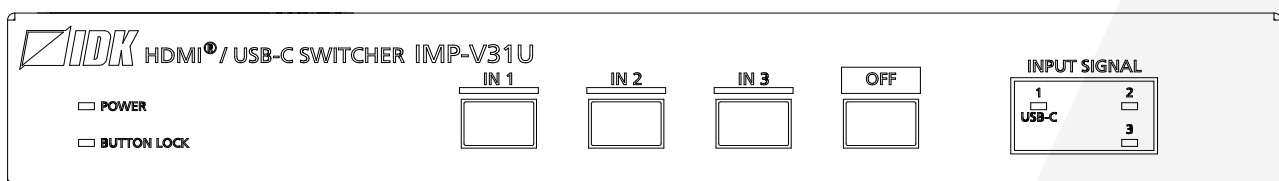


## HDMI/USB-C Switcher

# IMP-V31U

Command Guide

Ver.1.0.0



Thank you for choosing our product.

Please thoroughly familiarize yourself with this guide before installing this equipment. We recommend keeping this manual together with the equipment for future reference as needed.

- All rights reserved.
- Some information contained in this guide such as exact product appearance, communication commands, and so on may differ depending on the product version.
- This guide is subject to change without notice. You can download the latest version from IDK’s website at: [www.idkav.com](http://www.idkav.com)

**About technical documentation**

■ **Please read the following guides before connecting this equipment to a power source.**

<p><b>1. Safety Instructions</b> Contains important safety instructions for the product to help ensure your own personal safety and protect the product and working environment from potential damage.</p>	<p>Provided with the product.</p>
<p><b>2. Setup Guide</b> Contains setup information and precautions for installing the product and connecting cables.</p>	<p>Download from <a href="http://www.idkav.com">www.idkav.com</a></p>

■ **Please refer to the following guides as needed.**

<p><b>3. Operation Guide</b> Describes how to configure and use the equipment.</p>	<p>Download from <a href="http://www.idkav.com">www.idkav.com</a></p>
<p><b>4. User Guide</b> Contains detailed explanation of functions, setting values, and restrictions.</p>	
<p><b>5. Command Guide</b> Contains information on controlling the equipment using communication commands through RS-232C or LAN communication.</p>	

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**FCC STATEMENT**

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

(Class A)

**Supplier's Declaration of Conformity**  
**47 CFR § 2.1077 Compliance Information**

**Unique Identifier**

Type of Equipment: HDMI/USB-C Switcher

Model Name: IMP-V31U

**Responsible Party – U.S. Contact Information**

Company Name: IDK America Inc.

Address: 72 Grays Bridge Road Suite 1-C, Brookfield, CT 06804

Telephone number: +1-203-204-2445

URL: www.idkav.com

**FCC Compliance Statement**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(FCC SDoC)

- **CE MARKING**

- This equipment complies with the essential requirements of the relevant European health, safety and environmental protection legislation.

- **WEEE MARKING**



- Waste Electrical and Electronic Equipment (WEEE), Directive 2002/96/EC
- (This directive is only valid in the EU.)
- This equipment complies with the WEEE Directive (2002/96/EC) marking requirement.
- The left marking indicates that you must not discard this electrical/electronic equipment in domestic household waste.

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## About this guide

The IMP-V31U switcher (hereafter referred to as IMP-V) can be remotely configured and controlled via RS-232C communication or LAN communication.

## Command and Response

Setting command : For setting or changing commands

Getting command : For getting the current settings or statuses

### Command format

A command consists of [**@**] (**40** in hex), 3 one-byte alphabetical characters (Not case sensitive), and parameters. [,] (a comma, **2C** in hex) is indicated between two characters.

The number of parameters varies depending on commands.

Processing is executed by sending line endings <CR><LF> (return+line feed, **0D** and **0A** in hex) at the end of the command. The line endings are added to each response.

@SPM,2<CR><LF> in hex:

	Header	3 one-byte alphabetical characters			Comma	Parameter	Line endings	
ASCII	@	S	P	M	,	2	CR	LF
Hex	40	53	50	4D	2C	32	0D	0A

### Response examples

If the command is valid and performed,

Setting: the same command string is returned.

