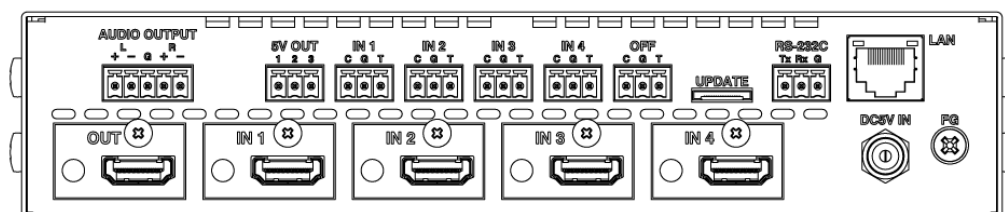
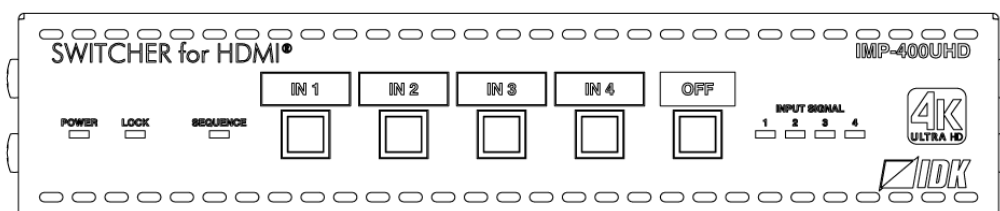


## 4K@60 and HDCP2.2 supported 4 x 1 HDMI Switcher

# IMP-400UHD

<Command Reference Guide>

Ver.1.0.0



- Thank you for choosing our product.
- To ensure the best performance of this product, please read this User's Guide fully and carefully before using it and keep this manual together with the product for reference as needed.

**IDK Corporation**

## Trademarks

- The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing Administrator, Inc. in the United States and other countries.
- Blu-ray Disc and Blu-ray are trademarks of Blu-ray Disc Association.
- Anti Snow and Connection Reset are registered trademarks of IDK in Japan.
- All other company and product names mentioned in this manual are either registered trademarks or trademarks of their respective owners. In this manual, the “®” or “™” marks may not be specified.

# Before reading this manual

- All rights reserved.
- Some of the contents in this user's guide such as the appearance of diagrams, menu operations, communication commands, and so on may differ between products depending on the specific version.
- This Command guide is subject to change without notice. You can download the latest version from IDK's website at: <http://www.idkav.com>

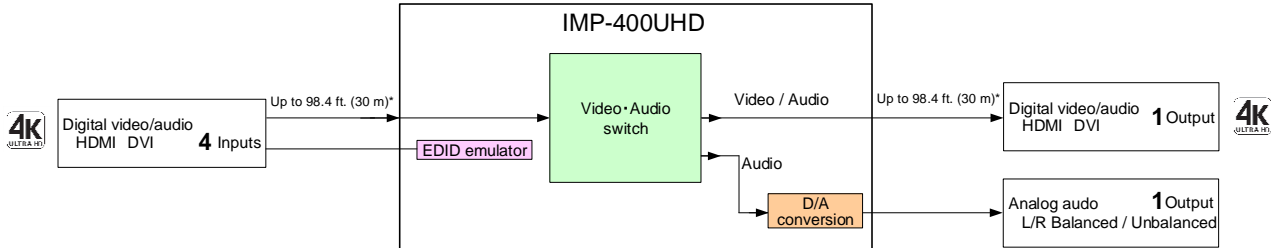
## Table of Contents

1	About this Guide.....	5
2	Specification and Setup of Communication.....	6
2.1	RS-232C communication.....	6
2.1.1	RS-232C connector specification.....	6
2.1.2	RS-232C communication specification.....	6
2.1.3	Setting up RS-232C communication.....	7
2.2	LAN communication.....	8
2.2.1	LAN connector specification.....	8
2.2.2	LAN communication specification.....	8
2.2.3	Setting up LAN communication.....	9
2.2.4	The number of TCP-IP connections.....	10
3	Command.....	11
3.1	Command outline.....	11
3.2	Command list.....	12
3.3	Detailed description.....	14
3.3.1	Error status.....	14
3.3.2	Selecting input channel.....	14
3.3.3	Input setting.....	15
3.3.4	Switching setting.....	16
3.3.5	Output settings.....	21
3.3.6	Audio setting.....	22
3.3.7	Contact input.....	23
3.3.8	EDID.....	24
3.3.9	RS-232C communication.....	29
3.3.10	LAN communication.....	30
3.3.11	Startup settings.....	32
3.3.12	Other settings.....	33
3.3.13	Displaying status.....	34

# 1 About this Guide

This guide contains information of communication commands that control the IMP-400UHD via RS-232C or LAN communication.

The IMP-400UHD is a 4x1 HDMI signal switcher supporting 4K@60 video signal and HDCP2.2. Digital audio signal is converted into analog and output from the AUDIO OUTPUT connector.



\*Maximum cable distance  
1080p@60: up to 98.4 ft. (30 m)  
4K@60: up to 39.4 ft. (12 m) when 18 Gbps high-speed transmission cable is used.

[Figure 1.1] Diagram

## 2 Specification and Setup of Communication

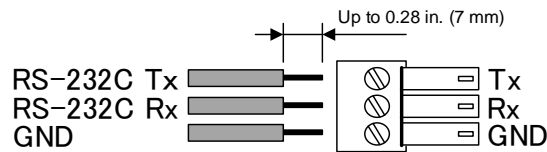
### 2.1 RS-232C communication

#### 2.1.1 RS-232C connector specification

Connect the RS-232C cable to the provided 3-pin terminal block, and then insert it to the RS-232C connector. AWG28 to AWG16 conductor gauge is recommended for optimal performance.

The recommended wire strip length is 7 mm/0.28 inch.

If connecting to the D-sub9, please short RTS, CTS, DTR, and DSR.



[Figure 2.1] Connecting RS-232C cable to 3-pin terminal block connector

#### 2.1.2 RS-232C communication specification

[Table 2.1] RS-232C specification

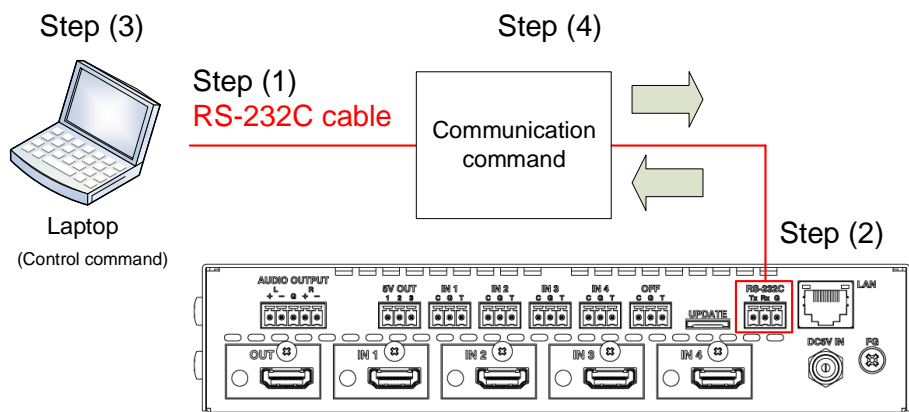
Standard	RS-232C
Baud rate [bps]	4800 / 9600 / 19200 / 38400 [bps]
Data bit length [bit]	7 / 8
Parity check	NONE, EVEN, ODD
Stop bit [bit]	1 / 2
X parameter	Invalid
Flow control	None
Delimiter	CR LF (Carriage return and line feed, 0D and 0A in hex)
Communication method	Full duplex

## 2.1.3 Setting up RS-232C communication

Follow the procedure below to set RS-232C communication between the IMP-400UHD and control devices.

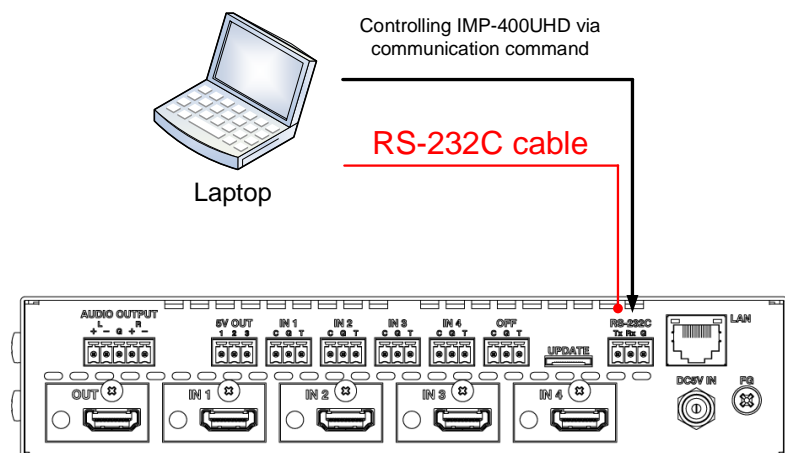
- (1) Connect the IMP-400UHD and the control device via an appropriate cable.
- (2) Set the RS-232C communication as follows:
  - RS-232C communication: Baud rate, data bit length, parity check, and stop bit  

【Reference: User's Guide】
- (3) For the control device, set the same values in the same way as RS-232C communication (baud rate, data bit length, parity check, and stop bit) in step (2) above.
- (4) Send a communication command from the control device to the IMP-400UHD in order to check the control status of the IMP-400UHD.



