responses not needed by your system.

When to send

In the case of your system working as a controller for a Camera, your system should send a parameter query that it want to get.
Almost Sony Camera only send status when its status is changed by receiving commands or its function (ex. automatic iris control or etc.).
The status of your system can be updated by receiving status responses from a connected Sony Camera by sending status queries to that Camera (via CNA-1).

In another case, your system works as a Camera among CNS, your system should send commands when its status is changed (must behave like a Sony Camera). The commands must be absolute commands in this case.
If Sony control panels receive no absolute command responses from your system, they cannot update their status and also cannot update the displays.
Therefore, the absolute command responses from your system are necessarily for the control system.

Permission control (Panel Active control)

CNS supports operating multiple cameras by multiple control panels. In case of using the Panel Assign Function, control panels are assigned to Cameras by a CNS Master device, such as MSU.
The assignment function allows duplicate assignment, meaning one camera can be controlled by two or more control panels. Control conflicts can occur in this case. Therefore, permission control for the Camera is determined by the CNS Master device, using Panel Active command.
If a network system with your system requires permission control, your system should use Panel Active command and your system’s Panel Active state should be controlled by the CNS Master device because CNA-1 behaves in the same way as the Sony Control Panel in RCP-mode.
In a single connection (CNA-1 configured Bridge mode of CNS setting), the permission control is managed by CNA-1 itself.

Permission allows your system to send all available commands. Without permission, your system can send only Status Query commands (Control commands are rejected). Permission control does not regulate receiving commands.

When your system receives permission using Panel Active command, another control panel assigned to the same Camera loses permission.
If your system does not want to affect the permission of another control panel, your system can use Para command instead of Panel Active command. Usage of Para command is the same as Panel Active command. However, permission by Para command does not allow controlling of Iris, Master Black and sending Absolute Word command.

A configuration of CNA-1 “Panel Active Function Enable/ Disable” enables this permission control function. If Panel Active Function is enabled, CNA-1 manages Panel Active state and your system can use Panel Active/ Iris Active/ Para commands. If the function is disabled, CNA-1 rejects these commands.

Permission control is not necessarily in the network system. Your system can ignore that and can send command if CNA-1 configured “Panel Active Disable (default)”. However, if a duplicate assignment is set to CNA-1 and another control panel, conflict can occur between other control panels in the no permission control state. Especially, Absolute type commands will certainly conflict, and erratic Camera behavior can occur. For this reason, pay close attention to Absolute type commands

Panel active command examples:

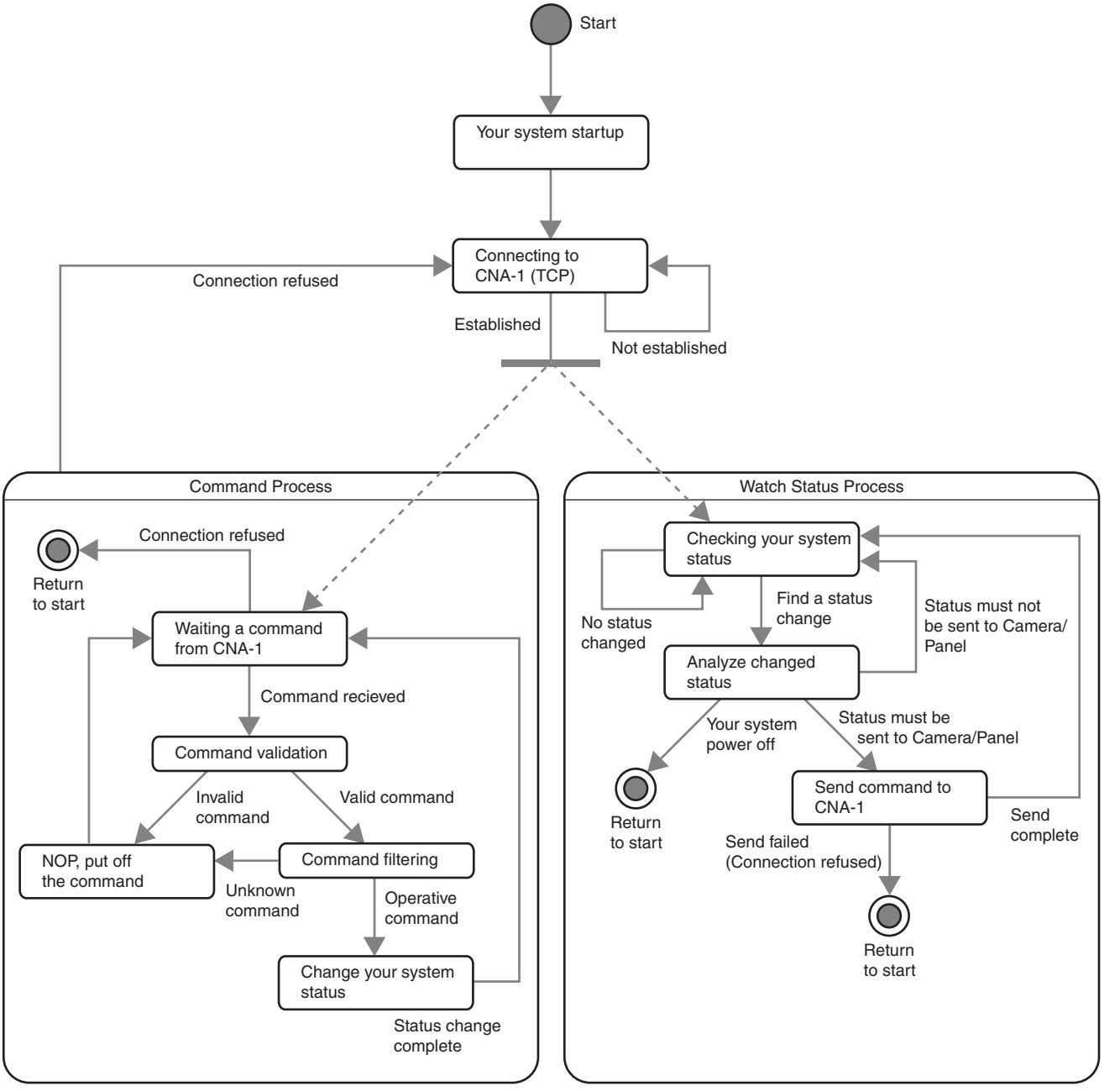
Get current permission state
- Send: “0b,90,01,00\n” => Receive: “0b,XX,01,81\n”
  XX is ID of Master device. Value “81” means sender (your system) has No permission
- Send: “0b,90,01,00\n” => Receive: “0b,XX,01,82\n”
  XX is ID of Master device. Value “82” means sender (your system) has permission to control

Require the permission
- Send: “0b,90,01,02\n” => Receive: “0b,XX,01,81\n” or “0b,XX,01,82\n”

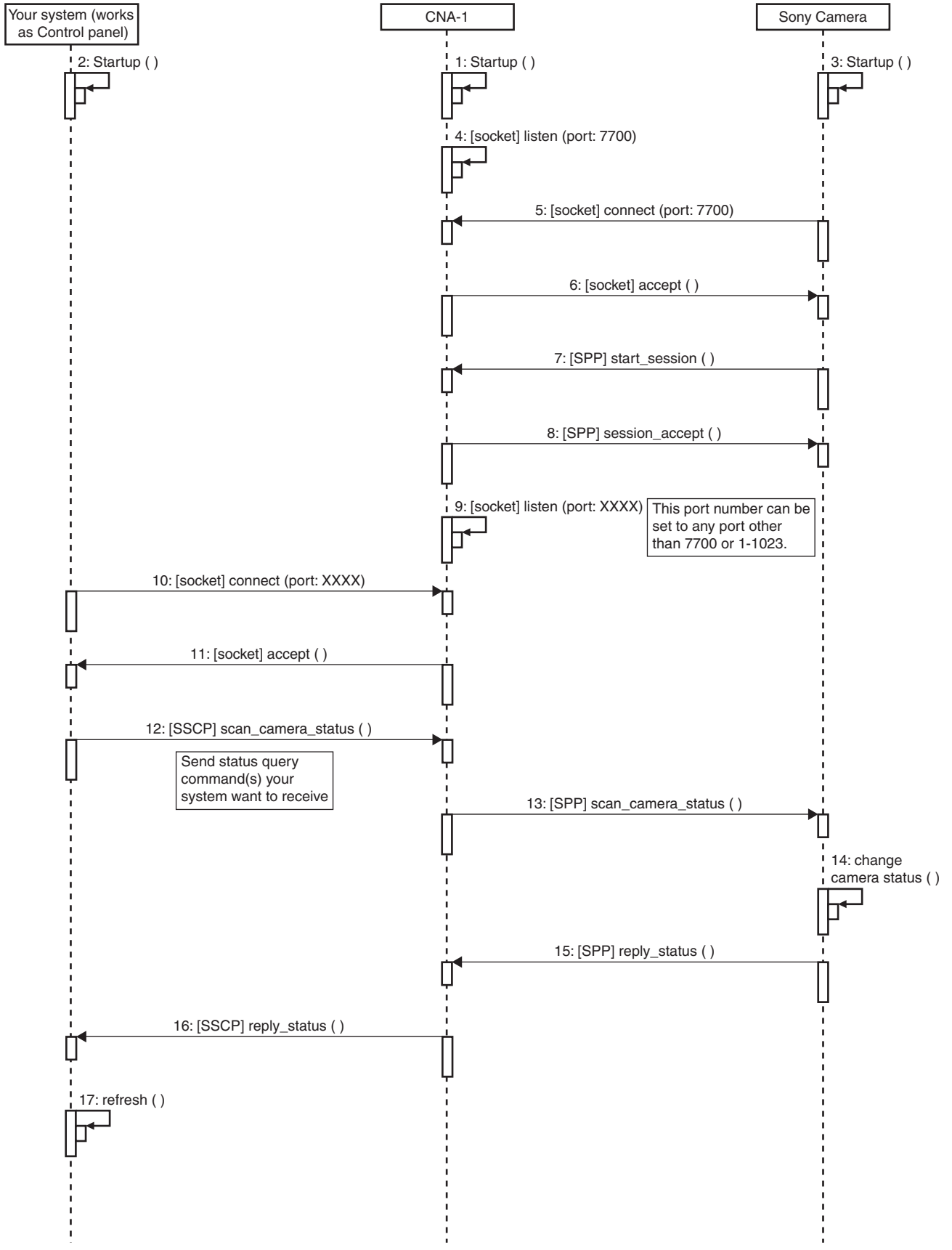
Release the permission
- Send: “0b,90,01,01\n” => Receive: “0b,XX,01,81” or “0b,XX,01,82\n”

Appendix

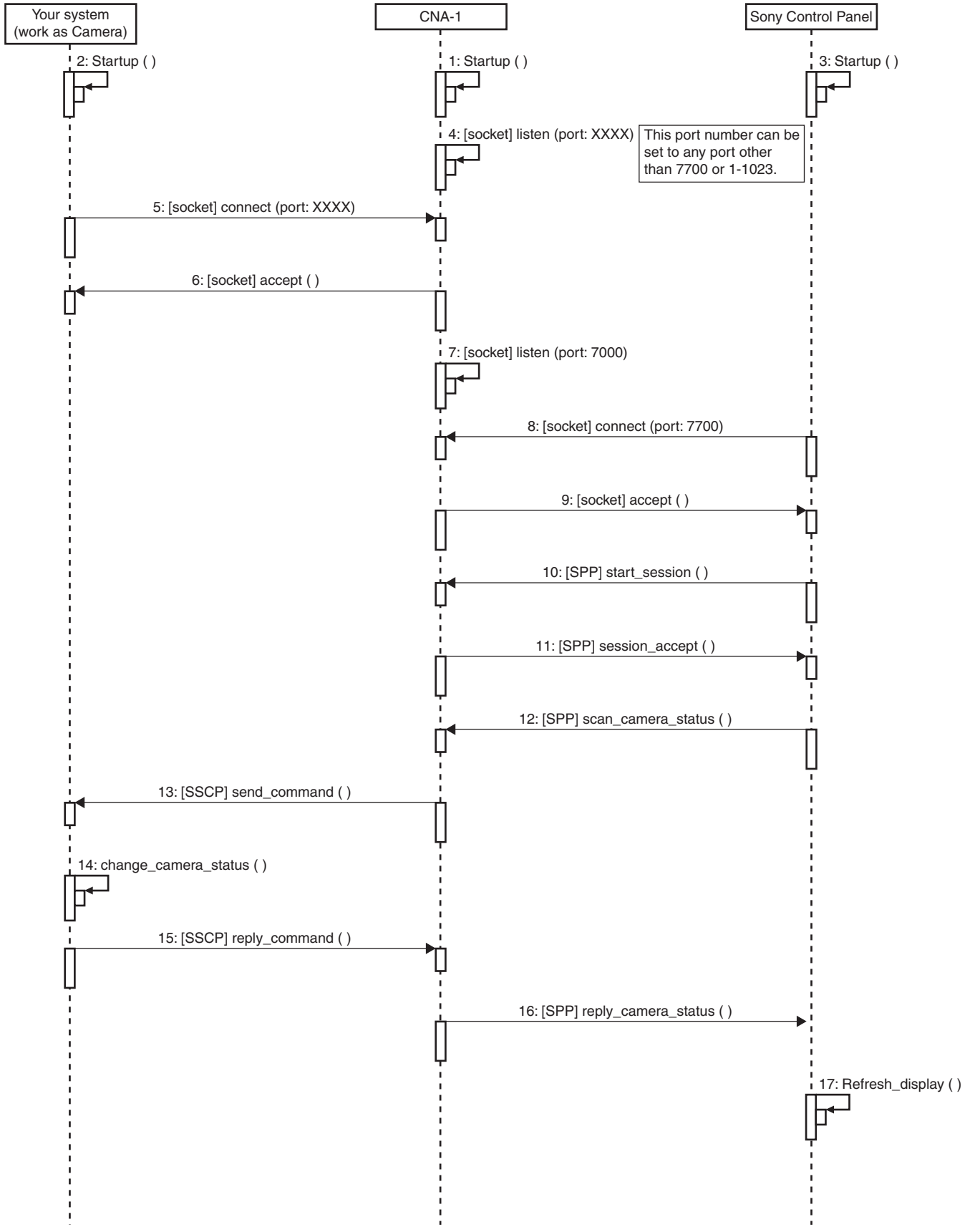
Example of State Machine diagram for your system



Example of Startup Sequence (your system works as Controller)



Example of Startup Sequence (your system works as Camera)



Extended commands of Optional Software

By installing optional software on CNA-1, you can use extensional commands in addition to the standard commands described in the list of commands. To purchase an optional software, consult with qualified Sony personnel.
This chapter describes the extended functions and the specifications of the commands of the optional software HZC-MSCN1 and HZC-RACN1.