Command example → @SSW,1,1<CR><LF>

Response example ← @SSW,1,1<CR><LF>

Getting: the current settings are returned in ascending order following the sent command.

Command example → @GSW,1<CR><LF>

Response example ← @GSW,1,1,1<CR><LF>

Error response:

If the command is invalid, an error response (“@ERR Error status (P.10)”) is returned.

Command example → @XXX<CR><LF>

Response example ← @ERR,2<CR><LF>

## RS-232C communication

It takes about 10 seconds at maximum to be ready for normal operation after powering up.

### RS-232C communication specification

Compliant standard	RS-232C
Baud rate	4800/9600/14400/19200/38400/57600/115200 (bps)
Data bit length	7/8 (bit)
Parity check	NONE, ODD, EVEN
Stop bit	1/2 (bit)
X parameter	Invalid
Flow control	None
Delimiter	CR LF (Carriage return and line feed, <b>0D</b> and <b>0A</b> in hex)
Communication method	Full duplex

### Connecting RS-232C cable

Insert and secure the wires from the RS-232C cable into the supplied 3-pin captive screw connector, and then insert the captive screw connector into the mating connector on the IMP-V.

28 AWG to 16 AWG conductor gauge is recommended. The recommended wire strip length is 0.28 in. (7 mm). Short RTS/CTS and DTR/DSR as needed.



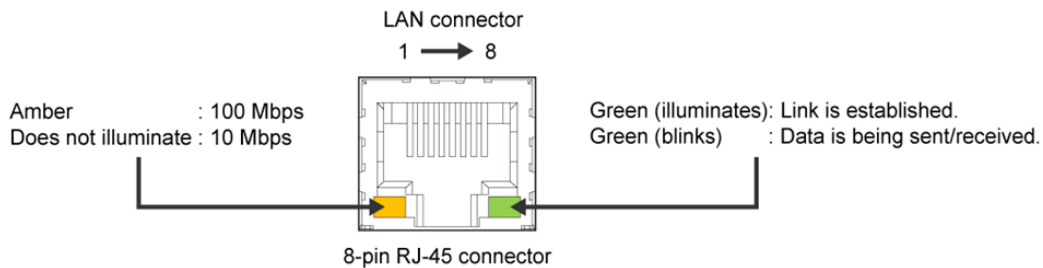
## LAN communication

It takes about 13 seconds at maximum to be ready for normal operation after powering up.

### LAN communication specification

Physical layer	10Base-T (IEEE802.3i)/100Base-TX (IEEE802.3u)
Network layer	ARP/IP/ICMP
Transport layer	TCP Port used for command control: 1100 Port used for WEB browser control(HTTP): 80 UDP Port used for status notification: 1 to 65535
Maximum number of connections	8

### LAN connector specification



Auto MDI/MDI-X that distinguishes and switches straight/cross cables automatically is supported.

### The number of TCP-IP connections

The IMP-V supports up to eight simultaneous TCP-IP connections (Eight logical ports).

To maintain optimal system accessibility, it is advisable to issue **port-open** and **port-close** commands before and after command or query strings are issued. This approach enables eight or more control devices to be effectively interfaced simultaneously and without concern for communication errors.

As a safeguard, the IMP-V incorporates a timeout window for each port. If any port is inactive for more than 30 seconds (by default), it will be closed automatically.

You can change the timeout setting using “@GLD/@SLD **Automatic disconnection time (Timeout) (P.19)**”.

## Command list

### ■ Error status

@ERR	Error status	10
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### ■ Selecting I/O channels

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### ■ Unsolicited status notification

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@AIN	Input signal status (For each connector)	29
@AOT	Output signal status (For each channel)	31
@GAA	Alarm status	33

## Details of commands

Default values are shaded.

Optional descriptions are indicated in parentheses.