[Figure 2.2] RS-232C communication

### ■ RS-232C communication operation example



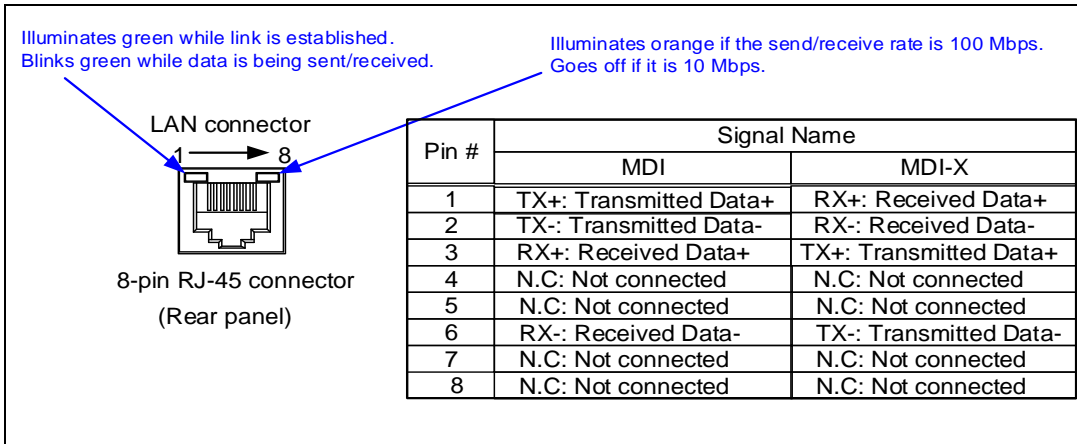
[Figure 2.3] Operation example: RS-232C communication

## 2.2 LAN communication

### 2.2.1 LAN connector specification

The IMP-400UHD supports Auto MDI/MDI-X, which distinguishes/switches straight and cross cables automatically.

Pin assignments of LAN connector:



[Figure 2.4] LAN connector specification

### 2.2.2 LAN communication specification

[Table 2.2] Specification of LAN communication

Physical layer	10BASE-T (IEEE802.3i)/100Base-TX (IEEE802.3u)
Network layer	ARP, IP, ICMP
Transport layer	TCP Port used for command control: 23, 1100, 6000 to 6999
Application layer	HTTP, TELNET

**Note:** Up to 7 connections can be used simultaneously.



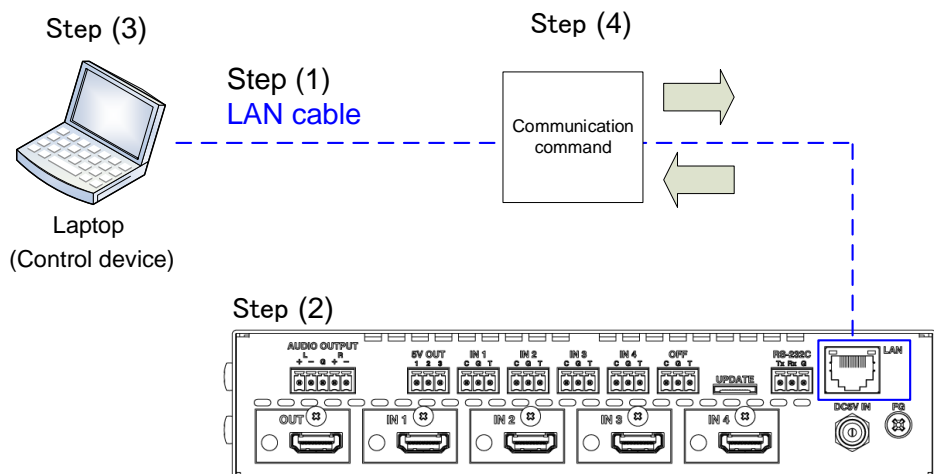
## 2.2.3 Setting up LAN communication

Follow the procedure below to set LAN communication between the IMP-400UHD and control devices.

- (1) Connect the IMP-400UHD and the control device via a LAN cable.
- (2) Set up LAN communication as follows:
  - Set IP address and subnet mask
  - TCP port number: 23, 1100, 6000 to 6999

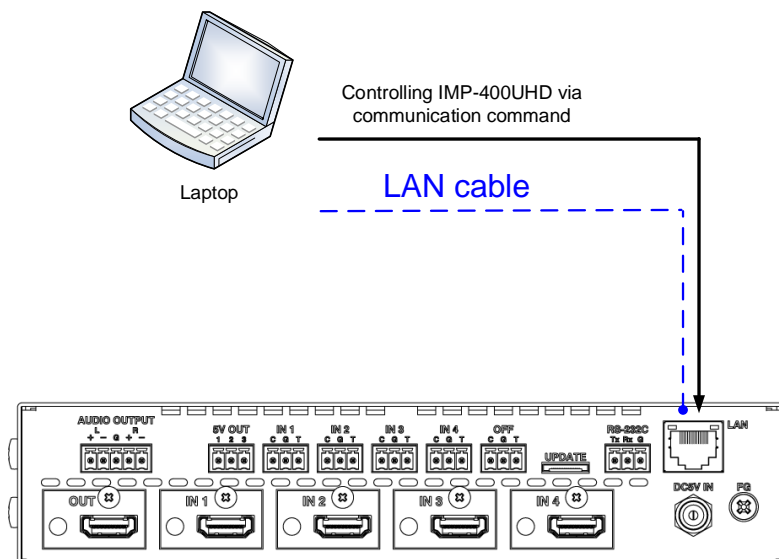
【Reference: User's Guide】

- (3) Establish the connection from the control device to the IP address and TCP port that are set to the IMP-400UHD in step (2) above.
- (4) Send a communication command from the control device to the IMP-400UHD in order to check the control status of the IMP-400UHD.



[Figure 2.5] Control via LAN communication

### ■ LAN communication operation example



[Figure 2.6] Operation example: LAN communication

## 2.2.4 The number of TCP-IP connections

---

The IMP-400UHD series can connect up to seven connections (seven ports) simultaneously. If the IMP-400UHD is controlled from eight or more PCs, they may not be connected to the IMP-400UHD, since the number of connections that can be used is limited.

If you use eight connections or more, execute TCP-IP connection/close every time the communication command is sent or received from the software of user's side. It makes IMP-400UHD's ports occupied or released so that eight or more connections can be connected logically.

[Table 2.3] Increasing connections

Your PC's software		IMP-400UHD
TCP-IP connection	→	(Occupied by 1 port)
Send command (@xxx)	→	
	←	Send back command (@xxx)
TCP-IP close	→	(Release 1 port)

**Note:**

If any command is not sent from the PC side to the IMP-400UHD for 30 seconds, the IMP-400UHD disconnects the connection to avoid the limitation problem on the number of connections. As a result, connection needs to be established again from the PC side after the current connection of the PC is disconnected.

(Since the number of ports in the IMP-400UHD is seven, ports are occupied permanently if the PC is turned off while connections are valid. To prevent this, the IMP-400UHD disconnects connections if no communication command is sent from the PC side.)

## 3 Command

---

### 3.1 Command outline

---

A command consists of “@” (“40” in hexadecimal), 3 one-byte alphabetical characters (upper and lower cases), and parameters (one-byte numbers<sup>\*</sup>). For some commands, several parameters can be specified or no parameter is required. Processing is executed by sending a delimiter at the end of the command.

Example: @SSW,2 ↵

“,”( a comma, “2C” in hexadecimal) is indicated between a command and parameter and between two parameters.

↵: delimiter CR LF (return+line feed, “0D” and “0A” in hex)

#### ■ If there is an error:

An error command is returned if an undefined command or wrong parameter is included.

Example:@SSW,5 ↵

@ERR,1

#### ■ Using as HELP:

If only delimiter is sent, command list as the help command is returned.

Example:↵

```

----- HELP (1/8) -----↵
(CHANNEL SELECT Command) ↵
@GSW / @SSW : Get/Set Input Channel↵
@GCP / @IOS : Get/Set Input Channel↵
↵
----- HELP (2/8) -----↵
(INPUT SETTING Command) ↵
@GDT / @SDT : Get/Set Digital Input Signal Detect Time↵
@GHE / @SHE : Get/Set HDCP Input Enable↵
@GAU / @SAU : Get/Set Auto Switching On↵
@GOF / @SOF : Get/Set Auto Switching Off↵

```

## 3.2 Command list

### ■ Error status

Command	Feature	Page
@ERR	Error status	14

### ■ Input channel setting

Command	Feature	Page
@GSW / @SSW	Input channel	14
@GCP / @IOS	Input channel switching (For the previous model)	15

### ■ Input setting

Command	Feature	Page
@GDT / @SDT	No-signal-input monitoring	15
@GHE / @SHE	HDCP input enabled/disabled	16

### ■ Switching setting

Command	Feature	Page
@GAU / @SAU	Priority of input channel automatic switching (OFF to ON)	16
@GOF / @SOF	Priority of input channel automatic switching	17
@GMT / @SMT	Masking time after automatic switching of input channel	17
@GST / @SST	Sequence switching mode	18
@GSQ / @SSQ	Target channel for sequence switching mode	18
@GIT / @SIT	Switching interval for sequence switching mode	19
@GSD / @SSD	Input detection	19
@GSC / @SSC	Starting channel of sequence switching mode	20

### ■ Output setting

Command	Feature	Page
@GDM / @SDM	Output mode	21
@GCO / @SCO	Sink device EDID check	21
@HAU	HDCP re-encryption	22

### ■ Audio setting

Command	Feature	Page
@GAM / @SAM	Audio output mute	22

### ■ Contact input

Command	Feature	Page
@GFP / @SFP	Chattering reduction time of contact input	23

### ■ EDID

Command	Feature	Page
@GVF / @SVF	EDID	24
@GDI / @SDI	Deep Color input	25
@GAF / @SAF	Audio format	26
@GSP / @SSP	The number of speakers	28
@RME	EDID copy	28