Multi camera control (HZC-MSCN1)

Abstract

CNA-1 supports Multiple Camera Control by an optional software HZC-MSCN1 that enables “MSU-mode” of Emulation mode. In MSU-mode, CNA-1 works as a Sony MSU in Camera Network System to handle multiple control sessions between CNA-1 and cameras.
A control session is provided by CNA-1 as single TCP/IP session for your system. It is the same session control procedure as RCP-mode.
Multiple camera control methods are provided as “Camera Selection” and “Command Destination Control” by CNA-1 in MSU-mode. Details are described in the next section.

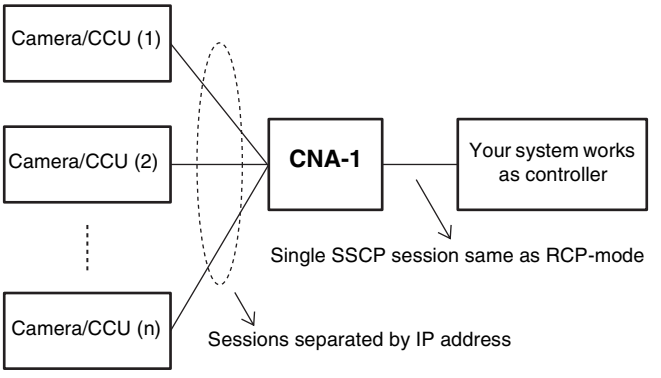


Figure.1 Session abstract of multiple control

MSU-mode

To enable multiple camera control by CNA-1, CNA-1 has to be configured to MSU-mode that configurable by web configuration menu “CNS” -> “Gateway Configuration” -> “Emulation Mode”.
Device number of CNA-1 is handled as MSU number in the network. The device number has to be set to different number from all MSUs in the network.

Camera selection

CNA-1 selects a control target camera from connected cameras by receiving a “Camera Select” command from your system.
“Camera Select” command switches the session between CNA-1 and Camera/CCU.

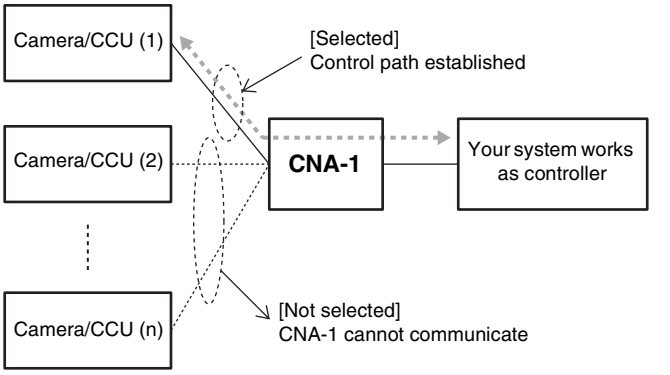


Figure.2 Camera selection

Command destination control

In principle, CNA-1 controls an only one camera selected by “Camera Select” command. If your system needs to control two or more cameras simultaneously, “Address Selector” command has to be added to a head of control command to control the destination of the command.
A command with “Address Selector” is able to send to unselected Camera/CCU, however, your system cannot receive any responses from unselected Camera/CCU.

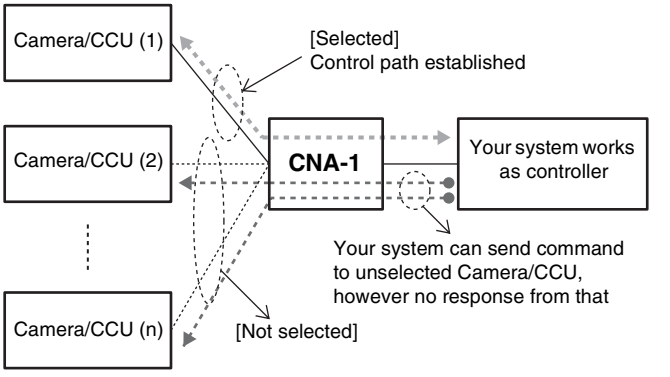


Figure.3 Command destination control (Address selection)

Using commands for multiple camera control

Camera Select command

Format:

Byte command
“[CMD-GP],[PARAM0],[PARAM1]\n”
CMD-GP: 0x60/0x61 (relative/absolute)
PARAM0: 0x02
PARAM1: Camera number 0x00 to 0x60 (decimal 0 to 96)

Relative control:

It means a status query.
A camera number which is currently selected is received by this query.
PARAM1 is ignored and does not affect.

Absolute control:

Select a camera that has PARAM1 camera number.

Usage:

Get a current selected camera number

Send:“60,02,00\n” -> Receive:“61,02,02\n”

(Your system is selecting a camera 2)

Select a camera number 12

“61,02,0c\n” -> Receive:“61,02,0c\n” (Selection success. Your system is selecting a camera 12)

Timing and delay specification:

Sending commands after camera selection

Your system can send camera select command and control commands simultaneously (into a same TCP packet). The control commands will send to selected Camera/CCU immediately.

Receiving commands after camera selection

Your system has to wait 50msec or more if your system requires responses from Camera/CCU. Session switching by “Camera Select” command takes several tens of milliseconds to ready to setup session between CNA-1 and Camera/CCU.

Address Selector command

Format:

Add an attribute to control a command destination.

“[CMD-GP],[PARAM0],[PARAM1],[COMMAND]\n”

CMD-GP: 0x6c

PARAM0: Destination device type

0x02 Camera (CHU + CCU)

PARAM1: Destination device number 0x00 to 0x60 (0 to 96 decimal)

COMMAND: Control command that your system needs to send.

Usage:

Send:“6c,02,02,23,a9,00,00\n” (Clear Master black of Camera 2)

-> Receive: No response

“6c,02,02” is an address selector command. This means “Send command to Camera 2”

“23,a9,00,00” is normal control command

Send:“6c,02,02,23,a9,00,00\n6c,02,03,23,a9,00,00\n” (Clear Master black of Camera 2 and Camera 3 at same time)

-> Receive: No response

Processing commands with address selector arrived from other device in the network

Your system can be received command with “Address Selector” from other devices. If your system receives the commands, your system should decompose that into destination header (Address Selector command) and control command.

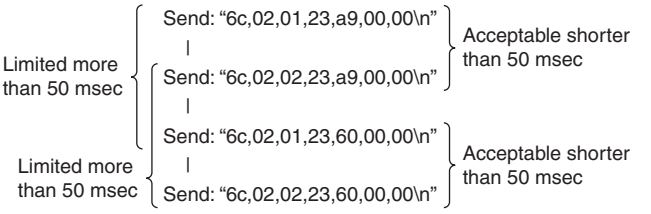
Your system can process the received control commands and also can discard the commands if your system does not need to process.

Inter-packet interval limitation

This limitation described on SSCP document is applied each session individually at multiple camera control.

The packet interval limitation can be ignored if you send commands to different Camera/CCU.

Example:



CCU/BPU Format Control commands (HZC-MSCN1)

This chapter describes the specifications of format control commands for CCU and BPU. To use the commands, you need to install the optional software HZC-MSCN1. For details on how to purchase the optional software, consult with qualified Sony personnel.

Command Format

The command formats are as follows. The only difference between the CCU command and BPU command is CMD-GP. Their specifications are the same.

“[CMD-GP],[FUNCTION],[PARAM1],[PARAM2]…\n”

CMD-GP	0x4e BPU Command 0x4f CCU Command
FUNCTION	See “FUNCTION List.”
PARAM1, PARAM2 ...	Depending on the FUNCTION type, the number of PARAMs varies. For details, see “Command Specification of Each FUNCTION.”

FUNCTION List

Format control commands have three versions with different usable FUNCTIONs. The compatible FUNCTIONs differ depending on the CCU/BPU generation.

Therefore, you need to check which version the communication destination CCU/BPU is compatible with before using commands.

The FUNCTION list and compatible versions are shown in the following.

		v1.0	v2.0	v3.0
0x12	Request available formats of Transmit Format	○	–	–
0x13	Reply of available formats of Transmit Format	○	–	–
0x14	Request selected format of Transmit Format	○	–	–
0x15	Reply of selected format of Transmit Format Select format of Transmit Format	○	–	–
0x20	Request label name of a Slot/Block	○	○	○
0x21	Reply of label name of a Slot/Block	○	○	○
0x22	Request available formats of a Slot/Block	○	–	–

		v1.0	v2.0	v3.0
0x23	Reply of available formats of a Slot/Block	○	–	–
0x24	Request selected format of all Slot/Blocks	○	–	–
0x25	Reply of selected format of all Slot/Blocks Select format of Slot/Block	○	–	–
0x2e	Request available Slot/Blocks	○	○	○
0x2f	Reply of available Slot/Blocks	○	○	○
0x30	Request Format Control command version	○	○	○
0x31	Reply of Format Control command version	○	○	○
0x32	Request available formats of Transmit Format	–	○	○
0x33	Reply of available formats of Transmit Format	–	○	○
0x34	Request selected format of Transmit Format	–	○	○
0x35	Reply of selected format of Transmit Format Select format of Transmit Format	–	○	○
0x36	Request available formats of a Slot/Block	–	○	○
0x37	Reply of available formats of a Slot/Block	–	○	○
0x38	Request selected format of Slot/Block	–	○	○
0x39	Reply of selected format of Slot/Block Select format of Slot/Block	–	○	○
0x3a	Request available output settings of Slot/Block	–	–	○
0x3b	Reply of available output settings of Slot/Block	–	–	○
0x3c	Request selected output setting of a Slot/Block	–	–	○
0x3d	Reply of selected output setting of a Slot/Block Select output setting of a Slot/Block	–	–	○
0x3e	Request available output settings of Transmit Format	–	–	○
0x3f	Reply of available output settings of Transmit Format	–	–	○
0x40	Request selected output setting of Transmit Format	–	–	○
0x41	Reply of selected output setting of Transmit Format Select output setting of Transmit Format	–	–	○

Example 1 for version inquiry

Transmit command:	“4f,30,00\n”
Receive command:	“4f,31,02,01,00\n”

This example shows the version inquiry for CCU. The reply is 1.0.

Example 2 for version inquiry

Transmit command:	“4e,30,00\n”
Receive command:	“4e,31,02,03,00\n”

This example shows the version inquiry for BPU. The reply is 3.0.

Command Specification of Each FUNCTION

Command specification of the FUNCTION shared between Ver. 1.0/Ver. 2.0/Ver. 3.0

0x20: Request label name of a Slot/Block

Command for BPU: “4e,20,02,[SLOT_NO],[BLOCK_NO]\n”
Command for CCU: “4f,20,02,[SLOT_NO],[BLOCK_NO]\n”

Parameters:

SLOT_NO	Slot number
BLOCK_NO	Block number

0x21: Reply of label name of a Slot/Block

Command for BPU: “4e,21,[DTLEN],[SLOT_NO],[BLOCK_NO],[CHAR(0)]…\n”
Command for CCU: “4f,21,[DELEN],[SLOT_NO],[BLOCK_NO],[CHAR(0)]…\n”

Parameters:

DTLEN	2 + N
SLOT_NO	Slot number
BLOCK_NO	Block number
CHAR(0) : CHAR(N-1)	Character string data of SLOT/BLOCK name. ASCII code (20h to 7Eh). Maximum 51 characters.

N: Number of characters

0x2e: Request available Slot/Blocks

Command for BPU: “4e,2e,00\n”
Command for CCU: “4f,2e,00\n”

0x2f: Reply of available Slot/Blocks

Command for BPU: “4e,2f,[DTLEN],[APPEND_FLAG],([SLOT_NO(0)],[BLOCK_NO(0)])…\n”
Command for CCU: “4f,2f,[DTLEN],[APPEND_FLAG],([SLOT_NO(0)],[BLOCK_NO(0)])…\n”

Parameters:

DTLEN	1 + 2 × N
APPEND_FLAG	Specify 1 when it does not fit in one packet and 0 for other cases.
SLOT_NO(0) BLOCK_NO(0) : : SLOT_NO(N-1) BLOCK_NO(N-1)	Slot number/block number list

N: Number of available slots/blocks

0x30: Request Format Control command version

Command for BPU: "4e,30,00\n"
Command for CCU: "4f,30,00\n"

0x31: Reply of Format Control command version

Command for BPU: "4e,31,02,[VER],[SUB_VER]\n"
Command for CCU: "4f,31,02,[VER],[SUB_VER]\n"

Parameters:

VER	Main version
SUB_VER	Sub version

Command specification of Ver.1.0 FUNCTION

Ver.1.0 FUNCTION only has a CCU command. There is no BPU command.

0x12: Request available formats of Transmit Format

Command for CCU: "4f,12,00\n"

0x13: Reply of available formats of Transmit format

Command for CCU: "4f,13,[DTLEN],[APPEND_FLAG],([FORMAT_CODE_1(0)],[FORMAT_CODE_2(0)])…\n"

Parameters:

DTLEN	1 + 2 × N
APPEND_FLAG	Specify 1 when it does not fit in one packet and 0 for other cases.
FORMAT_ CODE_1(0) FORMAT_ CODE_2 (0) : : FORMAT_ CODE_1(N-1) FORMAT_ CODE_2 (N-1)	Format code list. For details, see "Format code V1.0 specification."

N: Number of available formats

0x14: Request selected format of Transmit Format

Command for CCU: "4f,14,00\n"

0x15: Reply of selected format of Transmit Format / Select format of Transmit Format

Command for CCU: "4f,15,02,[FORMAT_CODE_1],[FORMAT_CODE_2]\n"

Parameters:

FORMAT_ CODE_1	See "Format code V1.0 specification."
FORMAT_ CODE_2	

0x22: Request available format list of a Slot/Block

Command for CCU: "4f,22,02,[SLOT_NO],[BLOCK_NO]\n"

Parameters:

SLOT_NO	Slot number
BLOCK_NO	Block number

0x23: Reply of available formats of a Slot/Block

Command for CCU: "4f,23,[DTLEN],[SLOT_NO],[BLOCK_NO],[APPEND_FLAG],([FORMAT_CODE_1(0),[FORMAT_CODE_2(0)])...\n"

Parameters:

DTLEN	3 + 2 × N
SLOT_NO	Slot number
BLOCK_NO	Block number
APPEND_FLAG	Specify 1 when it does not fit in one packet and 0 for other cases.
FORMAT_ CODE_1(0) FORMAT_ CODE_2(0) : : FORMAT_ CODE_1(N-1) FORMAT_ CODE_2(N-1)	Format code list. For details, see "Format code V1.0 specification."