### Error status

@ERR	Error status
Response	@ERR,error<CR><LF>
error: Error status	
<ul style="list-style-type: none"> <li>1 = Erroneous format or value</li> <li>2 = Undefined command or wrong format</li> <li>3 = The command could not be executed.</li> <li>4 = Loading EDID from the sink device failed.</li> </ul>	
Getting example	
@SSW<CR><LF>	Switching channels
@ERR,1<CR><LF>	Command format or parameter was invalid.

### Selecting I/O channels

@GSW/@SSW	Switching channel
Getting	Command
	Response
Setting	Command
input: Input channel	
0 = INOFF 1 to 3 = IN1 to IN3	
Getting example	
@GSW<CR><LF>	Getting the input channel
@GSW,2<CR><LF>	IN2
Setting example	
@SSW,1<CR><LF>	Setting input channel to IN1

## Output

@GVO/@SVO		Signal output
Getting	Command	@GVO,output<CR><LF>
	Response	@GVO,output,signal(,signal)<CR><LF>
Setting	Command	@SVO,output,signal<CR><LF>
output: Output connector 0 = All outputs    1 = OUT A    201 = OUT B		
signal: Signal output 0 = OFF    1 = ON		
Getting example		
@GVO,1<CR><LF>		Getting the OUT A signal output
@GVO,1,1<CR><LF>		ON
Setting example		
@SVO,1,1<CR><LF>		Setting the OUT A signal output to ON
Remarks: If [0] (OFF) is selected, a sink device may be in standby status depending on the device type.		

@GDB/@SDB		Video mute
Getting	Command	@GDB,output<CR><LF>
	Response	@GDB,output,mute(,mute)<CR><LF>
Setting	Command	@SDB,output,mute<CR><LF>
output: Output connector 0 = All outputs    1 = OUT A    201 = OUT B		
mute: Video mute 0 = OFF    1 = ON		
Getting example		
@GDB,201<CR><LF>		Getting the OUT B video mute
@GDB,201,1<CR><LF>		ON
Setting example		
@SDB,1,1<CR><LF>		Setting the OUT A video mute to ON

## Input

@GHE/@SHE		HDCP input
Getting	Command	@GHE,input<CR><LF>
	Response	@GHE,input,hdcp(,hdcp)<CR><LF>
Setting	Command	@SHE,input,hdcp<CR><LF>
input: Input channel 0 = All inputs    2 = IN2    3 = IN3 Only HDMI input connector(s) can be specified.		
hdcp: HDCP input 0 = NOT SUPPORT    1 = HDCP 1.4 SUPPORT    2 = HDCP 2.2 SUPPORT		
Getting example		
@GHE,0<CR><LF>		Getting the HDCP input of all HDMI inputs
@GHE,0,2,2<CR><LF>		HDCP 2.2 SUPPORT
Setting example		
@SHE,2,0<CR><LF>		Setting the IN2 HDCP input to NOT SUPPORT

## Input channel automatic switching

<b>@GAU/@SAU</b>		<b>Signal ON priority</b>
Getting	Command	@GAU<CR><LF>
	Response	@GAU,priority_in1,priority_in2,priority_in3<CR><LF>
Setting	Command	@SAU,priority_in1,priority_in2,priority_in3<CR><LF>
priority_in1-3: Signal ON priority (IN1 to IN3) 0 = OFF    1 to 3 = Priority (Highest to Lowest)		
Getting example		
@GAU<CR><LF> @GAU,1,2,3<CR><LF>		Getting the signal ON priority <ul style="list-style-type: none"> <li>▪ IN1: 1</li> <li>▪ IN2: 2</li> <li>▪ IN3: 3</li> </ul>
Setting example		
@SAU,3,2,1<CR><LF>		Setting the signal ON priority as follows: <ul style="list-style-type: none"> <li>▪ IN1: 3</li> <li>▪ IN2: 2</li> <li>▪ IN3: 1</li> </ul>