### ■ RS-232C setting

Command	Feature	Page
@GCT / @SCT	RS-232C	29

### ■ LAN setting

Command	Feature	Page
@GIP / @SIP	IP address	30
@GSB / @SSB	Subnet mask	30
@GLP / @SLP	TCP port number	31
@GMC	MAC address	31

### ■ Startup setting

Command	Feature	Page
@GMU / @SMU	Startup input channel	32
@GSO / @SSO	Startup operation lock	32

### ■ Other setting

Command	Feature	Page
@GLS / @SLS	Operation lock	33
@GBZ / @SBZ	Buzzer	33

### ■ Status display

Command	Feature	Page
@GSS	Displaying input signal status / sink device status	34
@GES	Monitor's EDID	38
@GIV	Version	39

### 3.3 Detailed description

#### 3.3.1 Error status

@ERR	Error status
Description	Response in case the command is not executed.
Response	@ERR, error ↵
Parameter	error:Error status 1 = Erroneous parameter format or value 2 = Undefined command or wrong format 3 = The command cannot be used. Sequence switching mode is being operated. 4 = Not used. 5 = Not used. 6 = Not used. 7 = Not used. 8 = Loading EDID from the sink device failed.
Getting example	Command @AAA ↵
	Response @ERR,2 ↵
	@AAA is sent. Command format error.
Remarks	—

#### 3.3.2 Selecting input channel

@GSW / @SSW	Input channel switching	
Getting	Command	@GSW ↵
	Response	@GSW, input ↵
Setting	Command	@SSW, input ↵
	Response	@SSW, input ↵
Parameter	Input: Input channel 0 = OFF, 1 = IN1 to 4 = IN4 [Default] OFF	
Getting example	Command	@GSW ↵
	Response	@GSW,2 ↵
	Description	Getting the input channel that is assigned to OUT. IN2
Setting example	Command	@SSW,1 ↵
	Response	@SSW,1 ↵
	Description	Setting OUT's input channel to IN1.
Remarks	—	

<b>@GCP / @IOS</b>		<b>Input channel switching (For the previous model)</b>
Getting	Command	@GCP
	Response	@GCP, input
Setting	Command	@IOS, input
	Response	@IOS, input
Parameter		input: Input channel 0 = OFF, 1 = IN1 to 4 = IN4 [Default] OFF
Getting example	Command	@GCP
	Response	@GCP,2
	Description	Getting the input channel that is assigned to OUT. IN2
Setting example	Command	@IOS,1
	Response	@IOS,1
	Description	Setting OUT's input channel to IN1.
Remarks		—

### 3.3.3 Input setting

<b>@GDT / @SDT</b>		<b>No-signal-input monitoring</b>
Getting	Command	@GDT
	Response	@GDT, time_1, time_2, time_3, time_4
Setting	Command	@SDT, ch_1, time_1 (, ch_2, time_2···)
	Response	@SDT, ch_1, time_1 (, ch_2, time_2···)
Parameter		time_1-4: No-signal-input monitoring 0 = OFF, 2000 = 2 sec. to 15000 = 15 sec. [Default] 10000 = 10 sec. Set the value by 100 ms. If you set a value other than 0 for the lower 2 digits, these values will be rounded down. (For example, if you set it to 2955, the monitoring time is set to 2900 ms.) ch_1-4: Input channel 0 = All inputs, 1 = IN1 to 4 = IN4
Getting example	Command	@GDT
	Response	@GDT,6000,10000,10000,4000
	Description	Getting the set monitoring time. IN1: 6000 ms. (6 sec.), IN2 and IN3: 10000 ms. (10 sec.), IN4: 4000 ms. (4 sec.)
Setting example	Command	@SDT,3,6000
	Response	@SDT,3,6000
	Description	Setting the monitoring time of IN3 to 6000 ms. (6 sec.).
Remarks		—

@GHE / @SHE		HDCP input enabled/disabled
Getting	Command	@GHE ↵
	Response	@GHE, hdcp_1, hdcp_2, hdcp_3, hdcp_4 ↵
Setting	Command	@SHE, ch_1, hdcp_1 (, ch_2, hdcp_2···) ↵
	Response	@SHE, ch_1, hdcp_1 (, ch_2, hdcp_2···) ↵
Parameter		hdcp_1-4: HDCP input enabled/disabled 0 = DISABLE, 1 = HDCP 1.4, 2 = HDCP 2.2 [Default] HDCP 2.2
		ch_1-4: Input channel 0 = All inputs, 1 = IN1 to 4 = IN4
Getting example	Command	@GHE ↵
	Response	@GHE,2,2,0,2 ↵
	Description	Getting HDCP input enabled/disabled. IN3: disables HDCP input, other input channels: enables HDCP 2.2 input
Setting example	Command	@SHE,1,0 ↵
	Response	@SHE,1,0 ↵
	Description	Setting IN1 HDCP input to disabled.
Remarks		—

### 3.3.4 Switching setting

@GAU / @SAU		Priority of input channel automatic switching (OFF to ON)
Getting	Command	@GAU ↵
	Response	@GAU, in1_priority, in2_priority, in3_priority, in4_priority ↵
Setting	Command	@SAU, in1_priority, in2_priority···, in4_priority ↵
	Response	@SAU, in1_priority, in2_priority···, in4_priority ↵
Parameter		in1_priority - in4_priority: Priority 0 = OFF, 1 = Priority (high) to 4 = Priority (low) [Default] OFF
Getting example	Command	@GAU ↵
	Response	@GAU,1,2,3,4 ↵
	Description	Getting the set priority (OFF to ON). IN1>IN2>IN3>IN4
Setting example	Command	@SAU,4,3,2,1 ↵
	Response	@SAU,4,3,2,1 ↵
	Description	Setting the priority to IN4>IN3>IN2>IN1.
Remarks		—



<b>@GOF / @SOF</b>		<b>Priority of input channel automatic switching (ON to OFF)</b>
Getting	Command	@GOF ↵
	Response	@GOF, in1_priority, in2_priority, in3_priority, in4_priority ↵
Setting	Command	@SOF, in1_priority, in2_priority···, in4_priority ↵
	Response	@SOF, in1_priority, in2_priority···, in4_priority ↵
Parameter		in1_priority - in4_priority: Priority 0 = OFF, 1 = Priority (high) to 4 = Priority (low)  [Default] OFF
Getting example	Command	@GOF ↵
	Response	@GOF,1,2,3,4 ↵
	Description	Getting the set priority (ON to OFF). IN1>IN2>IN3>IN4
Setting example	Command	@SOF,4,3,2,1 ↵
	Response	@SOF,4,3,2,1 ↵
	Description	Setting the priority to IN4>IN3>IN2>IN1.
Remarks		—









<b>@GMT / @SMT</b>		<b>Masking time after automatic switching of input channel</b>
Getting	Command	@GMT ↵
	Response	@GMT, time ↵
Setting	Command	@SMT, time ↵
	Response	@SMT, time ↵
Parameter		time: Masking time 0 = 0 to 999999 = 999.999 sec. [Default] 0 sec.
Getting example	Command	@GMT ↵
	Response	@GMT,2000 ↵
	Description	Getting the set masking time after automatic switching of input channel. Automatic switching cannot be executed for 2000 ms. (2 sec.).
Setting example	Command	@SMT,2000 ↵
	Response	@SMT,2000 ↵
	Description	Setting the masking time to 2000 ms. (2 sec.)
Remarks		—

<b>@GST / @SST</b>		<b>Sequence switching mode</b>
Getting	Command	@GST ↵
	Response	@GST, mode ↵
Setting	Command	@SST, mode ↵
	Response	@SST, mode ↵
Parameter		mode: Sequence switching mode 0 = OFF, 1 = ON [Default] OFF
Getting example	Command	@GST ↵
	Response	@GST,0 ↵
	Description	Getting the set sequence switching mode. OFF
Setting example	Command	@SST,1 ↵
	Response	@SST,1 ↵
	Description	Setting the sequence switching mode to ON.
Remarks		—

<b>@GSQ / @SSQ</b>		<b>Target channel for sequence switching mode</b>
Getting	Command	@GSQ ↵
	Response	@GSQ, select_1, select_2, select_3, select_4 ↵
Setting	Command	@SSQ, ch_1, select_1 (, ch_2, select_2····) ↵
	Response	@SSQ, ch_1, select_1 (, ch_2, select_2····) ↵
Parameter		select_1-4: Setting whether the channel is switched or not. 0 = Not switched, 1 = Switched [Default] 1 (Switched) ch_1-4: Input channel 0 = All inputs, 1 = IN1 to 4 = IN4
Getting example	Command	@GSQ ↵
	Response	@GSQ,1,1,1,0 ↵
	Description	Getting the set mode status. IN1 to IN3 will be switched.
Setting example	Command	@SSQ,1,0 ↵
	Response	@SSQ,1,0 ↵
	Description	IN1 will not be switched.
	Command	@SSQ,0,0 ↵
	Response	@ERR,1 ↵
	Description	Error, because all input channels are set to OFF.
Remarks		—

<b>@GIT / @SIT</b>		<b>Switching interval for sequence switching mode</b>
Getting	Command	@GIT ↵
	Response	@GIT, time ↵
Setting	Command	@SIT, time ↵
	Response	@SIT, time ↵
Parameter		time: Switching interval 10000 = 10 to 30000 = 30 sec. [Default] 10 sec.
Getting example	Command	@GIT ↵
	Response	@GIT,20000 ↵
	Description	Getting set switching interval. 20 sec.
Setting example	Command	@SIT,15000 ↵
	Response	@SIT,15000 ↵
	Description	Setting the switching interval to 15 sec.
Remarks		—