N: Number of available formats

0x24: Request selected format of all Slot/Block

Command for CCU: "4f,24,02,[SLOT_NO],[BLOCK_NO]\n"

Parameters:

SLOT_NO	Slot number
BLOCK_NO	Block number

0x25: Reply of selected format of all Slot/Block / Select format of Slot/Block

Command for CCU: "4f,25,[DTLEN],([SLOT_NO(0)],[BLOCK_NO(0)],[FORMAT_CODE_1(0)],[FORMAT_CODE_2(0)])…\n"

Parameters:

DTLEN	4 × N
SLOT_NO(0) BLOCK_NO(0) FORMAT_ CODE_1(0) FORMAT_ CODE_2(0) : : SLOT_NO(N-1) BLOCK_NO(N-1) FORMAT_ CODE_1(N-1) FORMAT_ CODE_2(N-1)	Format code list compatible with slot number/block number. For details of the format code, see “Format code V1.0 specification.”

N: Number of settings

Format code V1.0 specification

The format codes consist of 2 bytes: FORMAT_CODE_1 and FORMAT_CODE_2.

FORMAT_CODE_1

bit7: Reserved (0)

bit6, 5: WARNING Level

bit6	bit5	WARNING Level	Meaning	Selectable/Unselectable
0	0	Level 0	Within standard	Selectable
0	1	Level 1	With warning	Selectable
1	0	Level 2	Within standard, but not recommended	Unselectable
1	1	Level 3	Below standard	Unselectable

bit4-1: Reserved (0000)

BIT0: 0: DIGITAL, 1: ANALOG

FORMAT_CODE_2

bit7-0:

00H	1080/60I	18H	1035/60I	30H	720/60I	48H	625/50I
01H	1080/30PsF	19H	1035/30PsF	31H	720/30PsF	49H	625/25PsF
02H	1080/30P	1AH	1035/30P	32H	720/30P	4AH	625/25P
03H	1080/60P	1BH	1035/60P	33H	720/60P	4BH	625/50P
04H	1080/59.94I	1CH	1035/59.94I	34H	720/59.94I	4CH	525/59.94I
05H	1080/29.97PsF	1DH	1035/29.97PsF	35H	720/29.97PsF	4DH	525/29.97PsF
06H	1080/29.97P	1EH	1035/29.97P	36H	720/29.97P	4EH	525/29.97P
07H	1080/59.94P	1FH	1035/59.95P	37H	720/59.94P	4FH	525/59.94P
08H	1080/50I	20H	1035/50I	38H	720/50I	50H	540/60P
09H	1080/25PsF	21H	1035/25PsF	39H	720/25PsF	51H	540/59.94P
0AH	1080/25P	22H	1035/25P	3AH	720/25P	52H	540/50P
0BH	1080/50P	23H	1035/50P	3BH	720/50P	53H	540/49.95P
0CH	1080/49.95I	24H	1035/49.95I	3CH	720/49.95I	54H	540/48P
0DH	1080/24.98PsF	25H	1035/24.98PsF	3DH	720/24.98PsF	55H	540/47.95P
0EH	1080/24.98P	26H	1035/24.98P	3EH	720/24.98P	56H	NTSC
0FH	1080/49.95P	27H	1035/49.95P	3FH	720/49.95P	57H	PAL
10H	1080/48I	28H	1035/48I	40H	720/48I		
11H	1080/24PsF	29H	1035/24PsF	41H	720/24PsF		
12H	1080/24P	2AH	1035/24P	42H	720/24P		
13H	1080/48P	2BH	1035/48P	43H	720/48P		
14H	1080/47.95I	2CH	1035/47.95I	44H	720/47.95I		
15H	1080/23.98PsF	2DH	1035/23.98PsF	45H	720/23.98PsF		
16H	1080/23.98P	2EH	1035/23.98P	46H	720/23.98P	FEH	Unknown
17H	1080/47.95P	2FH	1035/47.95P	47H	720/47.95P	FFH	No output

Command specification of Ver.2.0/Ver.3.0 FUNCTION

0x32: Request available formats of Transmit Format

Command for BPU: “4e,32,00\n”
Command for CCU: “4f,32,00\n”

0x33: Reply available formats of Transmit Format

Command for BPU: “4e,33,[DLEN],[FORMAT_CODE_LEN],[FORMAT_CODE_VER],[TOTAL_PACKS],[CUR_PACK_NO],([FORMAT_CODE_1(0)],[FORMAT_CODE_2(0)],,,)…\n”
Command for CCU: “4f,33,[DLEN],[FORMAT_CODE_LEN],[FORMAT_CODE_VER],[TOTAL_PACKS],[CUR_PACK_NO],([FORMAT_CODE_1(0)],[FORMAT_CODE_2(0)],,,)…\n”

Parameters:

DTLEN	4 + k × N
FORAMT_ CODE_LEN	Format code length
FORMAT_ CODE_VER	Format code version
TOTAL_PACKS	Total number of packets
CUR_PACK_NO	Current packet number (starting from 0x01)
FORMAT_ CODE_1(0) FORMAT_ CODE_2(0) : FORMAT_ CODE_7(0) : : FORMAT_ CODE_1(N-1) FORMAT_ CODE_2(N-1) : FORMAT_ CODE_7(N-1)	Format code list consisting of 7 bytes. For details, see “Format code V2.0 specification.”

k: Format code length (Current: 7)
N : Number of available formats

0x34: Request selected format of Transmit Format

Command for BPU: “4e,34,00\n”
Command for CCU: “4f,34,00\n”

0x35: Reply of selected format of Transmit Format / Select format of Transmit Format

Command for BPU: “4e,35,09,[FORMAT_CODE_LEN],[FORMAT_CODE_VER],[FORMAT_CODE_1],[FORMAT_CODE_2],,,\n”
Command for CCU: “4f,35,09,[FORMAT_CODE_LEN],[FORMAT_CODE_VER],[FORMAT_CODE_1],[FORMAT_CODE_2] ,,,\n”

Parameters:

FORMAT_ CODE_LEN	Format code length
FORMAT_ CODE_VER	Format code version
FORMAT_ CODE_1 FORMAT_ CODE_2 : FORMAT_ CODE_7	For details, see “Format code V2.0 specification.”

0x36: Request available formats of a Slot/Block

Command for BPU: “4e,36,02,[SLOT_NO],[BLOCK_NO]\n”
Command for CCU: “4f,36,02,[SLOT_NO],[BLOCK_NO]\n”

Parameters:

SLOT NO	Slot number
BLOCK_NO	Block number

0x37: Reply of available formats of a Slot/Block

Command for BPU: “4e,37,[DTLEN],[SLOT_NO],[BLOCK_NO],[FORMAT_CODE_LEN],[FORMAT_CODE_VER],[TOTAL_PACKS],[CUR_PACK_NO],([FORMAT_CODE_1(0)],[FORMAT_CODE_2(0)],,,)…\n”
Command for CCU: “4f,37,[DTLEN],[SLOT_NO],[BLOCK_NO],[FORMAT_CODE_LEN],[FORMAT_CODE_VER],[TOTAL_PACKS],[CUR_PACK_NO],([FORMAT_CODE_1(0)],[FORMAT_CODE_2(0)],,,)…\n”

Parameters:

DTLEN	6 + k × N
SLOT_NO	Slot number
BLOCK_NO	Block number
FOARMAT_ CODE_LEN	Format code length
FORMAT_ CODE_VER	Format code version
TOTAL_PACKS	Total number of packets
CUR_PACK_NO	Current packet number (starting from 0x01.)
FORMAT_ CODE_1(0) FORMAT_ CODE_2(0) : FORMAT_ CODE_7(0) : : FORMAT_ CODE_1(N-1) FORMAT_ CODE_2(N-1) : FORMAT_ CODE_7(0)	Format code list consisting of 7 bytes. For details, see “Format code V2.0 specification.”

k: Format code length (Current: 7)
N: Number of available formats

0x38: Request selected format of Slot/Block

Command for BPU: “4e,38,02,[SLOT_NO],[BLOCK_NO]\n”
Command for CCU: “4f,38,02,[SLOT_NO],[BLOCK_NO]\n”

Parameters:

SLOT_NO	Slot number (0x00: All slots)
BLOCK_NO	Block number

0x39: Reply of selected format of Slot/Block / Select format of Slot/Block

Command for BPU: “4e,39,[DTLEN],[FORMAT_CODE_LEN],[FORMAT_CODE_VER],[TOTAL_PACKS],[CUR_PACK_NO],([SLOT_NO],[BLOCK_NO],[FORMAT_CODE_1(0)],[FORMAT_CODE_2(0)],,,)…\n”
Command for CCU: “4f,39,[DTLEN],[FORMAT_CODE_LEN],[FORMAT_CODE_VER],[TOTAL_PACKS],[CUR_PACK_NO],([SLOT_NO],[BLOCK_NO],[FORMAT_CODE_1(0)],[FORMAT_CODE_2(0)],,,)…\n”

Parameters:

DTLEN	4 + (k + 2) × N
FORMAT_CODE_LEN	Format code length
FORMAT_CODE_VER	Format code version
TOTAL_PACKS	Total number of packets
CUR_PACK_NO	Current packet number (starting from 0x01.)
SLOT_NO(0) BLOCK_NO(0) FORMAT_CODE_1(0) FORMAT_CODE_2(0) : FORMAT_CODE_7(0) : : FORMAT_CODE_1(N-1) FORMAT_CODE_2(N-1) : FORMAT_CODE_7(N-1)	Format code list compatible with slot number/block number. For details of the format code consisting of 7 bytes, see “Format code V2.0 specification.”

k: Format code length (Current: 7)
N: Number of slots

0x3a: Request available output settings of a Slot/Block

Command for BPU: “4e,3a,03,[SLOT_NO],[BLOCK_NO],[ITEM_ID]\n”
Command for CCU: “4f,3a,03,[SLOT_NO],[BLOCK_NO],[ITEM_ID]\n”

Parameters:

SLOT NO	Slot number
BLOCK_NO	Block number
ITEM_ID	See “Output setting item ID/ Set value list.”

0x3b: Reply of available output settings of a Slot/Block

Command for BPU: “4e,3b,[DTLEN],[SLOT_NO],[BLOCK_NO],[ITEM_ID],[TOTAL_PACKS],[CUR_PACK_NO],[DATA(0)]…\n”
Command for CCU: “4f,3b,[DTLEN],[SLOT_NO],[BLOCK_NO],[ITEM_ID],[TOTAL_PACKS],[CUR_PACK_NO],[DATA(0)]…\n”

Parameters:

DTLEN	5 + N
SLOT NO	Slot number
BLOCK_NO	Block number
ITEM_ID	See “Output setting item ID/ Set value list.”
TOTAL_PACKS	Total number of packets
CUR_PACK_NO	Current packet number (starting from 0x01.)
DATA(0) : DATA(N - 1)	Settable value list. See “Output setting item ID/ Set value list.”

N: Number of available settings (in packets)

0x3c: Request selected output setting of a Slot/Block

Command for BPU: “4e,3c,03,[SLOT_NO],[BLOCK_NO],[ITEM_ID]\n”
Command for CCU: “4f,3c,03,[SLOT_NO],[BLOCK_NO],[ITEM_ID]\n”

Parameters:

SLOT NO	Slot number
BLOCK_NO	Block number
ITEM_ID	See “Output setting item ID/ Set value list.”

0x3d: Reply of selected output setting of a Slot/Block / Select output setting of a Slot/Block

Command for BPU: “4e,3d,04,[SLOT_NO],[BLOCK_NO],[ITEM_ID],[DATA]\n”
Command for CCU: “4f,3d,04,[SLOT_NO],[BLOCK_NO],[ITEM_ID],[DATA]\n”

Parameters:

SLOT NO	Slot number
BLOCK_NO	Block number
ITEM_ID	See “Output setting item ID/ Set value list.”
DATA	

0x3e: Request available output settings of Transmit Format

Command for BPU: “4e,3e,01,[ITEM_ID]\n”
Command for CCU: “4f,3e,01,[ITEM_ID]\n”

Parameters:

ITEM_ID	See “Output setting item ID/ Set value list.”

0x3f: Reply of available output settings of Transmit Format

Command for BPU: “4e,3f,[DTLEN],[ITEM_ID],[DATA(0)] …\n”
Command for CCU: “4f,3f,[DTLEN],[ITEM_ID],[DATA(0)] …\n”

Parameters:

DTLEN	1 + N
ITEM_ID	See “Output setting item ID/ Set value list.”
DATA(0) : : DATA(N - 1)	Settable value list. See “Output setting item ID/ Set value list.”

N: Number of available settings (in packets)

0x40: Request selected output setting of Transmit Format

Command for BPU: “4e,40,01,[ITEM_ID]\n”
Command for CCU: “4f,40,01,[ITEM_ID]\n”

Parameters:

ITEM_ID	See “Output setting item ID/ Set value list.”