<b>@GOF/@SOF</b>		<b>Signal OFF priority</b>
Getting	Command	@GOF<CR><LF>
	Response	@GOF,priority_in1,priority_in2,priority_in3,priority_inoff<CR><LF>
Setting	Command	@SOF,priority_in1,priority_in2,priority_in3,priority_inoff<CR><LF>
priority_in1-inoff: Signal OFF priority IN1 to IN3, INOFF 0 = OFF    1 to 4 = Priority (Highest to Lowest)		
Getting example		
@GOF<CR><LF> @GOF,1,2,3,4<CR><LF>		Getting the signal OFF priority <ul style="list-style-type: none"> <li>▪ IN1     : 1</li> <li>▪ IN2     : 2</li> <li>▪ IN3     : 3</li> <li>▪ INOFF  : 4</li> </ul>
Setting example		
@SOF,4,3,2,1<CR><LF>		Setting the signal OFF priority <ul style="list-style-type: none"> <li>▪ IN1     : 4</li> <li>▪ IN2     : 3</li> <li>▪ IN3     : 2</li> <li>▪ INOFF  : 1</li> </ul>

## Output audio

<b>@GAM/@SAM</b>		<b>Mute</b>
Getting	Command	@GAM,output<CR><LF>
	Response	@GAM,output,mute(,mute)<CR><LF>
Setting	Command	@SAM,output,mute<CR><LF>
output: Output connector 0 = All outputs    1 = OUT A    201 = OUT B		
mute: Audio mute 0 = OFF    1 = ON		
Getting example		
@GAM,1<CR><LF>		Getting the OUT A audio mute
@GAM,1,1<CR><LF>		ON
Setting example		
@SAM,1,1<CR><LF>		Setting the OUT A audio mute to ON

## Input audio

@GSO/@SSO		Audio level
Getting	Command	@GSO,input<CR><LF>
	Response	@GSO,input,level(,level···)<CR><LF>
Setting	Command	@SSO,input,level<CR><LF>
input: Input channel 0 = All inputs 1 to 3 = IN1 to IN3 201 = ANALOG		
level: Input audio level (dB) -100 to 10 0		
Getting example		
@GSO,3<CR><LF>		Getting the IN3 input audio level
@GSO,3,-4<CR><LF>		-4 dB
Setting example		
@SSO,3,-8<CR><LF>		Setting the IN3 input audio level to -8 dB

@SDZ		Adjusting input audio level
Setting	Command	@SDZ,input,updown<CR><LF>
input: Input channel 0 = All inputs 1 to 3 = IN1 to IN3 201 = ANALOG		
updown: Relative value (dB) The specified value is added/subtracted to/from the current input audio level offset. -110 to 110 Input audio level range: -100 dB to +10 dB		
Setting example		
@SDZ,1,-1<CR><LF>		Decreasing the IN1 input audio level by 1 dB

@GDZ		Input audio limit status
Getting	Command	@GDZ,input<CR><LF>
	Response	@GDZ,input,limit(,limit···)<CR><LF>
input: Input channel 0 = All inputs 1 to 3 = IN1 to IN3 201 = ANALOG		
limit: Limit status of input audio level -1 = Minimum value (-100 dB) 0 = Not reach limit value 1 = Maximum value (+10 dB)		
Getting example		
@GDZ,1<CR><LF>		Getting the limit status of the IN1 input audio level
@GDZ,1,1<CR><LF>		Maximum value

@GAW/@SAW		Stable wait (Audio signal)
Getting	Command	@GAW,input<CR><LF>
	Response	@GAW,input,wait(,wait···)<CR><LF>
Setting	Command	@SAW,input,wait<CR><LF>
input: Input channel 0 = All inputs 1 to 3 = IN1 to IN3		
wait: Stable wait (Audio signal) 0 = OFF 1 = ON		
Getting example		
@GAW,1<CR><LF>		Getting the IN1 stable wait (Audio signal)
@GAW,1,1<CR><LF>		ON
Setting example		
@SAW,1,0<CR><LF>		Disabling the IN1 stable wait (Audio signal)