<b>@GSD / @SSD</b>		<b>Input detection</b>
Getting	Command	@GSD ↵
	Response	@GSD, detect ↵
Setting	Command	@SSD, detect ↵
	Response	@SSD, detect ↵
Parameter		detect: Channels that is detected will be switched in sequence switching mode. 0 = All input channels will be switched. 1 = Only channels that is detected will be switched. [Default] Only channels that is detected will be switched.
Getting example	Command	@GSD ↵
	Response	@GSD,0 ↵
	Description	Getting the setting. All input channels will be switched in sequence switching mode..
Setting example	Command	@SSD,1 ↵
	Response	@SSD,1 ↵
	Description	Only channels that is detected will be switched in sequence switching mode..
Remarks		—

<b>@GSC / @SSC</b>		<b>Starting channel of sequence switching mode</b>
Getting	Command	@GSC 
	Response	@GSC, select 
Setting	Command	@SSC, select 
	Response	@SSC, select 
Parameter		select: Starting channel 0 = Starts from the current input channel 1 = Starts from the lowest target channel [Default] 0 (Starts from the current input channel)
Getting example	Command	@GSC 
	Response	@GSC,1 
	Description	Getting the starting channel. Starts from the lowest target channel
Setting example	Command	@SSC,0 
	Response	@SSC,0 
	Description	Setting the mode to start from the current input channel
Remarks		—

### 3.3.5 Output settings

@GDM / @SDM		Output mode
Getting	Command	@GDM ↵
	Response	@GDM, mode ↵
Setting	Command	@SDM, mode ↵
	Response	@SDM, mode ↵
Parameter		mode: Output mode 0 = AUTO, 1 = DVI, 2 = RGB, 3 = YCbCr4:2:0, 4 = YCbCr4:2:2, 5 = YCbCr4:4:4 [Default] 0 (AUTO)
Getting example	Command	@GDM ↵
	Response	@GDM,3 ↵
	Description	Getting the set output mode. YCbCr4:2:0
Setting example	Command	@SDM,3 ↵
	Response	@SDM,3 ↵
	Description	Setting the output mode to "YCbCr4:2:0".
Remarks		—

@GCO / @SCO		Sink device EDID check
Getting	Command	@GCO ↵
	Response	@GCO, mode ↵
Setting	Command	@SCO, mode ↵
	Response	@SCO, mode ↵
Parameter		mode: Sink device EDID check 0 = In case of EDID load error, the sink device is treated as a DVI device. 1 = In case of EDID load error, the sink device is treated as a HDMI (without SCDC) device. 2 = Always the sink device is treated as a HDMI (without SCDC) device. 3 = In case of EDID load error, the sink device is treated as a HDMI (with SCDC) device. 4 = Always the sink device is treated as a HDMI (with SCDC) device. [Default] 0 (In case of EDID load error, the sink device is treated as a DVI device.)
Getting example	Command	@GCO ↵
	Response	@GCO,3 ↵
	Description	Getting the set mode. In case of EDID load error, the sink device is treated as a HDMI (with SCDC) device.
Setting example	Command	@SCO,0 ↵
	Response	@SCO,0 ↵
	Description	Setting this menu to the sink device is treated as a DVI device in case of EDID load error.
Remarks		—

<b>@HAU</b>		<b>HDCP re-encryption</b>
Setting	Command	@HAU ↵
	Response	@HAU ↵
Parameter		NA
Setting example	Command	@HAU ↵
	Response	@HAU ↵
	Description	Setting OUT to re-encrypt HDCP.
Remarks		—

### 3.3.6 Audio setting

---

<b>@GAM / @SAM</b>		<b>Audio output mute</b>
Getting	Command	@GAM ↵
	Response	@GAM, mute ↵
Setting	Command	@SAM, mute ↵
	Response	@SAM, mute ↵
Parameter		mute: Audio output mute 0 = OFF, 1 = ON [Default] OFF
Getting example	Command	@GAM ↵
	Response	@GAM,0 ↵
	Description	Getting the set value of audio output mute. OFF
Setting example	Command	@SAM,1 ↵
	Response	@SAM,1 ↵
	Description	Muting digital / analog audio output.
Remarks		—

### 3.3.7 Contact input









---

@GFP / @SFP		Chattering reduction time of contact input
Getting	Command	@GFP ↵
	Response	@GFP, time ↵
Setting	Command	@SFP, time ↵
	Response	@SFP, time ↵
Parameter		time: Chattering reduction time 0 = 0 ms to 300 = 300 ms [Default] 30 ms
Getting example	Command	@GFP ↵
	Response	@GFP,10 ↵
	Description	Getting the set chattering reduction time. 10 ms.
Setting example	Command	@SFP,10 ↵
	Response	@SFP,10 ↵
	Description	Setting the chattering reduction time to 10 ms.
Remarks		—

### 3.3.8 EDID

@GVF / @SVF		EDID resolution
Getting	Command	@GVF
	Response	@GVF resolution_1, resolution_2, resolution_3, resolution_4
Setting	Command	@SVF, ch_1, resolution_1 (, ch_2, resolution_2···)
	Response	@SVF, ch_1, resolution_1 (, ch_2, resolution_2···)
Parameter		resolution_1-4: EDID resolution 0 = EXTERNAL, 1 = Copied EDID, 2 = SVGA (800x600), 3 = XGA (1024x768), 4 = VESA720 (1280x720), 5 = 720p, 6 = WXGA (1280x768), 7 = WXGA (1280x800), 8 = Quad-VGA (1280x960), 9 = SXGA (1280x1024), 10 = WXGA (1360x768), 11 = WXGA (1366x768), 12 = SXGA+ (1400x1050), 13 = WXGA+ (1440x900), 14 = WXGA++ (1600x900), 15 = UXGA (1600x1200), 16 = WSXGA+ (1680x1050), 17 = 1080i 18 = 1080p@24 / 25 / 30 (1920x1080) 19 = VESA1080 (1920x1080), 20 = 1080p@50 / 59.94 / 60 (1920x1080) 21 = WUXGA (1920x1200), 22 = QWXGA (2048x1152), 23 = WQHD (2560x1440), 24 = WQXGA (2560x1600), 41 = 2160p@24 / 25 / 30 (3840x2160), 42 = 4096x2160@24 / 25 / 30, 43 = 2160p@50 / 59.94 / 60 - 4:2:0 (3840x2160), 44 = 4096x2160@50 / 59.94 / 60 - 4:2:0, 45 = 2160p@50 / 59.94 / 60 - 4:4:4 (3840x2160) 46 = 4096x2160@50 / 59.94 / 60 - 4:4:4 [Default]2160p@50 / 59.94 / 60 - 4:4:4 (3840x2160)
		ch_1-4: Input channel 0 = All inputs, 1 = IN1 to 4 = IN4
Getting example	Command	@GVF
	Response	@GVF,45,45,45,9
	Description	Getting the set EDID resolution. IN4: SXGA(1280x1024), other inputs: 2160p@50 / 59.94 / 60 - 4:4:4 (3840x2160)
Setting example	Command	@SVF,0,15
	Response	@SVF,0,15
	Description	Setting EDID of all input channels to UXGA (1600x1200).
Remarks		—



@GDI / @SDI		Deep Color input
Getting	Command	@GDI 
	Response	@GDI, color_1, color_2, color_3, color_4 
Setting	Command	@SDI, ch_1, color_1 (, ch_2, color_2···) 
	Response	@SDI, ch_1, color_1 (, ch_2, color_2···) 
Parameter		color_1-4: Color depth 0 = 24 bit / pixel (8 bit / component) 1 = 30 bit / pixel (10 bit / component) 2 = 36 bit / pixel (12 bit / component) [Default] 24 bit / pixel (8 bit / component)
		ch_1-4: Input channel 0 = All inputs, 1 = IN1 to 4 = IN4
Getting example	Command	@GDI 
	Response	@GDI,1,1,1,0 
	Description	Getting the set color depth. IN4: 24 bit / pixel (8 bit / component); others: 30 bit / pixel (10 bit / component)
Setting example	Command	@SDI,4,0 
	Response	@SDI,4,0 
	Description	Setting IN4 color depth to 24 bit / pixel (8 bit / component).
Remarks		—