0x41: Reply of selected output setting of Transmit Format / Select output setting of Transmit Format

Command for BPU: “4e,41,02,[ITEM_ID],[DATA]\n”
Command for CCU: “4f,41,02,[ITEM_ID],[DATA]\n”

Parameters:

ITEM_ID	See “Output setting item ID/ Set value list.”
DATA	

Output setting item ID/ Set value list

Setting item ID	Setting item	Set value	
00H	OETF	00h	SDR
		01h	S-Log2
		02h	S-Log3
		03h	HLG_BT.2100
		04h	N/A
		05h	HLG
		06h	HLG(Var1.2)
		07h	PQ(ST2084)
		08h	RGB(SG1.2)
		09h	S-Log3(Live HDR)
		0Ah	S-Log3(HDR)
		0Bh	HLG_Live
		0Ch	HyperGamma4
		0Dh	Live HDR
		0Eh	Cinema
01H	Color Space	00h	Normal
		01h	Wide
		02h	ITU-R BT.709
		03h	ITU-R BT.2020
02H	Signal Source	00h	Camera
		01h	HD Trunk
		02h	4K Input
		03h	HD Input
		04h	HDx4 Input
		05h	Channel A Input

Format code V2.0 specification

FORMAT_CODE_1

RESOLUTION							
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0

bit 7 - bit 0

00h	720x486 / Analog 525
01h	720x576 / Analog 625
02h	960x540
03h	1280x720
04h	1920x1035 / Analog 1035
05h	1920x1080 / Analog 1080
06h	2048x1080
07h	3840x2160
08h	4096x2160
09h	7680x4320
0ah	8192x4320
0bh	UHD

FORMAT_CODE_2

1000/1001	FREQUENCY						
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0

bit 7

00h	1000
01h	1001

bit 6 - bit 0

00h	24Hz	**05h**	60Hz
01h	25Hz	**06h**	96Hz
02h	30Hz	**07h**	100Hz
03h	48Hz	**08h**	120Hz
04h	50Hz		

FORMAT_CODE_3

HIGH SPEED RATIO							
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0

bit 7 - bit 0

00h	Normal	**08h**	× 9
01h	× 2	**09h**	× 10
02h	× 3	**0Ah**	× 11
03h	× 4	**0Bh**	× 12
04h	× 5	**0Ch**	× 13
05h	× 6	**0Dh**	× 14
06h	× 7	**0Eh**	× 15
07h	× 8	**0Fh**	× 16

FORMAT_CODE_4

SCAN METHOD: Scan method			OUTPUT FORMAT: Video output format				
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0

bit 7 - bit 5

00h	interlace
01h	Progressive
02h	PsF

bit 4 - bit 0

00h	None	**07h**	3G-SDI(Level-B)
01h	HD-Analog (Component)	**08h**	DG-SDI
02h	NTSC	**09h**	3G-DG
03h	PAL	**0Ah**	12G-SDI
04h	SD-SDI	**0Bh**	3G-SDI
05h	HD-SDI	**0Ch**	6G-SDI
06h	3G-SDI(Level-A)		

FORMAT_CODE_5

PIXEL DEPTH			SAMPLING STRUCTURE				
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0

bit 7 - bit 5

00h	None
01h	Analog
02h	8bit
03h	10bit
04h	12bit
05h	16bit
06h	(4K/HDR)

bit 4 - bit 0

00h	None
01h	Analog
02h	YCbCr4:2:2
03h	YCbCr4:4:4
04h	RGB4:4:4
05h	Bayer(Dual Green)

FORMAT_CODE_6

WARNING LEVEL			OUTPUT CHANNEL				
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0

bit 7 - bit 5

00h	standard - selectable
01h	warning - selectable
02h	not recommended - Unselectable
03h	Non-standard - Unselectable

bit 4 - bit 0

00h	None	**06h**	Link-F
01h	Link-A	**07h**	Link-G
02h	Link-B	**08h**	Link-H
03h	Link-C	**1dh**	Link-Left
04h	Link-D	**1eh**	Link-Right
05h	Link-E	**1fh**	3D-Monitor

FORMAT_CODE_7

DIVISION				HIGH SPEED OUTPUT			
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0

bit 7 - bit 4

00h	None
01h	SQD
02h	2SI

bit 3 - bit 0

00h	None
01h	Alignment by field
02h	Alignment by frame
03h	Alignment by U

CCU Format Control Extension commands (HZC-MSCN1)

This chapter describes the specifications of extended format control commands for CCU. To use the commands, you need to install the optional software HZC-MSCN1. For details on how to purchase the optional software, consult with qualified Sony personnel.

Command Format

The command formats are as follows.

"[CMD-GP],[FUNCTION],[PARAM1],[PARAM2]…\n"

CMD-GP	0x4d
FUNCTION	See "FUNCTION List."
PARAM1, PARAM2 ...	Depending on the FUNCTION type, the number of PARAMs varies. For details, see "Command Specification of Each FUNCTION."

FUNCTION List

The FUNCTION list and compatible versions are shown in the following.

0x00	Request Format Control Ext command version
0x01	Reply of Format Control Ext command version
0x10	Request available Slot/Blocks
0x11	Reply of available Slot/Blocks
0x12	Request label name of a Slot/Block
0x13	Reply of label name of a Slot/Block
0x14	Request available formats of a Slot/Block
0x15	Reply of available formats of a Slot/Block
0x16	Request selected format of a Slot/Block
0x17	Reply of selected format of a Slot/Block
0x18	Request available output settings of a Slot/Block
0x19	Reply of available output settings of a Slot/Block
0x1a	Request selected output settings of a Slot/Block
0x1b	Reply of selected output settings of a Slot/Block

Command Specification of Each FUNCTION

0x00: Request Format Control Ext command version

Command for CCU: "4d,00,01,[TYPE]\n"

Parameters:

TYPE	See "Slot/Block Type Code."

0x01: Reply of Format Control Ext command version

Command for CCU: "4d,01,02,[TYPE],[VER]\n"

Parameters:

TYPE	See "Slot/Block Type Code."
VER	Version. Current: 0x01 only.

* If there is no reply, it is not compatible with this GMD-GP.

0x10: Request available Slot/Blocks

Command for CCU: "4d,10,01,[TYPE]\n"

Parameters:

TYPE	See "Slot/Block Type Code."

0x11: Reply of available Slot/Blocks

Command for CCU: "4d,11,[DTLEN],[TYPE],[TOTAL_PACKS],[CUR_PACK_NO],([SLOT_NO],BLOCK_NO])…\n"

Parameters:

DTLEN	3 + 2 × N
TYPE	See "Slot/Block Type Code."
TOTAL_PACKS	Total number of packets
CUR_PACK_NO	Current packet number
SLOT_NO(0) BLOCK_NO(0) : SLOT_NO(N-1) BLOCK_NO (N-1)	Slot number/block number list

N: Number of available slots/blocks

0x12: Request label name of a Slot/Block

Command for CCU: "4d,12,03,[TYPE],[SLOT_NO],[BLOCK_NO]\n"

Parameters:

TYPE	See "Slot/Block Type Code."
SLOT_NO	Slot number
BLOCK_NO	Block number

0x13: Reply of label name of a Slot/Block

Command for CCU: "4d,13,[DTLEN],[TYPE],[SLOT_NO],[BLOCK_NO],[CHAR(0)]…\n"

Parameters:

DTLEN	3 + N
TYPE	See "Slot/Block Type Code."
SLOT_NO	Slot number
BLOCK_NO	Block number
CHAR(0) : CHAR(N-1)	Character string data of SLOT/BLOCK name. ASCII code (20h to 7Eh). Maximum 50 characters.

N: Number of characters

0x14: Request available formats of a Slot/Block

Command for CCU: "4f,14,03,[TYPE],[SLOT_NO],[BLOCK_NO]\n"

Parameters:

TYPE	See "Slot/Block Type Code."
SLOT_NO	Slot number
BLOCK_NO	Block number

0x15: Reply of available formats of a Slot/Block

Command for CCU: "4d,15,[DTLEN],[TYPE],[SLOT_NO],[BLOCK_NO],[FORMAT_CODE_LEN],[FORMAT_CODE_VER],[TOTAL_PACKS],[CUR_PACK_NO],([FORMAT_CODE_1(0)],[FORMAT_CODE_2(0)],,,)…\n"

Parameters:

DTLEN	7 + k × N
TYPE	See “Slot/Block Type Code.”
SLOT_NO	Slot number
BLOCK_NO	Block number
FOARMAT_ CODE_LEN	Format code length
FORMAT_ CODE_VER	Format code version
TOTAL_PACKS	Total number of packets
CUR_PACK_NO	Current packet number (starting from 0x01.)
FORMAT_ CODE_1(0) FORMAT_ CODE_2(0) : FORMAT_ CODE_7(0) : : FORMAT_ CODE_1(N-1) FORMAT_ CODE_2(N-1) : FORMAT_ CODE_7(0)	Format code list consisting of 7 bytes. For details, see “Format code V2.0 specification.”

k: Format code length (Current: 7)
N: Number of available formats

0x16: Request selected format of Slot/Block

Command for CCU: “4d,16,03,[TYPE],[SLOT_NO],[BLOCK_NO]\n”

Parameters:

TYPE	See “Slot/Block Type Code.”
SLOT_NO	Slot number
BLOCK_NO	Block number

0x17: Reply of selected format of Slot/Block / Select format of Slot/Block

Command for CCU: “4d,17,[DTLEN],[TYPE],[FORMAT_CODE_LEN],[FORMAT_CODE_VER],[TOTAL_PACKS],[CUR_PACK_NO],([SLOT_NO],[BLOCK_NO],[FORMAT_CODE_1(0)],[FORMAT_CODE_2(0)],,,)…\n”

Parameters:

DTLEN	5 + (k + 2) × N
TYPE	See “Slot/Block Type Code.”
FORMAT_ CODE_LEN	Format code length
FORMAT_ CODE_VER	Format code version
TOTAL_PACKS	Total number of packets
CUR_PACK_NO	Current packet number (starting from 0x01.)
SLOT_NO(0) BLOCK_NO(0) FORMAT_ CODE_1(0) FORMAT_ CODE_2(0) : FORMAT_ CODE_7(0) : : FORMAT_ CODE_1(N-1) FORMAT_ CODE_2(N-1) : FORMAT_ CODE_7(N-1)	Format code list compatible with slot number/block number. For details of the format code consisting of 7 bytes, see “Format code V2.0 specification.”

k: Format code length (Current: 7)
N: Number of slots

0x18: Request available output settings of a Slot/Block

Command for CCU: “4d,18,04,[SLOT_NO],[BLOCK_NO],[ITEM_ID]\n”

Parameters:

TYPE	See “Slot/Block Type Code.”
SLOT_NO	Slot number
BLOCK_NO	Block number
ITEM_ID	See “Output setting item ID/ Set value list.”

0x19: Reply of available output settings of a Slot/Block

Command for CCU: “4d,19,[DTLEN],[TYPE],[SLOT_NO],[BLOCK_NO],[ITEM_ID],[TOTAL_PACKS],[CUR_PACK_NO],[DATA(0)]…\n”

Parameters:

DTLEN	6 + N
TYPE	See “Slot/Block Type Code.”
SLOT_NO	Slot number
BLOCK_NO	Block number
ITEM_ID	See “Output setting item ID/ Set value list.”
TOTAL_PACKS	Total number of packets
CUR_PACK_NO	Current packet number (starting from 0x01.)
DATA(0) : DATA(N - 1)	Settable value list. See “Output setting item ID/ Set value list.”

N: Number of available settings (in packets)

0x1a: Request selected output setting of a Slot/Block

Command for CCU: “4d,1a,04,[TYPE],[SLOT_NO],[BLOCK_NO],[ITEM_ID]\n”

Parameters:

TYPE	See “Slot/Block Type Code.”
SLOT_NO	Slot number
BLOCK_NO	Block number
ITEM_ID	See “Output setting item ID/ Set value list.”

0x1b: Reply of selected output setting of a Slot/ Block / Select output setting of a Slot/Block

Command for CCU: “4d,1b,05,[TYPE],[SLOT_NO],[BLOCK_NO],[ITEM_ID],[DATA]\n”

Parameters:

TYPE	See “Slot/Block Type Code.”
SLOT_NO	Slot number
BLOCK_NO	Block number
ITEM_ID	See “Output setting item ID/ Set value list.”
DATA	

Slot/Block Type Code

TYPE	Meaning
0x00	N/A
0x01	Return Input
0x02-0xff	Reserved

RCP Assignment control (HZC-RACN1)

Overview

RCP assignment function is for managing the assignment between RCP and Camera on Sony Camera Network System (CNS). You can get their assignment status and change them. This chapter explains how the SSCP commands work with RCP assignment by showing some concrete examples.

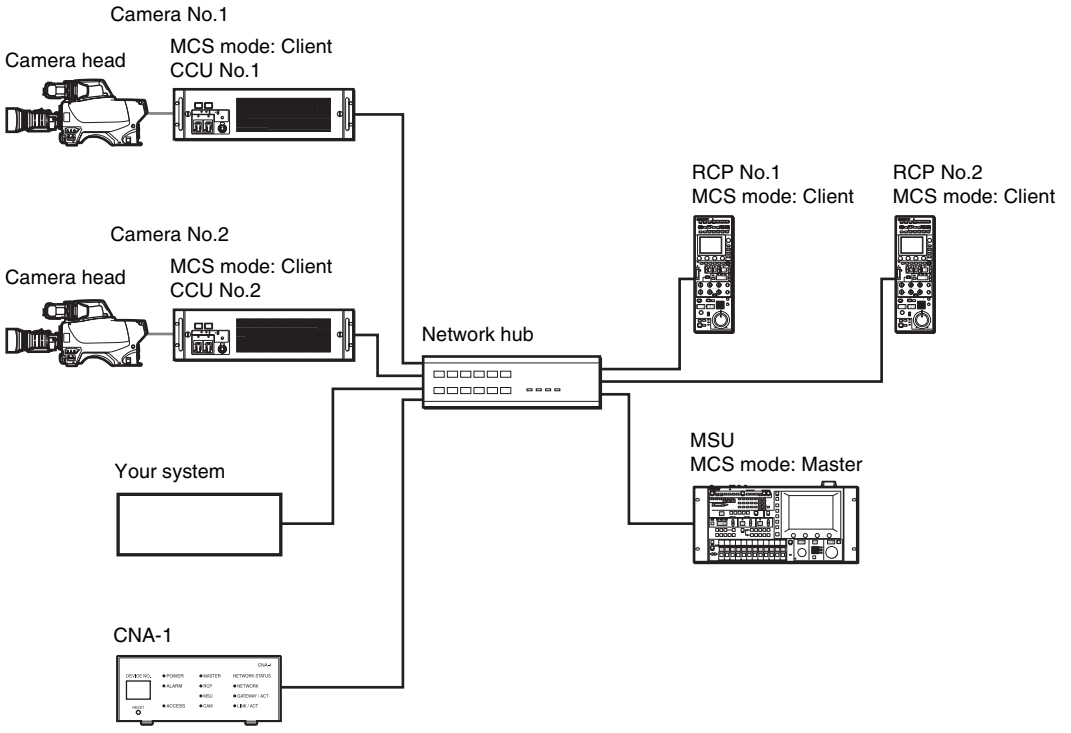


Figure.1

Figure 1 shows the standard configuration of CNS. In this case, there are one MSU as a Master device, two Cameras/CCUs and two RCPs on the CNS. By default, RCP is assigned to the same number of the Camera/CCU which is connected to the CNS. Actually, Camera No. is depended on the CCU No. Following table shows the relationship between RCP and Camera.

RCP Assignment	
RCP No.1	Camera No.1
RCP No.2	Camera No.2

In this assignment, RCP No.1 controls Camera No.1 and receives the status from it. On the other hand, RCP No.2 and Camera No.2 have same relationship.

Confirm assignment status

You can get the current assignment status by using following SSCP command.

“6d,4e,02,fe,12\n”

“6d”:	Command Group of RCP Assignment
“4e”:	This means ’Request Available RCP status list’
“02,fe,12”:	Fixed value of this command

This command is to get the status list of available RCP which is turned on and is connected to the CNS. Send this command to CNA-1 and you will receive following command as a reply.

“6d,8e,0d,fe,12,02,00,01,fe,01,01,00,02,fe,02,01\n”

“6d”:	Command Group of RCP Assignment
“8e”:	This means reply of ’Request Available RCP status list’
“0d”:	Data length after this parameter
“fe,12”:	Fixed value
“02”:	Number of RCP status info. There are two status info on this command
“00,01,fe,01,01”:	Status info of RCP No.1
“00,02,fe,02,01”:	Status info of RCP No.2

The RCP-01 status of “00,01,fe,01,01” can be interpret as follows.