## EDID

@GED/@SED		EDID selection
Getting	Command	@GED,input<CR><LF>
	Response	@GED,input,edid(,edid···)<CR><LF>
Setting	Command	@SED,input,edid<CR><LF>
input: Input channel 0 = All inputs 1 to 3 = IN1 to IN3		
edid: EDID 0 = BUILT-IN EDID 1 = EXTERNAL EDID OUT A 401 = COPY DATA* * Available only if valid data is stored.		
Getting example		
@GED,1<CR><LF>		Getting the IN1 EDID selection
@GED,1,0<CR><LF>		BUILT-IN EDID
Setting example		
@SED,2,401<CR><LF>		Setting the IN2 EDID selection to COPY DATA

@GVF/@SVF		Resolution
Getting	Command	@GVF,input<CR><LF>
	Response	@GVF,input,resolution(,resolution···)<CR><LF>
Setting	Command	@SVF,input,resolution<CR><LF>
input: Input channel 0 = All inputs 1 to 3 = IN1 to IN3		
resolution 0 = 800x600 (SVGA)                      1 = 1024x768 (XGA) 2 = 1280x720 (VESA720)                3 = 720p 4 = 1280x768 (WXGA)                  5 = 1280x800 (WXGA) 6 = 1280x960 (QuadVGA)               7 = 1280x1024 (SXGA) 8 = 1360x768 (WXGA)                  9 = 1366x768 (WXGA) 10 = 1400x1050 (SXGA+)                11 = 1440x900 (WXGA+) 12 = 1600x900 (WXGA++)               13 = 1600x1200 (UXGA) 14 = 1680x1050 (WSXGA+)              15 = 1080i* 16 = 1920x1080 (VESA1080)            17 = 1080p 18 = 1920x1200 (WUXGA)               19 = 2048x1152 (QWXGA) 20 = 2560x1440 (WQHD)                21 = 2560x1600 (WQXGA) 40 = 3840x2160 30Hz                    41 = 3840x2160 60Hz 4:2:0* 42 = 3840x2160 60Hz 4:4:4            43 = 4096x2160 30Hz 44 = 4096x2160 60Hz 4:2:0*          45 = 4096x2160 60Hz 4:4:4 * For the IN1 USB connector, 15, 41, or 44 cannot be selected.		
Getting example		
@GVF,3<CR><LF>		Getting the IN3 resolution
@GVF,3,9<CR><LF>		1366x768
Setting example		
@SVF,1,12<CR><LF>		Setting the IN1 resolution to 1600x900
Remarks: Available only if [0] (BUILT-IN EDID) is selected for “@GED/@SED (P.16)”.		



## RS-232CSetting

@GCT/@SCT		Command setting
Getting	Command	@GCT,port<CR><LF>
	Response	@GCT,port,baudrate,length,parity,stop<CR><LF>
Setting	Command	@SCT,port,baudrate,length,parity,stop<CR><LF>
port: Conenctor 1 (Fixed)		
baudrate: Baud rate 0 = 4800 bps   1 = 9600 bps   2 = 14400 bps   3 = 19200 bps   4 = 38400 bps   5 = 57600 bps 6 = 115200 bps		
length: Data bit length 0 = 7 bit   1 = 8 bit		
parity: Parity check 0 = None   1 = ODD   2 = EVEN		
stop: Stop bit 0 = 1 bit   1 = 2 bit		
Getting example		
@GCT,1<CR><LF> @GCT,1,3,1,0,0<CR><LF>		Getting the RS-232C communication settings <ul style="list-style-type: none"> <li>▪ Baud rate       : 19200 bps</li> <li>▪ Data bit length : 8 bit</li> <li>▪ Parity check   : NONE</li> <li>▪ Stop bit        : 1 bit</li> </ul>
Setting example		
@SCT,1,3,1,0,0<CR><LF>		Setting the RS-232C communication as follows: <ul style="list-style-type: none"> <li>▪ Baud rate       : 19200 bps</li> <li>▪ Data bit length : 8 bit</li> <li>▪ Parity check   : NONE</li> <li>▪ Stop bit        : 1 bit</li> </ul>