@GAF / @SAF		Audio format																
Getting	Command	@GAF, ch [↵]																
	Response	@GAF, ch, format_1, frequency_1 (, format_2, frequency_2···) [↵]																
Setting	Command	@SAF, ch, format_1, frequency_1 (, format_2, frequency_2···) [↵]																
	Response	@SAF, ch, format_1, frequency_1 (, format_2, frequency_2···) [↵]																
Parameter		<p>ch: Input channel 0 = All inputs (for setting only), 1 = IN1 to 4 = IN4</p> <p>format_1-4: Audio format 0 = PCM, 1 = Dolby Digital, 2 = AAC, 3 = Dolby Digital+, 4 = DTS, 5 = DTS-HD, 6 = Dolby TrueHD [Default] only PCM can be output</p> <p>frequency_1-4: Maximum sampling frequency 0 = Cannot be output, 1 = 32 kHz, 2 = 44.1 kHz, 3 = 48 kHz, 4 = 88.2 kHz, 5 = 96 kHz, 6 = 176.4 kHz, 7 = 192 kHz [Default] PCM: 48 kHz; others: 0 (Cannot be output)</p> <p>Maximum settable sampling frequency depends on the audio format.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #e0ffe0;"> <th>Audio format</th> <th>Maximum sampling frequency (kHz)</th> </tr> </thead> <tbody> <tr> <td>PCM</td> <td>32 / 44.1 / 48 / 88.2 / 96 / 176.4 / 192</td> </tr> <tr> <td>Dolby Digital</td> <td>Cannot be output / 32 / 44.1 / 48</td> </tr> <tr> <td>AAC</td> <td>Cannot be output / 32 / 44.1 / 48 / 88.2 / 96</td> </tr> <tr> <td>Dolby Digital+</td> <td>Cannot be output / 32 / 44.1 / 48</td> </tr> <tr> <td>DTS</td> <td>Cannot be output / 32 / 44.1 / 48 / 96</td> </tr> <tr> <td>DTS-HD</td> <td>Cannot be output / 44.1 / 48 / 88.2 / 96 / 176.4 / 192</td> </tr> <tr> <td>Dolby TrueHD</td> <td>Cannot be output / 44.1 / 48 / 88.2 / 96 / 176.4 / 192</td> </tr> </tbody> </table> <p>Getting commands: the set audio formats and maximum sampling frequency is returned. Setting commands: send the desired audio formats and the maximum sampling frequencies. Audio formats that are not sent are set to "0" (Cannot be output). PCM is always enabled, you can skip this menu unless you need to change the sampling frequency.</p>	Audio format	Maximum sampling frequency (kHz)	PCM	32 / 44.1 / 48 / 88.2 / 96 / 176.4 / 192	Dolby Digital	Cannot be output / 32 / 44.1 / 48	AAC	Cannot be output / 32 / 44.1 / 48 / 88.2 / 96	Dolby Digital+	Cannot be output / 32 / 44.1 / 48	DTS	Cannot be output / 32 / 44.1 / 48 / 96	DTS-HD	Cannot be output / 44.1 / 48 / 88.2 / 96 / 176.4 / 192	Dolby TrueHD	Cannot be output / 44.1 / 48 / 88.2 / 96 / 176.4 / 192
Audio format	Maximum sampling frequency (kHz)																	
PCM	32 / 44.1 / 48 / 88.2 / 96 / 176.4 / 192																	
Dolby Digital	Cannot be output / 32 / 44.1 / 48																	
AAC	Cannot be output / 32 / 44.1 / 48 / 88.2 / 96																	
Dolby Digital+	Cannot be output / 32 / 44.1 / 48																	
DTS	Cannot be output / 32 / 44.1 / 48 / 96																	
DTS-HD	Cannot be output / 44.1 / 48 / 88.2 / 96 / 176.4 / 192																	
Dolby TrueHD	Cannot be output / 44.1 / 48 / 88.2 / 96 / 176.4 / 192																	
Getting example	Command	@GAF,1 [↵]																
	Response	@GAF,1,0,7 [↵]																
	Description	Getting the set audio formats for IN1. PCM, up to 192 kHz																
Setting example	Command	@SAF,2,4,3 [↵]																
	Response	@SAF,2,4,3 [↵]																
	Description	Setting IN2 to output audio PCM and DTS 48 kHz. (PCM's sampling frequency is not changed).																
Remarks		—																

@GSP / @SSP		The number of speakers																																																																																																																							
Getting	Command	@GSP, ch [↵]																																																																																																																							
	Response	@GSP, ch, number, speaker_1 (, speaker_2····) [↵]																																																																																																																							
Setting	Command	@SSP, ch, number (, speaker_1, speaker_2····) [↵]																																																																																																																							
	Response	@SSP, ch, number (, speaker_1, speaker_2····) [↵]																																																																																																																							
Parameter		ch: Input channel 0 = All inputs (for setting only), 1 = IN1 to 4 = IN4																																																																																																																							
		number: The number of speakers 1 to 8 [Default] 2																																																																																																																							
		speaker_1-8: Speaker configuration 0 = Front Left / Right [Default], 1 = Low Frequency Effect, 2 = Front Center, 3 = Rear Left / Right, 4 = Rear Center, 5 = Front Left / Right Center, 6 = Rear Left / Right Center, 7 = Front Left / Right Wide, 8 = Front Left / Right High, 9 = Top Center, 10 = Front Center High																																																																																																																							
		Getting commands: the number of speakers and which speakers will be used is returned. Setting commands: if you do not specify the speaker configuration, the following configuration will be applied depending on the set number of speakers.																																																																																																																							
		<table border="1"> <thead> <tr> <th rowspan="2">number</th> <th colspan="11">speaker</th> </tr> <tr> <th>0</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> <th>7</th> <th>8</th> <th>9</th> <th>10</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>OFF</td> <td>OFF</td> <td>ON</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> </tr> <tr> <td>2</td> <td>ON</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> </tr> <tr> <td>3</td> <td>ON</td> <td>ON</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> </tr> <tr> <td>4</td> <td>ON</td> <td>ON</td> <td>ON</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> </tr> <tr> <td>5</td> <td>ON</td> <td>ON</td> <td>OFF</td> <td>ON</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> </tr> <tr> <td>6</td> <td>ON</td> <td>ON</td> <td>ON</td> <td>ON</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> </tr> <tr> <td>7</td> <td>ON</td> <td>ON</td> <td>ON</td> <td>ON</td> <td>ON</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> </tr> <tr> <td>8</td> <td>ON</td> <td>ON</td> <td>ON</td> <td>ON</td> <td>OFF</td> <td>OFF</td> <td>ON</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> </tr> </tbody> </table>	number	speaker											0	1	2	3	4	5	6	7	8	9	10	1	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	2	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	4	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	5	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	6	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	7	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	8	ON	ON	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
number	speaker																																																																																																																								
	0	1	2	3	4	5	6	7	8	9	10																																																																																																														
1	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																																																																																																														
2	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																																																																																																														
3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																																																																																																														
4	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																																																																																																														
5	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF																																																																																																														
6	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF																																																																																																														
7	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF																																																																																																														
8	ON	ON	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF																																																																																																														
		For speaker configurations: the <i>number</i> and total number of speakers (speaker_1-8) do not match, the <i>number</i> is set automatically based on the setting of speaker configuration. In case the <i>number</i> exceeds the settable range, an error is returned.																																																																																																																							

<b>@GSP / @SSP</b>		<b>The number of speakers (cont'd)</b>
Getting example	Command	@GSP,1 ↵
	Response	@GSP,1,6,0,1,2,3 ↵
	Description	Getting the IN1 speaker configuration. Six speakers (Front Left / Right, Low Frequency Effect, Front Center, Rear Left / Right) are used.
Setting example	Command	@SSP,2,8 ↵
	Response	@SSP,2,8 ↵
	Description	Setting IN2 speaker configuration to Front Left / Right, Low Frequency Effect, Front Center, Rear Left / Right, Rear Left / Right Center (eight speakers). Completed normally.
Setting example	Command	@SSP,3,8,0,3,5,6,7 ↵
	Response	@ERR,1 ↵
	Description	Setting IN3 speaker configuration to Front Left / Right, Rear Left / Right, Front Left / Right Center, Rear Left / Right Center, Front Left / Right Wide. The number of speakers is 10 which exceeds the settable value, and it causes the error.
Remarks		—

<b>@RME</b>		<b>EDID copy</b>
Setting	Command	@RME ↵
	Response	@RME ↵
Setting example	Command	@RME ↵
	Response	@RME ↵
	Description	Loading EDID data of the sink device connected to the HDMI output connector and saving it in the IMP-400UHD.
Remarks		—

### 3.3.9 RS-232C communication

@GCT / @SCT		RS-232C communication
Getting	Command	@GCT ↵
	Response	@GCT, setting ↵
Setting	Command	@SCT, setting ↵
	Response	@SCT, setting ↵
Parameter		setting: Communication setting <ul style="list-style-type: none"> <li>▪ Baud rate (4800, 9600, 19200, 38400 [bps] [Default] 9600)</li> <li>▪ Data length (8, 7 [bit] [Default] 8)</li> <li>▪ Parity check (NONE, EVEN, ODD [Default]: NONE)</li> <li>▪ Stop bit (1, 2 [bit] [Default] 1)</li> </ul> For setting values, see the table below.
Getting example	Command	@GCT ↵
	Response	@GCT,24 ↵
	Description	Getting communication settings of RS-232Cs. All baud rates = 19200 [bps], data bit length = 8 [bit], parity check = None, stop bit = 1 [bit]
Setting example	Command	@SCT,24 ↵
	Response	@SCT,24 ↵
	Description	Baud rate =19200 [bps], data bit length = 8 [bit], parity check = NONE, stop bit = 1 [bit].
Remarks		If IP address or RS-232C communication setting is changed, the communication may be disabled. Change the environmental settings of communication based on the IMP-400UHD settings.

[Table 3.1] Parameter for RS-232C communication settings

Value	Communication				Value	Communication				Value	Communication				Value	Communication			
0	4800	8	NONE	1	12	9600	8	NONE	1	24	19200	8	NONE	1	36	38400	8	NONE	1
1	4800	8	NONE	2	13	9600	8	NONE	2	25	19200	8	NONE	2	37	38400	8	NONE	2
2	4800	8	ODD	1	14	9600	8	ODD	1	26	19200	8	ODD	1	38	38400	8	ODD	1
3	4800	8	ODD	2	15	9600	8	ODD	2	27	19200	8	ODD	2	39	38400	8	ODD	2
4	4800	8	EVEN	1	16	9600	8	EVEN	1	28	19200	8	EVEN	1	40	38400	8	EVEN	1
5	4800	8	EVEN	2	17	9600	8	EVEN	2	29	19200	8	EVEN	2	41	38400	8	EVEN	2
6	4800	7	NONE	1	18	9600	7	NONE	1	30	19200	7	NONE	1	42	38400	7	NONE	1
7	4800	7	NONE	2	19	9600	7	NONE	2	31	19200	7	NONE	2	43	38400	7	NONE	2
8	4800	7	ODD	1	20	9600	7	ODD	1	32	19200	7	ODD	1	44	38400	7	ODD	1
9	4800	7	ODD	2	21	9600	7	ODD	2	33	19200	7	NONE	2	45	38400	7	EVEN	2
10	4800	7	EVEN	1	22	9600	7	EVEN	1	34	19200	7	EVEN	1	46	38400	7	EVEN	1
11	4800	7	EVEN	2	23	9600	7	EVEN	2	35	19200	7	EVEN	2	47	38400	7	EVEN	2

### 3.3.10 LAN communication

@GIP / @SIP		IP address
Getting	Command	@GIP ↵
	Response	@GIP, unit_1, unit_2, unit_3, unit_4 ↵
Setting	Command	@SIP, unit_1, unit_2, unit_3, unit_4 ↵
	Response	@SIP, unit_1, unit_2, unit_3, unit_4 ↵
Parameter		unit_1: Upper bit of the IP address to unit_4: lower bit of the IP address 0 to 255 = 8 bit (Decimal notation) [Default] 192.168.1.199
Getting example	Command	@GIP ↵
	Response	@GIP,192,168,3,2 ↵
	Description	Getting the set IP address of the IMP-400UHD. IP address:192.168.3.2。
Setting example	Command	@SIP,192,168,3,2 ↵
	Response	@SIP,192,168,3,2 ↵
	Description	Setting IP address to 192.168.3.2.
Remarks		If IP address or RS-232C communication setting is changed, the communication may be disabled. Change the environmental settings of communication based on the IMP-400UHD settings.