“00”:	Fixed value
“01”:	RCP No.
“fe”:	Fixed value
“01”:	Camera No. which is assigned to this RCP

“01”: RCP Status which is represented by bit info.
bit 1: 0 = Assignment is default, 1 = Assignment has been changed
bit 0: 0 = not Available, 1 = Available

According to this info, you can see that RCP No.1 is assigned to Camera No.1, it’s assignment is default value and it is available on the CNS. The status of RCP No.2 can be parsed as well.

Change RCP assignment

Now, we change the assignment of RCP No.2 to Camera No.1. The result should be as follows.

RCP Assignment	
RCP-01	Camera-01
RCP-02	Camera -01

The SSCP commands to do this is follows.

“6d,6d,09,fe,12,01,00,02,fe,01,00,00\n”

“6d”: Command Group of RCP Assignment
“6d” This means ’Request RCP assignment change’
“09” Data length after this parameter
“fe,12”: Fixed value
“01”: Number of RCP info which you want to change
“00”: Fixed value
“02”: RCP No.
“fe”: Fixed value
“01”: Camera No. to which you want assign
“00,00”: Fixed value

Send this command and you will receive RCP-02 status info which was changed as a reply.

“6d,8d,08,fe,12,01,00,02,fe,01,03\n”

“6d”: Command Group of RCP Assignment
“8d”: Reply of ’Request RCP assignment change’
“08”: Data length after this parameter
“fe,12”: Fixed value
“01”: Number of RCP status info. There are one status info on this command
“00,02,fe,01,03”: Status info of RCP No.2

We already saw how to interpret the status of RCP on the command in previous section.
In this case, RCP No.2 status of “00,02,fe,01,03” is showing that it is assigned to Camera No.1, its assignment has been changed and it is available on the CNS.

So far, we have seen how the SSCP commands work with RCP assignment in some cases. For more information about command’s specification, refer the explanation from next chapter.

RCP Assignment control commands

To control RCP assignment, we provide command group (CMD-GP) of 0x6d. Since RCP assignment is managed in CNS Master device, you need one Master device in you CNS, and the task of CMD-GP 0x6d is communication with Master device.

Each command in this group is distinguished by PARAM0. Following list shows all commands in CMD-GP 0x6d:

PARAM0	Task of Command
0x48	Request Camera number range info to CNS Master device
0x88	Reply of Camera number range info from CNS Master device
0x49	Request Camera status to CNS Master device
0x89	Reply of Camera status from CNS Master device
0x4a	Request Available Camera status list to CNS Master device
0x8a	Reply of Available Camera status list from CNS Master device
0x4b	Request All Camera status list to CNS Master device
0x8b	Reply of All Camera status list from CNS Master device
0x4c	Request RCP number range info to CNS Master device
0x8c	Reply of RCP number range info from CNS Master device
0x4d	Request RCP status to CNS Master device
0x8d	Reply of RCP status from CNS Master device
0x6d	Request RCP assignment status change to CNS Master device
0x4e	Request Available RCP status list to CNS Master device
0x8e	Reply of Available RCP status list from CNS Master device
0x4f	Request All RCP status list to CNS Master device
0x8f	Reply of All RCP status list from CNS Master device
0xad	Request RCP assignment reset to CNS Master device
0xae	Request All RCP assignment reset to CNS Master device

Commands in CMD-GP 0x6d can be classified in three types.

Type	PARAM0		Task
	Request	Reply	
Commands to get Camera status information	0x48	0x88	Get Camera number range info
	0x49	0x89	Get Camera status info
	0x4a	0x8a	Get Available Camera status info list
	0x4b	0x8b	Get All Camera status info list
Commands to get RCP status information	0x4c	0x8c	Get RCP number range info
	0x4d	0x8d	Get RCP status info
	0x4e	0x8e	Get Available RCP status info list
	0x4f	0x8f	Get All RCP status info list
Commands to change RCP assignment status	0x6d	–	Change RCP assignment status
	0xad	–	Reset RCP assignment status
	0xae	–	Reset all RCP assignment status

Commands to get Camera status information

There are four kinds of commands to get Camera status information from CNS Master device. Each kind has request command and reply command.

Commands to get RCP status information

There are four kinds of commands to get RCP status information from CNS Master device. Each kind has request command and reply command.

Commands to change RCP assignment status

There are three kinds of commands to change RCP assignment status. All kinds only have request command. Reply for these commands is PARAM0: 0x8d which is same as the reply of command “Get RCP status info”

Commands to get Camera status information

Get Camera number range info

Type	Format
Request	6d,48,01,fe\n
Reply	6d,88,03,fe,[CAM No. Min],[CAM No. Max]\n

Parameters:

CAM No. Min: Minimal value of Camera number, “01”-“60” (1-96 in Decimal)
CAM No. Max: Maximal value of Camera number, “01”-“60” (1-96 in Decimal)

Example:

Send: “6d,48,01,fe\n”
Receive: “6d,88,03,fe,01,0c\n”
Reply from Master is:
Available Cameras on the CNS has the number in range from 1 to 12.

Get Camera status info

Type	Format
Request	6d,49,[DLEN],fe,[NUM],[CAM No.]…\n
Reply	6d,89,[DLEN],fe,[NUM],([CAM No.],00,[CAM Status])…\n

Parameters:

DLEN: Data length after “[DLEN]”
“fe”: Fixed value. No other value is permitted.
NUM: Number of parameters on this command.
when Request, this means number of “[CAM No.]”, range is “01”-“33”(1-51 in Decimal)
when Reply, this means number of “[CAM No.],00,[CAM Status]”
CAM No.: “01”-“60” (1-96 in Decimal)
“00”: Fixed value. No other value is permitted.
CAM status: “00” = not Available, “01” = Available Camera is recognized as available when it is turned on and is connected to the CNS.

Example:

1. Request status of Camera No.1.
Send: “6d,49,03,fe,01,01\n”
Receive: “6d,89,05,fe,01,01,00,01\n”
Reply from Master is: Camera No.1 is available.

2. Request status of Camera No.1, Camera No.2 and Camera No.4.
Send: “6d,49,05,fe,03,01,02,04\n”
Receive: “6d,89,0b,fe,03,01,00,01,02,00,00,04,00,01\n”
Reply from Master is:
Camera No.1 is available
Camera No.2 is not available
Camera No.4 is available

Get Available Camera status info list

Type	Format
Request	6d,4a,01,fe\n
Reply	6d,8a,[DLEN],fe,[NUM],([CAM No.],00,[CAM Status])…\n

Parameters:

DLEN: Data length after “[DLEN]”
“fe”: Fixed value. No other value is permitted.
NUM: Number of parameters on this command.
when Reply, this means number of “[CAM No.],00,[CAM Status]”
CAM No.: “01”-“60” (1-96 in Decimal)
“00”: Fixed value. No other value is permitted.
CAM status: “00” = not Available, “01” = Available Camera is recognized as available when it is turned on and is connected to the CNS.

Example:

Send: “6d,4a,01,fe\n”
Receive: “6d,8a,08,fe,02,01,00,01,04,00,01\n”
Reply from Master is:
There are two cameras available on the CNS, the number of which is 1 and 4.

Get All Camera status info list

Type	Format
Request	6d,4b,01,fe\n
Reply	6d,8b,[DLEN],fe,[NUM],([CAM No.],00,[CAM Status])…\n

Parameters:

DLEN: Data length after “[DLEN]”
“fe”: Fixed value. No other value is permitted.
NUM: Number of parameters on this command.
when Reply, this means number of “[CAM No],00,[CAM Status]”
CAM No.: “01”-“60” (1-96 in Decimal)
“00”: Fixed value. No other value is permitted.
CAM status: “00” = not Available, “01” = Available Camera is recognized as available when it is turned on and is connected to the CNS.

Example:

Send: “6d,4b,01,fe\n”

Receive:
"6d,8b,26,fe,0c,01,00,01,02,00,00,03,00,00,04,00,01,05,00,00,06,00,00,07,00,00,08,00,00,09,00,00,0a,00,00,0b,00,00,0c,00,00\n"

Reply from Master is:
There are 12 Cameras.
Camera No.1 and No.4 are available, and others are not available.

Commands to get RCP status information

Get RCP number range info

Type	Format
Request	6d,4c,02,fe,12\n
Reply	6d,8c,06,fe,12,00,[RCP No. Min],00,[RCP No. Max]\n

Parameters:

RCP No. Min: Minimal value of RCP number, "01"-"60" (1-96 in Decimal)
RCP No. Max: Maximal value of RCP number, "01"-"60" (1-96 in Decimal)

Example:
Send: "6d,4c,02,fe,12\n"
Receive: "6d,8c,06,fe,12,00,01,00,0c\n"
Reply from Master is:
Available RCP on the CNS has the number in range from 1 to 12.

Get RCP status info

Type	Format
Request	6d,4d,[DLEN],fe,12,[NUM],(00,[RCP No.])…\n
Reply	6d,8d,[DLEN],fe,12,[NUM],(00,[RCP No.],fe,[CAM No.],[RCP Status])…\n

Parameters:

DLEN: Data length after "[DLEN]"
"fe,12": Fixed value. No other value is permitted.
NUM: Number of parameters on this command.
when Request, this means number of "00,
[RCP No.]", range is "01"-"19" (1-25 in Decimal)
when Reply, this means number of "00,[RCP No.],fe,[CAM No.],[RCP Status]"
"00": Fixed value. No other value is permitted.
RCP No.: "01"-"60" (1-96 in Decimal)
"fe": Fixed value. No other value is permitted.
CAM No.: Camera to which RCP is assigned, "01"-"60" (1-96 in Decimal), "00"=None
RCP status: Status is presented by bit info.
bit 1: 0 = Assignment is default,
1 = Assignment has been changed
bit 0: 0 = not Available, 1 = Available
RCP is recognized as available when it is turned on and is connected to the CNS.

Example:
1. Request status of RCP No.1.
Send: "6d,4d,05,fe,12,01,00,01\n"
Receive: "6d,8d,08,fe,12,01,00,01,fe,01,01\n"
Reply from Master is:
RCP No.1 is assigned to Camera No.1, its assignment is default and it is available.

2. Request status of RCP No.1 and RCP No.4.
Send: "6d,4d,07,fe,12,02,00,01,00,04\n"
Receive:
"6d,8d,0d,fe,12,02,00,01,fe,01,01,00,04,fe,01,03\n"
Reply from Master is:
RCP No.1 is assigned to Camera No.1, its assignment is default and it is available.
RCP No.4 is assigned to Camera No.1, its assignment has been changed and it is available.

Get Available RCP status info list

Type	Format
Request	6d,4e,02,fe,12\n
Reply	6d,8e,[DLEN],fe,12,[NUM],(00,[RCP No.],fe,[CAM No.],[RCP Status])…\n

Parameters:

DLEN: Data length after "[DLEN]"
"fe,12": Fixed value. No other value is permitted.
NUM: Number of parameters on this command.
when Reply, this means number of "00,[RCP No.],fe,[CAM No.],[RCP Status]"
"00": Fixed value. No other value is permitted.
RCP No.: "01"-"60" (1-96 in Decimal)
"fe": Fixed value. No other value is permitted.
CAM No.: Camera to which RCP is assigned, "01"-"60"
(1-96 in Decimal), "00"=None
RCP status: Status is presented by bit info.
bit 1: 0 = Assignment is default,
1 = Assignment has been changed
bit 0: 0 = not Available, 1 = Available
RCP is recognized as available when it is turned on and is connected to the CNS.

Example:
Send: "6d,4e,02,fe,12\n"
Receive:
"6d,8e,0d,fe,12,02,00,01,fe,01,01,00,04,fe,01,03\n"
Reply from Master is:
There are two RCP available in the CNS, the number of which is 1 and 4.
RCP No.1 is assigned to Camera No.1, its assignment is default and it is available.
RCP No.4 is assigned to Camera No.1, its assignment has been changed and it is available.

Get All RCP status info list

Type	Format
Request	6d,4f,02,fe,12\n
Reply	6d,8f,[DLEN],fe,12,[NUM],(00,[RCP No.],fe,[CAM No.],[RCP Status])…\n

Parameters:

DLEN:	Data length after “[DLEN]”
“fe,12”:	Fixed value. No other value is permitted.
NUM:	Number of parameters on this command. when Reply, this means number of “00, [RCP No.],fe,[CAM No.],[RCP Status]”
“00”:	Fixed value
RCP No.:	“01”-“60” (1-96 in Decimal)
“fe”:	Fixed value. No other value is permitted.
CAM No.:	Camera to which RCP is assigned, “01”-“60” (1-96 in Decimal), “00”=None
RCP status:	Status is presented by bit info. bit 1: 0 = Assignment is default, 1 = Assignment has been changed bit 0: 0 = not Available, 1 = Available RCP is recognized as available when it is turned on and is connected to the CNS.

Example:

Send: “6d,4f,02,fe,12\n”

Receive:

“6d,8f,30,fe,12,09,00,01,fe,01,01,00,02,fe,00,00,00,03,fe,00,00,00,04,fe,04,01,00,05,fe,00,00,00,06,fe,00,00,00,07,fe,00,00,00,08,fe,00,00,00,09,fe,00,00\n”

“6d,8f,12,fe,12,03,00,0a,fe,00,00,00,0b,fe,00,00,00,0c,fe,00,00\n”

Two commands are sent from Master device because total length of the reply info is over the limitation of command length, 168 characters.

Reply from Master is:

There are 12 RCPs.

RCP No.1 is assigned to Camera No.1, its assignment is default and it is available.

RCP No.4 is assigned to Camera No.1, its assignment has been changed and it is available.

Other RCPs, their number are other than 1 and 4, are assigned to none of Camera and are not available.

Commands to change RCP assignment status

Change RCP assignment status

Type	Format
Request	6d,6d,[DLEN],fe,12,[NUM],(00,[RCP No.],fe,[CAM No.],00,00)…\n
Reply	same as reply of “Get RCP status info”

Parameters:

DLEN:	Data length after “[DLEN]”
“fe,12”:	Fixed value. No other value is permitted.
NUM:	Number of parameters on this command. “01”-“08” (1-8 in Decimal) when Request, this means number of “00, [RCP No.],fe,[CAM No.],00,00”
“00”:	Fixed value. No other value is permitted.
RCP No.:	“01”-“60” (1-96 in Decimal)
“fe”:	Fixed value. No other value is permitted.
CAM No.:	Camera to which you want to assign, “01”-“60” (1-96 in Decimal), “00”=None
“00,00”:	Fixed value. No other value is permitted.