## LAN

<b>@GIP/@SIP</b>		<b>IP address</b>
Getting	Command	@GIP<CR><LF>
	Response	@GIP,unit_1,unit_2,unit_3,unit_4<CR><LF>
Setting	Command	@SIP,unit_1,unit_2,unit_3,unit_4<CR><LF>
unit_1 to unit_4 = Upper bit of the IP address to Lower bit of the IP address 0 to 255 192.168.1.199		
Getting example		
@GIP<CR><LF>		Getting the IP address
@GIP,192,168,3,2<CR><LF>		192.168.3.2
Setting example		
@SIP,192,168,3,2<CR><LF>		Setting the IP address to 192.168.3.2

<b>@GSB/@SSB</b>		<b>Subnet mask</b>
Getting	Command	@GSB<CR><LF>
	Response	@GSB,unit_1,unit_2,unit_3,unit_4<CR><LF>
Setting	Command	@SSB,unit_1,unit_2,unit_3,unit_4<CR><LF>
unit_1 to unit_4 = Upper bit of the subnet mask to Lower bit of the subnet mask 0 to 255 255.255.255.0		
Getting example		
@GSB<CR><LF>		Getting the subnet mask
@GSB,255,255,192,0<CR><LF>		255.255.192.0
Setting example		
@SSB,255,255,192,0<CR><LF>		Setting the subnet mask to 255.255.192.0

<b>@GGW/@SGW</b>		<b>Gateway address</b>
Getting	Command	@GGW<CR><LF>
	Response	@GGW,unit_1,unit_2,unit_3,unit_4<CR><LF>
Setting	Command	@SGW,unit_1,unit_2,unit_3,unit_4<CR><LF>
unit_1 to unit_4 = Upper bit of the gateway address to Lower bit of the gateway address 0 to 255 192.168.1.200		
Getting example		
@GGW<CR><LF>		Getting the gateway address
@GGW,192,168,1,254<CR><LF>		192.168.1.254
Setting example		
@SGW,192,168,1,254<CR><LF>		Setting the gateway address to 192.168.1.254

<b>@GMC</b>		<b>MAC address</b>
Getting	Command	@GMC<CR><LF>
	Response	@GMC,unit_1,unit_2,unit_3,unit_4,unit_5,unit_6<CR><LF>
unit_1 to unit_6 = Upper bit of the MAC address to Lower bit of the MAC address 00 to FF in hex		
Getting example		
@GMC<CR><LF>		Getting the MAC address
@GMC,00,08,E5,00,00,00<CR><LF>		00-08-E5-00-00-00

<b>@GLD/@SLD</b>		<b>Automatic disconnection time (Timeout)</b>
Getting	Command	@GLD,service<CR><LF>
	Response	@GLD,service,time<CR><LF>
Setting	Command	@SLD,service,time<CR><LF>
service: Network service 1 (Fixed)		
time: Automatic disconnection time 0 = NOT DISCONNECT 1 to 180 = 1 sec. to 180 sec. 30 sec.		
Getting example		
@GLD,1<CR><LF>		Getting the automatic disconnection time
@GLD,1,120<CR><LF>		120 sec.
Setting example		
@SLD,1,100<CR><LF>		Setting the automatic disconnection time to 100 sec.

## Configuring IMP-V

<b>@RBT</b>		<b>Reboot</b>
Setting	Command	@RBT<CR><LF>
Setting example		
@RBT<CR><LF>		Rebooting the IMP-V31U

<b>@CLR</b>		<b>Initialization</b>
Setting	Command	@CLR,mode<CR><LF>
mode 0 = ALL INITIALIZE (All settings) 1 = NORMAL INITIALIZE (Settings other than communication settings)		
Setting example		
@CLR,0<CR><LF>		Initializing all settings
Remarks: The IMP-V reboots after initialization.		