@GSB / @SSB		Subnet mask
Getting	Command	@GSB ↵
	Response	@GSB, unit_1, unit_2, unit_3, unit_4 ↵
Setting	Command	@SSB, unit_1, unit_2, unit_3, unit_4 ↵
	Response	@SSB, unit_1, unit_2, unit_3, unit_4 ↵
Parameter		unit_1: Upper bit of the subnet mask to unit_4: lower bit of the subnet mask 0 to 255 = 8 bit (Decimal notation) [Default] 255.255.255.0
Getting example	Command	@GSB ↵
	Response	@GSB,255,255,192,0 ↵
	Description	Getting the set subnet mask of the IMP-400UHD. Subnet mask: 255.255.192.0 (= 18 bit)
Setting example	Command	@SSB,255,255,192,0 ↵
	Response	@SSB,255,255,192,0 ↵
	Description	Setting subnet mask to 255.255.192.0 (= 18 bit) .
Remarks		If IP address or RS-232C communication setting is changed, the communication may be disabled. Change the environmental settings of communication based on the IMP-400UHD settings.

<b>@GLP / @SLP</b>		<b>TCP port number</b>
Getting	Command	@GLP ↵
	Response	@GLP, port_1, port_2, port_3, port_4, port_5, port_6, port_7 ↵
Setting	Command	@SLP, connection_1, port_1 (, connection_2, port_2···) ↵
	Response	@SLP, connection_1, port_1 (, connection_2, port_2···) ↵
Parameter		connection_1-7: Connection number 0 = All connections, 1 = Connection1 to 7 = Connection 7 port_1-7: TCP port number 23, 1100, 6000 to 6999 [Default] Connections 1 to 4 = 1100; Connections 5 to 7 = 23
Getting example	Command	@GLP ↵
	Response	@GLP,1100,1100,1100,23,23,23,23 ↵
	Description	Getting the set TCP port number. Connections 1 to 3: 1100; Connections 4 to 7: 23
Setting example	Command	@SLP,7,6000 ↵
	Response	@SLP,7,6000 ↵
	Description	Setting port number of connection 7 to "6000".
Remarks		If IP address or RS-232C communication setting is changed, the communication may be disabled. Change the environmental settings of communication based on the IMP-400UHD settings.

<b>@GMC</b>		<b>MAC address</b>
Getting	Command	@GMC ↵
	Response	@GMC, unit_1, unit_2, unit_3, unit_4, unit_5, unit_6 ↵
Parameter		unit_1: Upper bit of the MAC address to unit_6: lower bit of the MAC address 00 to FF = 8 bit (in hexadecimal)
Getting example	Command	@GMC ↵
	Response	@GMC,00,08,E5,5C,00,00 ↵
	Description	Getting the set MAC address. MAC address: 00-08-E5-5C-00-00.
Remarks		—

### 3.3.11 Startup settings

<b>@GMU / @SMU</b>		<b>Startup input channel</b>
Getting	Command	@GMU ↵
	Response	@GMU, state ↵
Setting	Command	@SMU, state ↵
	Response	@SMU, state ↵
Parameter		state: Startup input channel 1 = IN1 to 4 = IN4, 5 = Channel OFF, 6 = Last channel [Default] Last channel
Getting example	Command	@GMU ↵
	Response	@GMU,3 ↵
	Description	Getting the set input channel at startup. IN3
Setting example	Command	@SMU,3 ↵
	Response	@SMU,3 ↵
	Description	Setting the startup channel to IN3.
Remarks		—

<b>@GSO / @SSO</b>		<b>Startup operation lock</b>
Getting	Command	@GSO ↵
	Response	@GSO, state ↵
Setting	Command	@SSO, state ↵
	Response	@SSO, state ↵
Parameter		state: Setting the operation lock for startup 0 = AUTO, 1 = UNLOCK, 2 = LOCK [Default] AUTO
Getting example	Command	@GSO ↵
	Response	@GSO,1 ↵
	Description	Getting the setting for startup. UNLOCK
Setting example	Command	@SSO,1 ↵
	Response	@SSO,1 ↵
	Description	Setting this menu to "1" (UNLOCK).
Remarks		—



### 3.3.12 Other settings

<b>@GLS / @SLS</b>		<b>Operation lock</b>
Getting	Command	@GLS ↵
	Response	@GLS, lock ↵
Setting	Command	@SLS, lock ↵
	Response	@SLS, lock ↵
Parameter		lock: Operation lock 0 = Unlock [Default], 1 = Lock, 2 = Toggle
Getting example	Command	@GLS ↵
	Response	@GLS,1 ↵
	Description	Getting the operation lock status. Locked
Setting example	Command	@SLS,1 ↵
	Response	@SLS,1 ↵
	Description	Enabling operation lock.
Remarks		—

<b>@GBZ / @SBZ</b>		<b>Buzzer</b>
Getting	Command	@GBZ ↵
	Response	@GBZ, bz ↵
Setting	Command	@SBZ, bz ↵
	Response	@SBZ, bz ↵
Parameter		bz: Buzzer sound 0 = OFF, 1 = ON [Default] ON
Getting example	Command	@GBZ ↵
	Response	@GBZ,1 ↵
	Description	Getting the buzzer status. ON
Setting example	Command	@SBZ,1 ↵
	Response	@SBZ,1 ↵
	Description	Enabling buzzer.
Remarks		—

### 3.3.13 Displaying status

@GSS		Displaying input signal status / sink device status																
Getting	Command	@GSS, channel, mode ↵																
	Response	@GSS, channel, mode, status_1 (, status_2, status_3, status_4) ↵																
Parameter		<p>channel: I/O channel</p> <p>1 = IN (Selected input channel)</p> <p>11 = OUT (Output channel)</p> <p>mode: Target status</p> <p>channel = For 1 (selected input channel)</p> <p>0 = All of 1 to 4,</p> <p>1 = Input signal type*<sup>1</sup>,</p> <p>2 = Video input signal format*<sup>2</sup>,</p> <p>3 = Audio input signal format*<sup>3</sup>,</p> <p>4 = with/without HDCP*<sup>4</sup></p> <p>channel = For 11 (Output channel)</p> <p>0 = All of 1 to 3,</p> <p>1 = HDCP authentication status*<sup>5</sup>,</p> <p>2 = Output signal type*<sup>6</sup>,</p> <p>3 = Error code*<sup>7</sup></p> <p>status_1-4: Status</p> <p>*<sup>1</sup> One of the following values is returned.</p> <table border="1" data-bbox="497 1144 1442 1310"> <thead> <tr> <th>Return</th> <th>Input signal type</th> </tr> </thead> <tbody> <tr> <td>Hxx</td> <td>HDMI signal is input. xx stands for color depth which is 24, 30 or 36.</td> </tr> <tr> <td>D</td> <td>DVI signal is input.</td> </tr> <tr> <td>N</td> <td>No signal is input.</td> </tr> </tbody> </table> <p>*<sup>2</sup> For format of video input signal</p> <table border="1" data-bbox="497 1388 1442 1668"> <thead> <tr> <th>Return example</th> <th>Format of video input signal</th> </tr> </thead> <tbody> <tr> <td>1080i 59.94Hz</td> <td>SDTV/HDTV signal is input, which replies the format type and vertical synchronous frequency.</td> </tr> <tr> <td>800 x 600 60.00Hz</td> <td>VESA signal is input, and [Horizontal resolution x Vertical resolution] and vertical synchronous frequency are returned.</td> </tr> <tr> <td>NO SIGNAL</td> <td>No video signal is input.</td> </tr> </tbody> </table>	Return	Input signal type	Hxx	HDMI signal is input. xx stands for color depth which is 24, 30 or 36.	D	DVI signal is input.	N	No signal is input.	Return example	Format of video input signal	1080i 59.94Hz	SDTV/HDTV signal is input, which replies the format type and vertical synchronous frequency.	800 x 600 60.00Hz	VESA signal is input, and [Horizontal resolution x Vertical resolution] and vertical synchronous frequency are returned.	NO SIGNAL	No video signal is input.
Return	Input signal type																	
Hxx	HDMI signal is input. xx stands for color depth which is 24, 30 or 36.																	
D	DVI signal is input.																	
N	No signal is input.																	
Return example	Format of video input signal																	
1080i 59.94Hz	SDTV/HDTV signal is input, which replies the format type and vertical synchronous frequency.																	
800 x 600 60.00Hz	VESA signal is input, and [Horizontal resolution x Vertical resolution] and vertical synchronous frequency are returned.																	
NO SIGNAL	No video signal is input.																	