Example:

1. change assign of RCP No.1 to Camera No.4

Send: “6d,6d,09,fe,12,01,00,01,fe,04,00,00\n”

Receive: “6d,8d,08,fe,12,01,00,01,fe,04,03\n”

Reply from Master is:

RCP No.1 is assigned to Camera No.4, its assignment has been changed and it is available.

2. change assignment of RCP No.1 to Camera No.4, and assignment of RCP No.4 to Camera No.1

Send:

“6d,6d,0f,fe,12,02,00,01,fe,04,00,00,00,04,fe,01,00,00\n”

Receive:

“6d,8d,0d,fe,12,02,00,01,fe,04,03,00,04,fe,01,03\n”

Reply from Master is:

RCP No.1 is assigned to Camera No.4, its assignment has been changed and it is available.

RCP No.4 is assigned to Camera No.1, its assignment has been changed, and it is available.

Reset RCP assignment status

Type	Format
Request	6d,ad,[DLEN],fe,12,[NUM],(00,[RCP No.])…\n
Reply	same as reply of “Get RCP status info” (Reply contains RCP status info of which assignment has been changed)

Parameters:

DLEN:	Data length after “[DLEN]”
“fe,12”:	Fixed value. No other value is permitted.
NUM:	Number of parameters on this command. “01”-19” (1-25 in Decimal) when Request, this means number of “00, [RCP No.]”
“00”:	Fixed value. No other value is permitted.
RCP No.:	“01”-“60” (1-96 in Decimal)

Example:

1. reset assignment of RCP No.1

Send: “6d,ad,05,fe,12,01,00,01\n”

Receive: “6d,8d,08,fe,12,01,00,01,fe,01,01\n”

Reply from Master is:

RCP No.1 is assigned to Camera No.1, its assignment is default and it is available.

2. reset assignment of RCP No.1 and RCP No.4

Send: “6d,ad,07,fe,12,02,00,01,00,04\n”

Receive:

“6d,8d,0d,fe,12,02,00,01,fe,01,01,00,04,fe,04,01\n”

Reply from Master is:

RCP No.1 is assigned to Camera No.1, its assignment is default and it is available.

RCP No.4 is assigned to Camera No.4, its assignment is default and it is available.

Reset All RCP assignment status

Type	Format
Request	6d,ae,02,fe,12\n
Reply	same as reply of “Get RCP status info” (Reply contains RCP status info of which assignment has been changed)

Parameters:

None

Example:

When RCP No.1 is assigned to Camera No.1, and RCP No.4 is assigned to Camera No.1.

Send: “6d,ae,02,fe,12\n”

Receive: “6d,8d,08,fe,12,01,00,04,fe,04,01\n”

Reply from Master is:

RCP No.4 is assigned to Camera No.4, its assignment is default and it is available.

The status of RCP No.1 isn’t included in the reply command because its assignment is already default and hasn’t been changed.

List of available commands

Command							Usage
Command Category	**Command Type**	**Command Name**	**CMD_GP (Relative/ Absolute)**	**PARAM0**	**PARAM1**	**PARAM2**	
System Control	Other command	return_ setting	0x07	0x02	0x04	0x40	[PARAM3] return number [PARAM4] 0x50 [PARAM5] FORMAT_CODE_2 of v1.0 Format Code * Available if HZC-MSCN1 optional software is installed
	Bit command	tally	0x08/0x09	0x20	TALLY_ DATA	–	TALLY_DATA= bit0 Red bit1 Green bit2 Yellow
	Other command	call	0x0b	SENDER_ SRCID	0x00	CALL VALUE	SENDER_SRCID= 0x90 when your system works as Controller 0x20 when your system works as Camera CALL VALUE= 0x80 current status query 0x81 Call off 0x82 Call on (two seconds)
		panel_active	0x0b	SENDER_ SRCID	0x01	CONTROL VALUE	SENDER_SRCID= 0x90 CONTROL VALUE= 0x00 Current active status query 0x01 Active-off (release own control to Camera) 0x02 Active-on (get control to Camera) 0x81 Active-off status reply 0x82 Active-on status reply *This command is available in condition of Panel Active Function of CNA-1 is enabled (default is disable).
		iris_active	0x0b	SENDER_ SRCID	0x02	CONTROL VALUE	Same as panel_active command but this command affects only Iris and MasterBlack control.
		para	0x0b	SENDER_ SRCID	0x03	CONTROL VALUE	Same as panel_active command but this command does not affect permission of another control panel (parallel control can be used). * Iris, Master Black, all absolute word commands are not allowed in the permission received by this command.

Command							Usage
Command Category	**Command Type**	**Command Name**	**CMD_GP (Relative/ Absolute)**	**PARAM0**	**PARAM1**	**PARAM2**	
CHU Function Control	Inc/Dec command	shutter_ speed	0x20/0x21	0x00	INC/DEC value	–	Bit5-0 00: 1/60 01: 1/100 02: 1/125 03: 1/250 04: 1/500 05: 1/1000 06: 1/2000 07: 1/3000 08: 1/4000 09: 1/5000 0A: 1/10000 0B: 1/32 0C: 1/33 0D: 1/40 0E: 1/48 0F: 1/50 10: 1/96 11: 1/120
		master_gain		0x01	INC/DEC value	–	Bit5-0 00: -6dB 01: -3dB 02: 0dB 03: 3dB 04: 6dB 05: 9dB 06: 12dB 07: 15dB 08: 18dB 09: 21dB 0A: 24dB 0B: 27dB 0C: 30dB 0D: 33dB 0E: 36dB 0F: 39dB 10: 42dB 11: 45dB 12: 48dB 13: 51dB 14: 54dB 15: 57dB 16: 60dB
		nd_filter		0x03	INC/DEC value	–	Bit5-0 00: Filter 1-1 (ND 1) 01: Filter 1-2 (ND 2) 02: Filter 1-3 (ND 3) 03: Filter 1-4 (ND 4) 04: Filter 1-5 (ND 5)
		cc_filter		0x04	INC/DEC value	–	Bit5-0 00: Filter 2-1 (CC A) 01: Filter 2-2 (CC B) 02: Filter 2-3 (CC C) 03: Filter 2-4 (CC D) 04: Filter 2-5 (CC E)

Command							Usage
Command Category	Command Type	Command Name	CMD_GP (Relative/ Absolute)	PARAM0	PARAM1	PARAM2	
CHU Function Control	Inc/Dec command	master_ gamma_ select	0x20/0x21	0x06	INC/DEC value	–	Bit5-0 00: 1 01: 0.95 02: 0.90 03: 0.85 04: 0.80 05: 0.75 06: 0.70 07: 0.65 08: 0.60 09: 0.55 0A: 0.50 0B: 0.45 0C: 0.40 0D: 0.35 0E: 0.30 0F: 0.25 10: 0.20 11: 0.15 12: 0.10
		mic1_gain_ select		0x08	INC/DEC value	–	Bit5-0 1C: -60dB 1D: -50dB 1E: -40dB 1F: -30dB 20: -20dB
		mic2_gain_ select		0x09	INC/DEC value	–	Bit5-0 1C: -60dB 1D: -50dB 1E: -40dB 1F: -30dB 20: -20dB
		auto_iris_ window_ select		0x0a	INC/DEC value	–	Bit5-0 00: Cutting the top end 01: Cutting the top, bottom, left and right ends 02: Cutting the left and right ends 03: Cutting uniformly 04: Cutting the top, left and right ends 05: Cutting the bottom end 06: Variable-Window
		preset_mtx_ select		0x0d	INC/DEC value	–	Bit5-0 00: Default 01: SMPTE-240M 02: REC-709 03: SMPTE-WIDE 04: NTSC 05: EBU
		standard_ gamma_ table_mode		0x13	INC/DEC value	–	Bit5-0 00: Standard 01: Special 1 02: Special 2 03: User
		standard_ gamma_ select		0x14	INC/DEC value	–	
		special_ gamma_ select		0x15	INC/DEC value	–	

Command							Usage
Command Category	**Command Type**	**Command Name**	**CMD_GP (Relative/ Absolute)**	**PARAM0**	**PARAM1**	**PARAM2**	
CHU Function Control	Inc/Dec command	hyper_ gamma_ select	0x20/0x21	0x16	INC/DEC value	–	
		user_gamma _select		0x17	INC/DEC value	–	
		blk_gamma_ RGB_low_ range		0x18	INC/DEC value	–	Bit5-0 00: Low Range 01: Lower Middle Range 02: Higher Middle Range 03: High Range
		low_key_sat _low_range		0x1d	INC/DEC value	–	Bit5-0 00: Low Range 01: Lower Middle Range 02: Higher Middle Range 03: High Range
		sls_select		0x20	INC/DEC value	–	Bit5-0 00: 1F 01: 2F 02: 3F 03: 4F 04: 5F 05: 6F 06: 7F 07: 8F 08: 11F 09: 12F 0A: 15F 0B: 16F 0C: 22F 0D: 24F 0E: 25F 0F: 30F 10: 32F 11: 45F 12: 48F 13: 50F 14: 60F 15: 64F 16: 90F 17: 96F 18: 100F 19: 120F 1A: 128F 1B: 180F 1C: 192F 1D: 200F 1E: 240F 1F: 256F

Command							Usage
Command Category	**Command Type**	**Command Name**	**CMD_GP (Relative/ Absolute)**	**PARAM0**	**PARAM1**	**PARAM2**	
CHU Function Control	Inc/Dec command	acg_max_ gain	0x20/0x21	0x21	INC/DEC value	–	Bit5-0 00: -6dB 01: -3dB 02: 0dB 03: 3dB 04: 6dB 05: 9dB 06: 12dB 07: 15dB 08: 18dB 09: 21dB 0A: 24dB 0B: 27dB 0C: 30dB 0D: 33dB 0E: 36dB 0F: 39dB 10: 42dB 11: 45dB 12: 48dB 13: 51dB 14: 54dB 15: 57dB 16: 60dB
		digital_ extender		0x27	INC/DEC value	–	Bit5-0 00: x1.0 (OFF) 01: x1.5 02: x2.0 03: x2.5 04: x3.0 05: x3.5 06: x4.0 07: x4.5 08: x5.0 09: x5.5 0A: x6.0 0B: x6.5 0C: x7.0 0D: x7.5 0E: x8.0
		flicker_ reduce_area _select		0x28	INC/DEC value	–	* Only for HDC3300.
		compensation		0x29	INC/DEC value	–	

Command							Usage
Command Category	Command Type	Command Name	CMD_GP (Relative/ Absolute)	PARAM0	PARAM1	PARAM2	
CHU Function Control	Inc/Dec command	ns_level_ mode	0x20/0x21	0x2a	INC/DEC value	–	Bit5-0 00: 0% (OFF) 01: 5% 02: 10% 03: 15% 04: 20% 05: 25% 06: 30% 07: 35% 08: 40% 09: 45% 0A: 50% 0B: 55% 0C: 60% 0D: 65% 0E: 70% 0F: 75% 10: 80% 11: 85% 12: 90% 13: 95% 14: 100%
		flicker_ reduce_ave_ mode		0x2d	INC/DEC value	–	* Only for HDC3300.
	Byte command	3D_camera_ select		0x2e	LEFT/ RIGHT/ BOTH	–	LEFT=0x00, RIGHT=0x01. BOTH=0x02 *Only for HDFA-200
	Bit command	chu_function 01		0x81	ON/OFF bit value	–	Bit 7: Knee Saturation 6: Auto Knee 5: Knee 4: Gamma 3: Flare 2: S-EVS 1: ECS 0: Shutter
		chu_function 02		0x82	ON/OFF bit value	–	Bit 7: Detail Level Depend 6: Detail 5: User Matrix 4: Preset Matrix 3: V Mod Saw 2: Black Gamma 1: White Clip 0: Knee Aperture
		chu_function 03		0x83	ON/OFF bit value	–	Bit 7: Slim Detail 6: Multi Matrix 5: N/A 4: Matrix 3: Auto Iris 2: Skin Gate 1: Skin Detail 0: Iris Close
		chu_function 04		0x84	ON/OFF bit value	–	Bit 7: N/A 6: ATW 5-0: N/A

Command							Usage
Command Category	**Command Type**	**Command Name**	**CMD_GP (Relative/ Absolute)**	**PARAM0**	**PARAM1**	**PARAM2**	
CHU Function Control	Bit command	chu_system_mode	0x20/0x21	0x85	ON/OFF bit value	–	Bit 7: CHU Saturation Enable * If your system (works as Camera) has Saturation control function, your system should send this command with bit7=1 to Sony Control Panel. 6: ECS Display Type 5-2: N/A 1: SD/HD 0: NTSC/PAL
		test_signal_select		0x86	ON/OFF bit value	–	Bit 7: CHU Bars 6-3: N/A 2: Test3 10 step 1: Test2 3 or 10 step 0: Test1 Saw
		chu_function 05		0x87	ON/OFF bit value	–	Bit 7-6: N/A 5: N/A 4: Knee Max 3: N/A 2: 5600K 1: N/A 0: Filter Remote/Local Select * If your system's filter can be controlled remotely, your system should send this command with bit0 = 0 (Filter Remote) to Sony Control Panel.
		chu_function 06		0x89	ON/OFF bit value	–	Bit 7-5: N/A 4: Slow Shutter 3-0: N/A
		highlight_creation_hdr_white_clip		0x8c	ON/OFF bit value	–	Bit 7: Highlight Creation ON 6: HDR White Clip ON 5-0: N/A
		chu_function 07		0x8b	ON/OFF bit value	–	Bit 7: N/A 6: Flicker Reduction 5-1: N/A 0: Low Key Matrix
		skin_detail_ch		0x8d	ON/OFF bit value	–	Bit 7-4: N/A 3: Natural Skin Detail 2: CHU Skin Detail CH3 1: CHU Skin Detail CH2 0: CHU Skin Detail CH1