## Status

@GSS		Input signal/Output signal status								
Getting	Command	@GSS,connector,mode<CR><LF>								
	Response	@GSS,connector,mode,status_1(,status_2,status_3···)<CR><LF>								
connector: I/O connectors 1 = IN (Currently selected input connector) 101 = OUT A										
mode: Target status connector = 1 (Input connector) 0 = All of 1 to 4                      1 = Input signal type <sup>*1</sup> 2 = Input video signal format <sup>*2</sup> 3 = Input audio signal format <sup>*3</sup> 4 = Presence of HDCP <sup>*4</sup> connector = 101 (Output connector) 0 = All of 1 to 3                      1 = HDCP output <sup>*5</sup> 2 = Output signal type <sup>*6</sup> 3 = Error code <sup>*7</sup>										
status_1-4: I/O signal status  <sup>*1</sup> Input signal type <table border="1" style="margin-left: 20px;"> <tr> <td>Hxx</td> <td>HDMI signal is input. xx stands for color depth (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> </table>			Hxx	HDMI signal is input. xx stands for color depth (24, 30, or 36).	D	DVI signal is input.	N	No signal is input.		
Hxx	HDMI signal is input. xx stands for color depth (24, 30, or 36).									
D	DVI signal is input.									
N	No signal is input.									
<sup>*2</sup> Video input signal <table border="1" style="margin-left: 20px;"> <tr> <td>1920x1080p 60.00Hz</td> <td>Signal is input, and Horizontal resolution x Vertical resolution are returned.</td> </tr> <tr> <td>NO SIGNAL</td> <td>No video signal is input.</td> </tr> </table>			1920x1080p 60.00Hz	Signal is input, and Horizontal resolution x Vertical resolution are returned.	NO SIGNAL	No video signal is input.				
1920x1080p 60.00Hz	Signal is input, and Horizontal resolution x Vertical resolution are returned.									
NO SIGNAL	No video signal is input.									
<sup>*3</sup> Input audio signal type <table border="1" style="margin-left: 20px;"> <tr> <td>LINEAR PCM 48kHz</td> <td>LPCM signal is input, which returns the sampling frequency.</td> </tr> <tr> <td>LINEAR PCM 48kHz (MULTI CHANNEL)</td> <td>Multi-channel LPCM signal is input, which returns the sampling frequency.</td> </tr> <tr> <td>COMPRESSED AUDIO</td> <td>Bitstream audio (such as Dolby Digital and DTS) is input.</td> </tr> <tr> <td>NO SIGNAL</td> <td>No audio signal is input.</td> </tr> </table>			LINEAR PCM 48kHz	LPCM signal is input, which returns the sampling frequency.	LINEAR PCM 48kHz (MULTI CHANNEL)	Multi-channel LPCM signal is input, which returns the sampling frequency.	COMPRESSED AUDIO	Bitstream audio (such as Dolby Digital and DTS) is input.	NO SIGNAL	No audio signal is input.
LINEAR PCM 48kHz	LPCM signal is input, which returns the sampling frequency.									
LINEAR PCM 48kHz (MULTI CHANNEL)	Multi-channel LPCM signal is input, which returns the sampling frequency.									
COMPRESSED AUDIO	Bitstream audio (such as Dolby Digital and DTS) is input.									
NO SIGNAL	No audio signal is input.									

@GSS	Input signal/Output signal status (Cont'd)	
*4 HDCP input type		
	HDCP1.4	HDCP 1.4 input
	HDCP2.2 Type0	HDCP 2.2 Type 0 input
	HDCP2.2 Type1	HDCP 2.2 Type 1 input
	HDCP NOT ENCRYPTED	No HDCP is input.
	NO SIGNAL	No video signal is input.
*5 HDCP output type		
	HDCP1.4	HDCP 1.4 output
	HDCP2.2	HDCP 2.2 output
	HDCP2.2 Type0	HDCP 2.2 Type 0 output
	HDCP2.2 Type1	HDCP 2.2 Type 1 output
	HDCP NOT ENCRYPTED	No HDCP is output.
	HDCP ERROR	HDCP authentication failed.
	DURING AUTHENTICATION	Being HDCP encrypted.
	SIGNAL STOPPED	Video output stops.
	UNCONNECTED	Sink device is not connected.
*6 Output signal type		
	Hxx	HDMI signal is output. xx stands for color depth (24, 30, or 36).
	D	DVI signal is output.
	C	Being HDCP encrypted and no video is output.
	X	Video output stops.
	N	Sink device is not connected.