@GSS	Displaying input signal status / sink device status (cont'd)																
Parameter	* <sup>3</sup> Format of audio input signal																
	<table border="1"> <thead> <tr> <th data-bbox="443 277 722 313">Return example</th> <th data-bbox="722 277 1410 313">Format of audio input signal</th> </tr> </thead> <tbody> <tr> <td data-bbox="443 313 722 394">LINEAR PCM 48kHz</td> <td data-bbox="722 313 1410 394">Linear PCM signal is input. Sampling frequency is returned.</td> </tr> <tr> <td data-bbox="443 394 722 474">LINEAR PCM 48kHz (MULTI CHANNEL)</td> <td data-bbox="722 394 1410 474">Multi channel linear PCM signal is input. Sampling frequency is returned.</td> </tr> <tr> <td data-bbox="443 474 722 627">COMPRESSED AUDIO</td> <td data-bbox="722 474 1410 627">Compressed audio signal (such as Dolby Digital and DTS) is input (The IMP-400UHD does not recognize detailed formats. "COMPRESSED AUDIO" is sent to all compressed audio).</td> </tr> <tr> <td data-bbox="443 627 722 663">NO SIGNAL</td> <td data-bbox="722 627 1410 663">No audio signal is input.</td> </tr> </tbody> </table>	Return example	Format of audio input signal	LINEAR PCM 48kHz	Linear PCM signal is input. Sampling frequency is returned.	LINEAR PCM 48kHz (MULTI CHANNEL)	Multi channel linear PCM signal is input. Sampling frequency is returned.	COMPRESSED AUDIO	Compressed audio signal (such as Dolby Digital and DTS) is input (The IMP-400UHD does not recognize detailed formats. "COMPRESSED AUDIO" is sent to all compressed audio).	NO SIGNAL	No audio signal is input.						
	Return example	Format of audio input signal															
	LINEAR PCM 48kHz	Linear PCM signal is input. Sampling frequency is returned.															
	LINEAR PCM 48kHz (MULTI CHANNEL)	Multi channel linear PCM signal is input. Sampling frequency is returned.															
	COMPRESSED AUDIO	Compressed audio signal (such as Dolby Digital and DTS) is input (The IMP-400UHD does not recognize detailed formats. "COMPRESSED AUDIO" is sent to all compressed audio).															
	NO SIGNAL	No audio signal is input.															
	LINEAR PCM 48kHz	Linear PCM signal is input. Sampling frequency is returned.															
	LINEAR PCM 48kHz (MULTI CHANNEL)	Multi channel linear PCM signal is input. Sampling frequency is returned.															
	COMPRESSED AUDIO	Compressed audio signal (such as Dolby Digital and DTS) is input (The IMP-400UHD does not recognize detailed formats. "COMPRESSED AUDIO" is sent to all compressed audio).															
	NO SIGNAL	No audio signal is input.															
	* <sup>4</sup> With/without HDCP	<table border="1"> <thead> <tr> <th data-bbox="443 743 722 779">Return example</th> <th data-bbox="722 743 1410 779">Input HDCP status</th> </tr> </thead> <tbody> <tr> <td data-bbox="443 779 722 828">HDCP 2.2 Type0</td> <td data-bbox="722 779 1410 828">HDCP 2.2 stream type 0 signal is input.</td> </tr> <tr> <td data-bbox="443 828 722 878">HDCP 2.2 Type1</td> <td data-bbox="722 828 1410 878">HDCP 2.2 stream type 1 signal is input.</td> </tr> <tr> <td data-bbox="443 878 722 927">HDCP 1.4</td> <td data-bbox="722 878 1410 927">HDCP 1.4 signal is input.</td> </tr> <tr> <td data-bbox="443 927 722 976">HDCP OFF</td> <td data-bbox="722 927 1410 976">Signal that is not protected by HDCP is input.</td> </tr> <tr> <td data-bbox="443 976 722 1025">NO SIGNAL</td> <td data-bbox="722 976 1410 1025">No signal is input.</td> </tr> </tbody> </table>	Return example	Input HDCP status	HDCP 2.2 Type0	HDCP 2.2 stream type 0 signal is input.	HDCP 2.2 Type1	HDCP 2.2 stream type 1 signal is input.	HDCP 1.4	HDCP 1.4 signal is input.	HDCP OFF	Signal that is not protected by HDCP is input.	NO SIGNAL	No signal is input.			
	Return example	Input HDCP status															
	HDCP 2.2 Type0	HDCP 2.2 stream type 0 signal is input.															
	HDCP 2.2 Type1	HDCP 2.2 stream type 1 signal is input.															
HDCP 1.4	HDCP 1.4 signal is input.																
HDCP OFF	Signal that is not protected by HDCP is input.																
NO SIGNAL	No signal is input.																
HDCP 2.2 Type0	HDCP 2.2 stream type 0 signal is input.																
HDCP 2.2 Type1	HDCP 2.2 stream type 1 signal is input.																
HDCP 1.4	HDCP 1.4 signal is input.																
HDCP OFF	Signal that is not protected by HDCP is input.																
NO SIGNAL	No signal is input.																
* <sup>5</sup> HDCP authentication	<table border="1"> <thead> <tr> <th data-bbox="443 1066 722 1102">Return example</th> <th data-bbox="722 1066 1410 1102">HDCP authentication</th> </tr> </thead> <tbody> <tr> <td data-bbox="443 1102 722 1151">HDCP2.2 SUPPORT</td> <td data-bbox="722 1102 1410 1151">HDCP 2.2-compliant sink device is connected.</td> </tr> <tr> <td data-bbox="443 1151 722 1200">HDCP1.4 SUPPORT</td> <td data-bbox="722 1151 1410 1200">HDCP 1.4-compliant sink device is connected.</td> </tr> <tr> <td data-bbox="443 1200 722 1281">HDCP NOT SUPPORT</td> <td data-bbox="722 1200 1410 1281">Non-HDCP-compliant sink device is connected or input signal is without HDCP.</td> </tr> <tr> <td data-bbox="443 1281 722 1361">HDCP ERROR</td> <td data-bbox="722 1281 1410 1361">HDCP-compliant sink device is connected, but the authentication failed.</td> </tr> <tr> <td data-bbox="443 1361 722 1411">HDCP CHECK NOW</td> <td data-bbox="722 1361 1410 1411">Sink device status is being checked.</td> </tr> <tr> <td data-bbox="443 1411 722 1491">MONITOR DISCONNECT</td> <td data-bbox="722 1411 1410 1491">No sink device is connected.</td> </tr> <tr> <td data-bbox="443 1491 722 1541">UNCONNECTED</td> <td data-bbox="722 1491 1410 1541">HDCP 2.2-compliant sink device is connected.</td> </tr> </tbody> </table>	Return example	HDCP authentication	HDCP2.2 SUPPORT	HDCP 2.2-compliant sink device is connected.	HDCP1.4 SUPPORT	HDCP 1.4-compliant sink device is connected.	HDCP NOT SUPPORT	Non-HDCP-compliant sink device is connected or input signal is without HDCP.	HDCP ERROR	HDCP-compliant sink device is connected, but the authentication failed.	HDCP CHECK NOW	Sink device status is being checked.	MONITOR DISCONNECT	No sink device is connected.	UNCONNECTED	HDCP 2.2-compliant sink device is connected.
Return example	HDCP authentication																
HDCP2.2 SUPPORT	HDCP 2.2-compliant sink device is connected.																
HDCP1.4 SUPPORT	HDCP 1.4-compliant sink device is connected.																
HDCP NOT SUPPORT	Non-HDCP-compliant sink device is connected or input signal is without HDCP.																
HDCP ERROR	HDCP-compliant sink device is connected, but the authentication failed.																
HDCP CHECK NOW	Sink device status is being checked.																
MONITOR DISCONNECT	No sink device is connected.																
UNCONNECTED	HDCP 2.2-compliant sink device is connected.																
HDCP2.2 SUPPORT	HDCP 2.2-compliant sink device is connected.																
HDCP1.4 SUPPORT	HDCP 1.4-compliant sink device is connected.																
HDCP NOT SUPPORT	Non-HDCP-compliant sink device is connected or input signal is without HDCP.																
HDCP ERROR	HDCP-compliant sink device is connected, but the authentication failed.																
HDCP CHECK NOW	Sink device status is being checked.																
MONITOR DISCONNECT	No sink device is connected.																
UNCONNECTED	HDCP 2.2-compliant sink device is connected.																