Command							Usage
Command Category	**Command Type**	**Command Name**	**CMD_GP (Relative/ Absolute)**	**PARAM0**	**PARAM1**	**PARAM2**	
CHU Function Control	Bit command	skin_detail_ gate_ch	0x20/0x21	0x8e	ON/OFF bit value	–	Bit 7-4: N/A 3: HD Detail Reduction 2: CHU Skin Gate CH3 1: CHU Skin Gate CH2 0: CHU Skin Gate CH1
		hdr_y_knee_ on		0x90	ON/OFF bit value	–	Bit 7: N/A 6: HDR Y Knee ON 5-0: N/A
		chu_function 08		0x94	ON/OFF bit value	–	Bit 7-6: N/A 5: Select FPS 4-3: N/A 2: Zoom/Focus Remote On 1: N/A 0: Saturation
		flicker_ reduction_ hdr_setting		0x99	ON/OFF bit value	–	Bit 7: White Balance OFF 6: Gain OFF 5: Input Black Level Adjustment Mode ON 4: AIR Matching ON 3: Additional Paint ON 2: Through Mode ON 1: N/A 0: Flicker reduction Power Frequency (50Hz=0, 60Hz=1)
		live_tone_ control		0x9c	ON/OFF bit value	–	Bit 7-4: N/A 3: High Tone ON/OFF 2: Mid Tone ON/OFF 1: Low Tone ON/OFF 0: Live Tone Control ON/OFF
		hdr_black_ clip_black_ compression		0x9d	ON/OFF bit value	–	Bit 7-2: N/A 1: HDR Black Clip ON/OFF 0: HDR Black Compression ON/OFF
		chu_mode_ sw00		0xa0	ON/OFF bit value	–	Bit 7: Adaptive Matrix 6-0: N/A
		chu_mode_ sw01		0xa1	ON/OFF bit value	–	Bit 7: N/A 6: Auto ND ON 5: AE ON 4: AGC ON 3: EVS Iris Follow ON 2: Auto Iris Double Mode 1: Filter Local Enable 0: Iris Position Mode
		chu_mode_ sw02		0xa2	ON/OFF bit value	–	Bit 7-2: N/A 1: Adaptive Knee Mode 0: N/A
		chu_mode_ sw03		0xa3	ON/OFF bit value	–	Bit 7-4: N/A 3: Noise Suppression 2-0: N/A

Command							Usage
Command Category	**Command Type**	**Command Name**	**CMD_GP (Relative/ Absolute)**	**PARAM0**	**PARAM1**	**PARAM2**	
CHU Function Control	Bit command	chu_mode_ sw04	0x20/0x21	0xa4	ON/OFF bit value	–	Bit 7-2: N/A 1: V Detail Source Mode 0: Freq 1001/1000 1001=0 , 1000=1
				0xc2	ON/OFF bit value	–	Bit 7: N/A 6: SD Detail 5-0: N/A
	Word command	white_R	0x22/0x23	0x01	value H	value L	Effective size = 10bits
		white_G		0x02	value H	value L	
		white_B		0x03	value H	value L	
		master_mod _shd_v_saw		0x04	value H	value L	
		mod_shd_v_ saw_R		0x05	value H	value L	
		mod_shd_v_ saw_G		0x06	value H	value L	
		mod_shd_v_ saw_B		0x07	value H	value L	
		master_flare		0x08	value H	value L	
		flare_R		0x09	value H	value L	
		flare_G		0x0a	value H	value L	
		flare_B		0x0b	value H	value L	
		detail_limiter		0x0c	value H	value L	
		detail_white_ limiter		0x0d	value H	value L	
		detail_black_ limiter		0x0e	value H	value L	
		master_ black_ gamma		0x10	value H	value L	
		black_ gamma_R		0x11	value H	value L	
		black_ gamma_G		0x12	value H	value L	
		black_ gamma_B		0x13	value H	value L	
		master_knee _point		0x14	value H	value L	
		knee_point_ R		0x15	value H	value L	
		knee_point_ G		0x16	value H	value L	
		knee_point_ B		0x17	value H	value L	
		master_knee _slope		0x18	value H	value L	
		knee_slope_ R		0x19	value H	value L	

Command							Usage
Command Category	Command Type	Command Name	CMD_GP (Relative/ Absolute)	PARAM0	PARAM1	PARAM2	
CHU Function Control	Word command	knee_slope_ G	0x22/0x23	0x1a	value H	value L	Effective size = 10bits
		knee_slope_ B		0x1b	value H	value L	
		master_ gamma		0x1c	value H	value L	
		gamma_R		0x1d	value H	value L	
		gamma_G		0x1e	value H	value L	
		gamma_B		0x1f	value H	value L	
		master_ white_clip		0x20	value H	value L	
		white_clip_R		0x21	value H	value L	
		white_clip_G		0x22	value H	value L	
		white_clip_B		0x23	value H	value L	
		flicker_ reduce_gain _m		0x24	value H	value L	
		flicker_ reduce_ofs_ m		0x28	value H	value L	
		HD_detail_ level		0x30	value H	value L	
		HD_detail_ crispening		0x31	value H	value L	
		HD_detail_ H/V_ratio		0x32	value H	value L	
		HD_detail_ limitter		0x33	value H	value L	
		HD_detail_ white_limitter		0x34	value H	value L	
		HD_detail_ black_limitter		0x35	value H	value L	
		HD_detail_ frequency		0x36	value H	value L	
		HD_detail_ level_ depend		0x37	value H	value L	
		SDR_gain		0x3c	value H	value L	
		HDR_black_ offset		0x3d	value H	value L	
		HDR_Y_ knee_point		0x3e	value H	value L	
		HDR_Y_ knee_slope		0x3f	value H	value L	
		ecs_ frequency		0x41	value H	value L	
		evs_data		0x42	value H	value L	

Command							Usage
Command Category	Command Type	Command Name	CMD_GP (Relative/ Absolute)	PARAM0	PARAM1	PARAM2	
CHU Function Control	Word command	skin_detail_ phase	0x22/0x23	0x43	value H	value L	Effective size = 10bits
		skin_detail_ width		0x44	value H	value L	
		chu_optical_ level		0x47	value H	value L	Effective size = 15bits unsigned
		skin_detail2_ phase		0x54	value H	value L	Effective size = 10bits
		skin_detail2_ width		0x55	value H	value L	
		skin_detail3_ phase		0x56	value H	value L	
		skin_detail3_ width		0x57	value H	value L	
		iris		0x60	value H	value L	Effective size = 12bits unsigned
		acg_f_value		0x71	value H	value L	Effective size = 12bits unsigned
		ae_max_ freq_setting		0x72	value H	value L	Effective size = 10bits
		ae_f_value		0x73	value H	value L	Effective size = 12bits unsigned
		focus_control		0x76	value H	value L	Effective size = 16bits
		focus_value_ percent		0x77	value H	value L	Effective size = 16bits
		focus_value_ meter		0x78	value H	value L	Effective size = 16bits
		zoom_control		0x79	value H	value L	Effective size = 16bits
		zoom_speed _control		0x7a	value H	value L	Effective size = 16bits
		zoom_value _percent		0x7b	value H	value L	Effective size = 16bits
		zoom_value _milimeter		0x7c	value H	value L	Effective size = 16bits
		detail_level		0x9b	value H	value L	Effective size = 10bits
		detail_ crispening		0x9c	value H	value L	
		detail_mix_ ratio		0x9d	value H	value L	
		detail_HV_ ratio		0x9e	value H	value L	
		H_detail_HL _ratio		0x9f	value H	value L	
		detail_level_ depend		0xa0	value H	value L	
		skin_detail_ level		0xa1	value H	value L	
		skin_detail_ sat		0xa2	value H	value L	

Command							Usage
Command Category	Command Type	Command Name	CMD_GP (Relative/ Absolute)	PARAM0	PARAM1	PARAM2	
CHU Function Control	Word command	matrix_GR_R	0x22/0x23	0xa3	value H	value L	Effective size = 10bits
		matrix_BR_R		0xa4	value H	value L	
		matrix_RG_G		0xa5	value H	value L	
		matrix_BG_G		0xa6	value H	value L	
		matrix_RB_B		0xa7	value H	value L	
		matrix_GB_B		0xa8	value H	value L	
		master_ black		0xa9	value H	value L	Effective size = 12bits signed
		black_R		0xaa	value H	value L	Effective size = 10bits
		black_G		0xab	value H	value L	
		black_B		0xac	value H	value L	
		knee_sat_ slope		0xae	value H	value L	
		knee_ aperture		0xaf	value H	value L	
		comb_filter		0xb0	value H	value L	
		low_key_clip _level		0xb7	value H	value L	
		adaptive_ knee_point		0xc4	value H	value L	
		adaptive_ knee_slope		0xc5	value H	value L	
		slim_detail		0xc6	value H	value L	
		skin_detail2_ level		0xc7	value H	value L	
		skin_detail2_ sat		0xc8	value H	value L	
		skin_detail3_ level		0xc9	value H	value L	
		skin_detail3_ sat		0xca	value H	value L	
		chu_ saturation		0xd2	value H	value L	
		white_color_ temp_ctrl		0xdc	value H	value L	
		chu_color_ temp_ balance		0xde	value H	value L	
		select_fps		0xdf	value H	value L	
		SD_detail_ level		0xe0	value H	value L	
		SD_detail_ crispening		0xe1	value H	value L	

Command							Usage
Command Category	Command Type	Command Name	CMD_GP (Relative/ Absolute)	PARAM0	PARAM1	PARAM2	
CHU Function Control	Word command	SD_detail_ H/V_ratio	0x22/0x23	0xe2	value H	value L	Effective size = 10bits
		SD_detail_ limitter		0xe3	value H	value L	
		SD_detail_ white_limitter		0xe4	value H	value L	
		SD_detail_ black_limitter		0xe5	value H	value L	
		SD_detail_ frequency		0xe6	value H	value L	
		SD_detail_ level_ depend		0xe7	value H	value L	
		SD_detail_ detail_comb		0xeb	value H	value L	
		master_ white_gain		0xf2	value H	value L	
		HD_detail_ mix_ratio	0x3c/0x3d	0x66	value H	value L	Effective size = 10bits
		HD_knee_ aperture		0x67	value H	value L	
		4K_detail_ level		0x68	value H	value L	
		4K_detail_ crispening		0x69	value H	value L	
		4K_detail_ mix_ratio		0x6a	value H	value L	
		4K_detail_ H/V_ratio		0x6b	value H	value L	
		4K_detail_ limiter		0x6c	value H	value L	
		4K_detail_ white_limitter		0x6d	value H	value L	
		4K_detail_ black_limitter		0x6e	value H	value L	
		4K_detail_ frequency		0x6f	value H	value L	
		4K_detail_ level_ depend		0x70	value H	value L	
		4K_knee_ aperture		0x71	value H	value L	
		8K_detail_ level		0x72	value H	value L	
		8K_detail_ crispening		0x73	value H	value L	
		8K_detail_ mix_ratio		0x74	value H	value L	

Command							Usage
Command Category	Command Type	Command Name	CMD_GP (Relative/ Absolute)	PARAM0	PARAM1	PARAM2	
CHU Function Control	Word command	8K_detail_ H/V_ratio	0x3c/0x3d	0x75	value H	value L	Effective size = 10bits
		8K_detail_ limiter		0x76	value H	value L	
		8K_detail_ white_limitter		0x77	value H	value L	
		8K_detail_ black_limitter		0x78	value H	value L	
		8K_detail_ frequency		0x79	value H	value L	
		8K_detail_ level_ depend		0x7a	value H	value L	
		8K_knee_ aperture		0x7b	value H	value L	
		HDR_white_ clip_level		0x7e	value H	value L	Effective size = 16bits signed
		highlight_ creation_ point		0x7f	value H	value L	
		highlight_ creation_ slope		0x80	value H	value L	
		HD_detail_ reduction_ level		0x81	value H	value L	
		HD_detail_ reduction_ frequency		0x82	value H	value L	
		input_black_ level		0x83	value H	value L	
		SDR_ output_ black_level		0x84	value H	value L	
		HDR_ output_ black_level		0x85	value H	value L	
		low_tone_ level_R		0x86	value H	value L	
		low_tone_ level G		0x87	value H	value L	
		low_tone_ level B		0x88	value H	value L	
		low_tone_ level_master		0x89	value H	value L	
		low_tone_ width		0x8a	value H	value L	

Command							Usage
Command Category	**Command Type**	**Command Name**	**CMD_GP (Relative/ Absolute)**	**PARAM0**	**PARAM1**	**PARAM2**	
CHU Function Control	Word command	mid_tone_ level_R	0x3c/0x3d	0x8b	value H	value L	Effective size = 16bits signed
		mid_tone_ level G		0x8c	value H	value L	
		mid_tone_ level B		0x8d	value H	value L	
		mid_tone_ level_master		0x8e	value H	value L	
		mid_tone_ width		0x8f	value H	value L	
		mid_tone_ center		0x90	value H	value L	
		high_tone_ level_R		0x91	value H	value L	
		high_tone_ level_G		0x92	value H	value L	
		high_tone_ level_B		0x93	value H	value L	
		high_tone_ level_master		0x94	value H	value L	
		hight_tone_ curve		0x95	value H	value L	
CHU AutoSetup Control	Other command	auto_setup	0x25	TYPE	EXECUTE / STATUS	–	TYPE 0x00: Status query 0x01: Auto White Balance 0x02: Auto Black Balance 0x03: Auto Level 0x07: Skin Detail Auto Hue(CH1) 0x0A: Skin Detail Auto Hue(CH2) 0x0B: Skin Detail Auto Hue(CH3) EXECUTE / STATUS 0x00: Status query 0x01: Start 0x02: Break 0x03: OK 0x04: NG 0x05: Under execution 0x06: Standby 0x07: Cancel Standby 0x08: Reset Status 0x09: Busy

Command							Usage
Command Category	**Command Type**	**Command Name**	**CMD_GP (Relative/ Absolute)**	**PARAM0**	**PARAM1**	**PARAM2**	
CHU Scene FileControl	Other command	scene_file_ control	0x27	EXECUTE / STATUS	0x03	FILE_NO	EXECUTE / STATUS 0x00: Canceling the operation (Cancel) 0x01: Initialization (Formatting) 0x02: Calling 0x03: Saving 0x04: Erasing 0x05: Canceling the call 0x06: Status request 0x07: File call in progress 0x08: This file contains data that is not called 0x09: There is a file but no data 0x0a: The corresponding file does not exist 0x0b: Transmission of number of files 0x0c: File operation is not possible at present. Or, this command was transmitted while file operation was not possible for some reason. FILE_NO 1-32 (Decimal)
Converter All-Settings File Control	Other command	converter_ all_settings_ file	0x27	EXECUTE / STATUS	0x1b	FILE_NO	EXECUTE / STATUS 00H Canceling the operation (Cancel) 01H Initialization (Formatting) 02H Calling 03H Saving 04H Erasing 05H Canceling the call 06H Status request 07H File call in progress 08H This file contains data that is not called 09H There is a file but no data 0AH The corresponding file does not exist 0BH Transmission of number of files 0CH File operation is not possible at present. Or, this command was transmitted while file operation was not possible for some reason. FILE_NO 1-32 (Decimal)
Utility	Other command	chu_switch_ with_mask	0x29	SW_ADDR	SW_DATA	MASK_ DATA	Only absolute control. This command helps you to send Bit-type command absolutely. PARAM0-1 are same as an absolute Bit command. PARAM2 is masking datum for PARAM1. Each bit of PARAM1 is enabled when PARAM2 bit set to 1.

Command							Usage
Command Category	**Command Type**	**Command Name**	**CMD_GP (Relative/ Absolute)**	**PARAM0**	**PARAM1**	**PARAM2**	
CCU Function Control	Inc/Dec command	gen_lock_ mode	0x40/0x41	0x0a	INC/DEC value	MODE	MODE 00H: SD Analog 01H:: D1 Mode 02H: D2 Mode 03H: HD SDI Mode 04H: SD Digital 05H: HD Digital 06H-3FH: reserved * Available if HZC-MSCN1 optional software is installed
	Bit command	ccu_function 00		0x10	ON/OFF bit value	–	Bit 7: N/A 6: CCU Skin Gate 5-2: N/A 1: Chroma 0: CCU Bars
		ccu_function 01		0x12	ON/OFF bit value	–	Bit 7-3: N/A 2: Mono 1-0: N/A
		preview_ control		0x31	ON/OFF bit value	–	Bit 7-1: N/A 0: Preview
	Inc/Dec command	SD_letter_ box_mode		0x40	INC/DEC value	–	Bit5-0 00: 16:9 01: 15:9 02: 14:9 03: 13:9 04: 12:9
	Bit command	system 1000/ 1001		0x83	ON/OFF bit value	–	BIT0 0 FREQ 1001 1 FREQ 1000 * Available if HZC-MSCN1 optional software is installed
		SD_function 02		0xc2	ON/OFF bit value	–	Bit 7: N/A 6: SD Detail 5: SD User Matrix 4: SD Preset Matrix 3-0: N/A
		SD_function 03		0xc3	ON/OFF bit value	–	Bit 7: N/A 6: SD Multi Matrix 5: N/A 4: SD Matrix 3-0: N/A
		crop_control		0xe0	ON/OFF bit value	–	Bit 7-4: N/A 3: HD 16:9 squeeze 2: HD Letter Box 1: HD 4:3 Edge Crop 0: HD Crop Center Lock

Command							Usage
Command Category	**Command Type**	**Command Name**	**CMD_GP (Relative/ Absolute)**	**PARAM0**	**PARAM1**	**PARAM2**	
CCU Function Control	Word command	mono_ saturation	0x42/0x43	0x07	value H	value L	Effective size = 10bits
		mono_hue		0x08	value H	value L	
		crop_ position		0x70	value H	value L	
		SD_detail_ limiter		0x8c	value H	value L	
		SD_detail_ white_limiter		0x8d	value H	value L	
		SD_detail_ black_limiter		0x8e	value H	value L	
		SD_master_ gamma		0x9c	value H	value L	
		SD_matrix_ GR_R		0xa3	value H	value L	
		SD_matrix_ BR_R		0xa4	value H	value L	
		SD_matrix_ RG_G		0xa5	value H	value L	
		SD_matrix_ BG_G		0xa6	value H	value L	
		SD_matrix_ RB_B		0xa7	value H	value L	
		SD_matrix_ GB_B		0xa8	value H	value L	
		SD_detail_ comb		0xb0	value H	value L	
		SD_detail_ level		0xdb	value H	value L	
		SD_detail_ crispening		0xdc	value H	value L	
		SD_detail_ HV_ratio		0xde	value H	value L	
		SD_detail_ frequency		0xdf	value H	value L	
		SD_detail_ level_ depend		0xe0	value H	value L	
		optical_level		0xf0	value H	value L	Effective size = 15bits unsigned
Utility	Other command	ccu_switch_ with_mask	0x49	SW_ADDR	SW_DATA	MASK_ DATA	Same as chu_switch_with_mask

Command							Usage
Command Category	Command Type	Command Name	CMD_GP (Relative/ Absolute)	PARAM0	PARAM1	PARAM2	
CC Format Control Ext	Other command	request_ format_ control_ext_ command_ version	0x4d	0x00	COMMAND		COMMAND = Variable length of command * Available if HZC-MSCN1 optional software is installed
		reply_of_ format_ control_ext_ command_ version		0x01	COMMAND		
		request_ available_ slot_blocks		0x10	COMMAND		
		reply_of_ available_ slot_blocks		0x11	COMMAND		
		request_ label_name_ of_a_slot_ block		0x12	COMMAND		
		reply_of_ label_name_ of_a_slot_ block		0x13	COMMAND		
		request_ available_ formats_of_ a_slot_block		0x14	COMMAND		
		reply_of_ available_ formats_of_ a_slot_block		0x15	COMMAND		
		request_ selected_ format_of_a_ slot_block		0x16	COMMAND		
		reply_of_ selected_ format_of_a_ slot_block		0x17	COMMAND		
		request_ available_ output_ settings_of_ a_slot_block		0x18	COMMAND		
		reply_of_ available_ output_ settings_of_ a_slot_block		0x19	COMMAND		

Command							Usage
Command Category	**Command Type**	**Command Name**	**CMD_GP (Relative/ Absolute)**	**PARAM0**	**PARAM1**	**PARAM2**	
CC Format Control Ext	Other command	request_ selected_ output_ setting_of_ a_slot_block	0x4d	0x1a	COMMAND		COMMAND = Variable length of command * Available if HZC-MSCN1 optional software is installed
		reply_of_ selected_ output_ setting_of_ a_slot_block		0x1b	COMMAND		
BPU Format Control	Other command	request_ label_name_ of_a_slot_ block	0x4e	0x20	COMMAND		COMMAND = Variable length of command * Available if HZC-MSCN1 optional software is installed
		reply_of_ label_name_ of_a_slot_ block		0x21	COMMAND		
		request_ available_ slot_blocks		0x2e	COMMAND		
		reply_of_ available_ slot_blocks		0x2f	COMMAND		
		request_ format_ control_ command_ version		0x30	COMMAND		
		reply_of_ format_ control_ command_ version		0x31	COMMAND		
		request_ available_ formats_of_ transmit_ format		0x32	COMMAND		
		reply_of_ available_ formats_of_ transmit_ format		0x33	COMMAND		
		request_ selected_ format_of_ transmit_ format		0x34	COMMAND		

Command							Usage
Command Category	Command Type	Command Name	CMD_GP (Relative/ Absolute)	PARAM0	PARAM1	PARAM2	
BPU Format Control	Other command	reply_of_ selected_ format_of_ transmit_ format	0x4e	0x35	COMMAND		COMMAND = Variable length of command * Available if HZC-MSCN1 optional software is installed
		request_ available_ formats_of_ slot_block		0x36	COMMAND		
		reply_of_ available_ formats_of_ slot_block		0x37	COMMAND		
		request_ selected_ format_of_ slot_block		0x38	COMMAND		
		reply_of_ selected_ format_of_ slot_block		0x39	COMMAND		
		request_ available_ output_ settings_of_ slot_block		0x3a	COMMAND		
		reply_of_ available_ output_ settings_of_ slot_block		0x3b	COMMAND		
		request_ selected_ output_ setting_of_ a_slot_block		0x3c	COMMAND		
		reply_of_ selected_ output_ setting_of_ a_slot_block		0x3d	COMMAND		
		request_ available_ output_ settings_of_ transmit_ format		0x3e	COMMAND		
		reply_of_ available_ output_ settings_of_ transmit_ format		0x3f	COMMAND		

Command							Usage
Command Category	Command Type	Command Name	CMD_GP (Relative/ Absolute)	PARAM0	PARAM1	PARAM2	
BPU Format Control	Other command	request_ selected_ output_ setting_of_ transmit_ format	0x4e	0x40	COMMAND		COMMAND = Variable length of command * Available if HZC-MSCN1 optional software is installed
		reply_of_ selected_ output_ setting_of_ transmit_ format		0x41	COMMAND		
CCU Format Control	Other command	request_ available_ formats_of_ transmit_ format	0x4f	0x12	COMMAND		COMMAND = Variable length of command * Available if HZC-MSCN1 optional software is installed
		reply_of_ available_ formats_of_ transmit_ format		0x13	COMMAND		
		request_ selected_ format_of_ transmit_ format		0x14	COMMAND		
		reply_of_ selected_ format_of_ transmit_ format		0x15	COMMAND		
		request_ label_name_ of_a_slot_ block		0x20	COMMAND		
		reply_of_ label_name_ of_a_slot_ block		0x21	COMMAND		
		request_ available_ formats_of_ a_slot_block		0x22	COMMAND		
		reply_of_ available_ formats_of_ a_slot_block		0x23	COMMAND		
		request_ selected_ format_of_ all_slot_ blocks		0x24	COMMAND		

Command							Usage
Command Category	Command Type	Command Name	CMD_GP (Relative/ Absolute)	PARAM0	PARAM1	PARAM2	
CCU Format Control	Other command	reply_of_ selected_ format_of_ all_slot_ blocks	0x4f	0x25	COMMAND		COMMAND = Variable length of command * Available if HZC-MSCN1 optional software is installed
		request_ available_ slot_blocks		0x2e	COMMAND		
		reply_of_ available_ slot_blocks		0x2f	COMMAND		
		request_ format_ control_ command_ version		0x30	COMMAND		
		reply_of_ format_ control_ command_ version		0x31	COMMAND		
		request_ available_ formats_of_ transmit_ format		0x32	COMMAND		
		reply_of_ available_ formats_of_ transmit_ format		0x33	COMMAND		
		request_ selected_ format_of_ transmit_ format		0x34	COMMAND		
		reply_of_ selected_ format_of_ transmit_ format		0x35	COMMAND		
		request_ available_ formats_of_ slot_block		0x36	COMMAND		
		reply_of_ available_ formats_of_ slot_block		0x37	COMMAND		

Command							Usage
Command Category	Command Type	Command Name	CMD_GP (Relative/ Absolute)	PARAM0	PARAM1	PARAM2	
CCU Format Control	Other command	request_ selected_ format_of_ slot_block	0x4f	0x38	COMMAND		COMMAND = Variable length of command * Available if HZC-MSCN1 optional software is installed
		reply_of_ selected_ format_of_ slot_block		0x39	COMMAND		
		request_ available_ output_ settings_of_ slot_block		0x3a	COMMAND		
		reply_of_ available_ output_ settings_of_ slot_block		0x3b	COMMAND		
		request_ selected_ output_ setting_of_ a_slot_block		0x3c	COMMAND		
		reply_of_ selected_ output_ setting_of_ a_slot_block		0x3d	COMMAND		
		request_ available_ output_ settings_of_ transmit_ format		0x3e	COMMAND		
		reply_of_ available_ output_ settings_of_ transmit_ format		0x3f	COMMAND		
		request_ selected_ output_ setting_of_ transmit_ format		0x40	COMMAND		
		reply_of_ selected_ output_ setting_of_ transmit_ format		0x41	COMMAND		

Command							Usage
Command Category	**Command Type**	**Command Name**	**CMD_GP (Relative/ Absolute)**	**PARAM0**	**PARAM1**	**PARAM2**	
System Control	Byte Command	camera_ select	0x60/0x61	0x02	CAMERA NO.	–	CAMERA NO. = 1-96 (Decimal) * Available if HZC-MSCN1 optional software is installed
		camera_ number	0x60/0x61	0x0a	CAMERA NO.	–	CAMERA NO. = 1-96 (Decimal) * Status Query only
	Other command	address_ selector	0x6c	0x02	DESTINATION	COMMAND	DESTINATION = 1-96 (Decimal) COMMAND = Variable length of command * Available if HZC-MSCN1 optional software is installed
RCP Assignment control	Other command	request_ camera_ number_ range_info	0x6d	0x48	COMMAND		COMMAND = Variable length of command * Available if HZC-RACN1 optional software is installed
		reply_of_ camera_ number_ range_info		0x88	COMMAND		
		request_ camera_ status		0x49	COMMAND		
		reply_of_ camera_ status		0x89	COMMAND		
		request_ available_ camera_ status_list		0x4a	COMMAND		
		reply_of_ available_ camera_ status_list		0x8a	COMMAND		
		request_all_ camera_ status_list		0x4b	COMMAND		
		reply_of_all_ camera_ status_list		0x8b	COMMAND		
		request_rcp_ number_ range_info		0x4c	COMMAND		
		reply_of_ rcp_number_ range_info		0x8c	COMMAND		
		request_rcp_ status		0x4d	COMMAND		
		reply_of_ rcp_status		0x8d	COMMAND		
		request_rcp_ assignment_ status_ change		0x6d	COMMAND		
		request_ available_ rcp_status_ list		0x4e	COMMAND		

Command							Usage
Command Category	Command Type	Command Name	CMD_GP (Relative/ Absolute)	PARAM0	PARAM1	PARAM2	
RCP Assignment control	Other command	reply_of_ available_ rcp_status_ list	0x6d	0x8e	COMMAND		COMMAND = Variable length of command * Available if HZC-RACN1 optional software is installed
		request_all_ rcp_status_ list		0x4f	COMMAND		
		reply_of_all_ rcp_status_ list		0x8f	COMMAND		
		request_rcp_ assignment_ reset		0xad	COMMAND		
		request_all_ rcp_ assignment_ reset		0xae	COMMAND		

Format list

* If your system works as Camera that need to display a Sutter value on Sony Control Panel, your system must send Format value with these commands in advance.

Video Format	chu_ mode04 (0xa4)	format_mode (0x91)						chu_system_mode (0x85)		
	bit0	bit5	bit4	bit3	bit2	bit1	bit0	bit6	bit1	bit0
1035/59.94I	0	*	*	*	*	*	*	0	1	0
1035/60I	1	*	*	*	*	*	*	0	1	0
PAL	*	*	*	*	*	*	*	0	0	1
NTSC	*	*	*	*	*	*	*	0	0	0
NTSC 29.97P	0	0	1	0	0	0	0	1	0	0
NTSC 23.98P	0	0	1	0	0	1	0	1	0	0
NTSC 59.94I	0	0	0	0	0	0	0	1	0	0
PAL 50I	1	0	0	0	0	0	1	1	0	1
PAL 25P	1	0	1	0	0	0	1	1	0	1
1080/60I	1	0	0	0	0	0	0	1	1	0
1080/59.94I	0	0	0	0	0	0	0	1	1	0
1080/30P	1	0	1	0	0	0	0	1	1	0
1080/29.97P	0	0	1	0	0	0	0	1	1	0
1080/50I	1	0	0	0	0	0	1	1	1	0
1080/25P	1	0	1	0	0	0	1	1	1	0
1080/24P	1	0	1	0	0	1	0	1	1	0
1080/23.98P	0	0	1	0	0	1	0	1	1	0
1080/60P	1	0	1	0	1	0	0	1	1	0
1080/59.94P	0	0	1	0	1	0	0	1	1	0
1080/50P	1	0	1	0	1	0	1	1	1	0

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