@GSS	Displaying input signal status / sink device status (cont'd)																													
Parameter	<p><sup>*6</sup> Output signal type</p> <table border="1" data-bbox="443 232 1428 436"> <thead> <tr> <th data-bbox="451 241 550 277">Return</th> <th data-bbox="555 241 1420 277">Output signal type</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 284 550 320">Hxx</td> <td data-bbox="555 284 1420 320">HDMI signal is output. xx stands for the color depth, 24, 30, or 36.</td> </tr> <tr> <td data-bbox="451 327 550 362">D</td> <td data-bbox="555 327 1420 362">DVI signal is output.</td> </tr> <tr> <td data-bbox="451 369 550 405">C</td> <td data-bbox="555 369 1420 405">No video is output. HDCP is being authorized.</td> </tr> <tr> <td data-bbox="451 412 550 448">N</td> <td data-bbox="555 412 1420 448">No sink device is connected.</td> </tr> </tbody> </table>	Return	Output signal type	Hxx	HDMI signal is output. xx stands for the color depth, 24, 30, or 36.	D	DVI signal is output.	C	No video is output. HDCP is being authorized.	N	No sink device is connected.																			
	Return	Output signal type																												
Hxx	HDMI signal is output. xx stands for the color depth, 24, 30, or 36.																													
D	DVI signal is output.																													
C	No video is output. HDCP is being authorized.																													
N	No sink device is connected.																													
<p><sup>*7</sup> An error code is returned in the following order: video output to HDMI output connector, audio output to HDMI output connector, audio output to AUDIO OUTPUT connector.</p>																														
<table border="1" data-bbox="443 633 1412 1344"> <thead> <tr> <th data-bbox="451 642 598 678">Error code</th> <th data-bbox="603 642 989 678">Video output status</th> <th data-bbox="994 642 1404 678">Audio output status</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 685 598 721">0</td> <td colspan="2" data-bbox="603 685 1404 721">Video or audio is output correctly.</td> </tr> <tr> <td data-bbox="451 728 598 795">1</td> <td data-bbox="603 728 989 795">—</td> <td data-bbox="994 728 1404 795">"@GAM / @SAMAUDIO output mute" is set to "ON".</td> </tr> <tr> <td data-bbox="451 801 598 880">2</td> <td colspan="2" data-bbox="603 801 1404 880">DDC power is not input. (If no source device is connected, this error code is displayed.)</td> </tr> <tr> <td data-bbox="451 887 598 922">3</td> <td data-bbox="603 887 989 922">No video signal is input.</td> <td data-bbox="994 887 1404 922">No audio signal is input.</td> </tr> <tr> <td data-bbox="451 929 598 965">4</td> <td colspan="2" data-bbox="603 929 1404 965">Video or audio output of the source device is muted.</td> </tr> <tr> <td data-bbox="451 972 598 1008">5</td> <td colspan="2" data-bbox="603 972 1404 1008">Signal with HDCP is input but the sink device is HDCP non-compliant</td> </tr> <tr> <td data-bbox="451 1014 598 1081">6</td> <td colspan="2" data-bbox="603 1014 1404 1081">The source device does not output information (packets) required for video or audio output.</td> </tr> <tr> <td data-bbox="451 1088 598 1267">7</td> <td data-bbox="603 1088 989 1267">Signal that is not supported by the IMP-400UHD is input.</td> <td data-bbox="994 1088 1404 1267">Since compressed audio is input, audio cannot be output (Compressed audio can be output only to sink devices supporting compressed audio).</td> </tr> <tr> <td data-bbox="451 1274 598 1352">9</td> <td data-bbox="603 1274 989 1352">—</td> <td data-bbox="994 1274 1404 1352">Sink device that does not support audio is connected.<sup>*8</sup></td> </tr> </tbody> </table>	Error code	Video output status	Audio output status	0	Video or audio is output correctly.		1	—	"@GAM / @SAMAUDIO output mute" is set to "ON".	2	DDC power is not input. (If no source device is connected, this error code is displayed.)		3	No video signal is input.	No audio signal is input.	4	Video or audio output of the source device is muted.		5	Signal with HDCP is input but the sink device is HDCP non-compliant		6	The source device does not output information (packets) required for video or audio output.		7	Signal that is not supported by the IMP-400UHD is input.	Since compressed audio is input, audio cannot be output (Compressed audio can be output only to sink devices supporting compressed audio).	9	—	Sink device that does not support audio is connected. <sup>*8</sup>
Error code	Video output status	Audio output status																												
0	Video or audio is output correctly.																													
1	—	"@GAM / @SAMAUDIO output mute" is set to "ON".																												
2	DDC power is not input. (If no source device is connected, this error code is displayed.)																													
3	No video signal is input.	No audio signal is input.																												
4	Video or audio output of the source device is muted.																													
5	Signal with HDCP is input but the sink device is HDCP non-compliant																													
6	The source device does not output information (packets) required for video or audio output.																													
7	Signal that is not supported by the IMP-400UHD is input.	Since compressed audio is input, audio cannot be output (Compressed audio can be output only to sink devices supporting compressed audio).																												
9	—	Sink device that does not support audio is connected. <sup>*8</sup>																												

@GSS		Displaying input signal status / sink device status (cont'd)															
Parameter		<table border="1"> <thead> <tr> <th>Error code</th> <th>Video output status</th> <th>Audio output status</th> </tr> </thead> <tbody> <tr> <td>A</td> <td colspan="2">Input channel is set to "OFF" ( @GSW / @SSWInput channel (P.14), @GCPInput channel (P.15) )</td> </tr> <tr> <td>B</td> <td colspan="2">No sink device is connected.</td> </tr> <tr> <td>C</td> <td colspan="2">HDCP is being authenticated.</td> </tr> <tr> <td>D</td> <td colspan="2">HDCP authentication failed.</td> </tr> </tbody> </table> <p>*8 Status of the HDMI output connector</p>	Error code	Video output status	Audio output status	A	Input channel is set to "OFF" ( @GSW / @SSWInput channel (P.14), @GCPInput channel (P.15) )		B	No sink device is connected.		C	HDCP is being authenticated.		D	HDCP authentication failed.	
Error code	Video output status	Audio output status															
A	Input channel is set to "OFF" ( @GSW / @SSWInput channel (P.14), @GCPInput channel (P.15) )																
B	No sink device is connected.																
C	HDCP is being authenticated.																
D	HDCP authentication failed.																
Getting example	Command	@GSS,1,0 ↵															
	Response	@GSS,1,0,H30,1080P 60Hz,LINEAR PCM 48kHz, HDCP 1.4 ↵															
	Description	Getting all IN1 statuses. <ul style="list-style-type: none"> <li>• Input signal type: 30 bit / pixel (10 bit / component) signal</li> <li>• Video input signal: 1080P 60Hz</li> <li>• Audio input signal: LINEAR PCM 48kHz</li> <li>• HDCP: HDCP 1.4</li> </ul>															
Remarks		—															

<b>@GES</b>		<b>Monitor's EDID</b>
Getting	Command	@GES, mode
	Response	@GES, mode, status_1 (, status_2, status_3, status_4)
Parameter		<p>mode: Target item</p> <ul style="list-style-type: none"> <li>0 = All of 1 to 4,</li> <li>1 = Monitor's name <sup>*1</sup>,</li> <li>2 = Resolution and dot clock,</li> <li>3 = HDMI support status, sampling structure, and color depth <sup>*2</sup>,</li> <li>4 = Audio support status and sampling frequency, bit length, the number of channels, and support status of compressed audio <sup>*3</sup></li> </ul> <p>status_1-4: Status</p> <p><sup>*1</sup> If no sink device is connected, "UNCONNECTED" is returned.</p> <p><sup>*2</sup> For sink device that does not support HDMI, "DVI" is returned. For sink device that supports HDMI, "HDMI" is returned, and then supported sampling structures (RGB, YCbCr 4: 2: 2, YCbCr 4: 4: 4, and YCbCr 4: 2: 0, separated with "/") and supported color depths (24, 30, and 36, separated with "/") are replied in that order.</p> <p><sup>*3</sup> For sink device that does not support audio, "AUDIO NOT SUPPORT" is returned. For sink device that supports audio, "LINEAR PCM" is returned, and then supported sampling frequencies (32, 44.1, 48, 88.2, 96, 176.4, and 192, separated with "/"), bit length (16, 20, and 24, separated with "/"), the number of channels (one of 1 to 8), and "COMPRESSED AUDIO SUPPORT" (if compressed audio is supported) are replied in that order.</p>
Getting example	Command	@GES,0
	Response	@GES,0,IMP-400UHD,1920x1080 148.50MHz,DVI,AUDIO NOT SUPPORT
	Description	<p>Getting the EDID of the sink device connected to OUT1.</p> <ul style="list-style-type: none"> <li>• Monitor name: IMP-400UHD</li> <li>• Resolution: 1920x1080</li> <li>• Dot clock: 148.50 MHz</li> <li>• HDMI: Not supported</li> <li>• Audio: Not supported</li> </ul>
Remarks		—

<b>@GIV</b>		<b>Version</b>
Getting	Command	@GIV ↵
	Response	@GIV, id, ver ↵
Parameter		id : Model number ver : Firmware version
Getting example	Command	@GIV ↵
	Response	@GIV,IMP-400UHD,1.00 ↵
	Description	Getting the product information. Model number and firmware version are replied.
Remarks		—

---

---

## IMP-400UHD User's Guide (Command Guide)

Ver.1.0.0

Issued on: 1 December 2017

---

---



**Headquarters** IDK Corporation  
7-9-1 Chuo, Yamato-shi, Kanagawa-pref.  
242-0021 JAPAN  
TEL: +81-46-200-0764 FAX: +81-46-200-0765  
**Email:** [idx\\_eng@idx.co.jp](mailto:idx_eng@idx.co.jp) **URL:** <http://www.idxkav.com>

**USA** IDK America Inc.  
72 Grays Bridge Road Suite 1-C, Brookfield, CT 06804  
TEL: +1-203-204-2445  
**Email:** [sales@idxkav.com](mailto:sales@idxkav.com) **URL:** <http://www.idxkav.com>

**Europe** IDK Europe GmbH  
Lise-Meitner-Str. 6, D-40878 Ratingen  
TEL: +49-2102-578-301-0  
**Email:** [info@idxkav.eu](mailto:info@idxkav.eu) **URL:** <http://www.idxkav.com>



**Product information** Arvanics Corporation  
**Support** 7-9-1 Chuo, Yamato-shi, Kanagawa-pref.  
242-0021 JAPAN  
TEL: +81-46-259-6920 FAX: +81-46-259-6930  
**Email:** [info@arvanics.com](mailto:info@arvanics.com) **URL:** <http://www.arvanics.com>

**Information in this document is subject to change without notice.  
All rights reserved. All trademarks mentioned are the property of their respective owners.**