@GSS		Input signal/Output signal status (Cont'd)	
*7 Error code of the video output is returned first, and then that of the digital audio output is returned.			
Error code	Video output status	Audio output status	
0	No error		
1	"@GDB/@SDB Video mute (P.11)" is set to [1] (ON).	"@GAM/@SAM (P.13)" is set to [1] (ON).	
2	Source device is not connected. (No DDC 5 V signal is input.)		
3	No video signal is input.	No audio signal is input.*8	
4	Video or audio output of the source device is muted.		
5	Signal with HDCP is input but sink device is HDCP incompliant. (This error code may also be returned during HDCP authentication.)	—	
6	Source device does not output the returned information (packets) for output of video or audio.		
7	Signal that is not supported by IMP-V (Dot clock is out of range) is input.	Since bitstream audio (such as Dolby Digital and DTS) is input, audio cannot be output (Bitstream audio can be output only to sink devices supporting these audio).	
8	—		
9	—		
A	Input channel selection is set to OFF.		
*8 Since input status of analog input audio cannot be detected, audio may not be output even if [0] is returned.			
<b>Getting example1</b>			
<pre>@GSS,1,0&lt;CR&gt;&lt;LF&gt; @GSS,1,0,H30,1920x1080p 60.00Hz, LINEAR PCM 48kHz,HDCP1.4&lt;CR&gt;&lt;LF&gt;</pre>		Getting all statuses of selected input connectors <ul style="list-style-type: none"> <li>• Input signal type : 30-BIT COLOR HDMI signal</li> <li>• Video input signal : 1920x1080p 60.00Hz</li> <li>• Audio input signal : LINEAR PCM 48kHz</li> <li>• HDCP : HDCP 1.4</li> </ul>	
<b>Getting example2</b>			
<pre>@GSS,101,0&lt;CR&gt;&lt;LF&gt; @GSS,101,0,HDCP2.2,H24,00&lt;CR&gt;&lt;LF&gt;</pre>		Getting OUT A all statuses <ul style="list-style-type: none"> <li>• HDCP : HDCP 2.2</li> <li>• Output signal type : 24-BIT COLOR HDMI signal</li> <li>• Error code : Output correctly</li> </ul>	

@GES		Viewing sink device EDID
Getting	Command	@GES,connector,mode<CR><LF>
	Response	@GES,connector,mode,status_1(,status_2,status_3,status_4)<CR><LF>
connector: Output connector 1 = OUT A		
mode: Target status 0 = All of 1 to 4 1 = Sink device name 2 = Recommended resolution and dot clock 3 = HDMI, video signal format, and color depth support status <sup>*1</sup> 4 = Audio sampling frequency, bit length, the number of channels, and support status of audio signal format <sup>*2</sup>		
status_1-4: EDID status SIGNAL STOPPED : Video output stops. UNCONNECTED : Sink device is not connected. EDID READ ERROR : Reading EDID fails.		
<sup>*1</sup> For sink device that does not support HDMI : [DVI] is returned. For sink device that supports HDMI : [HDMI] is returned, and then supported video signal format (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 returned in that order.		
<sup>*2</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 bitstream audio is supported) are returned in that order.		
Getting example		
@GES,1,0<CR><LF>		Getting the EDID of the sink device connected to OUT A
@GES,1,0,MSD-V62U,1920x1080 148.50MHz, DVI,AUDIO NOT SUPPORT<CR><LF>		<ul style="list-style-type: none"> <li>▪ Sink device name : MSD-V62U</li> <li>▪ Recommended resolution : 1920x1080</li> <li>▪ Dot clock : 148.50 MHz</li> <li>▪ HDMI : Not supported</li> <li>▪ Audio : Not supported</li> </ul>

<b>@GHC</b>		<b>System check</b>
Getting	Command	@GHC<CR><LF>
	Response	@GHC,voltage,temp<CR><LF>
voltage: Internal voltage status 0 = Normal 1 = Abnormal		
temp: Internal temperature status 0 = Normal 1 = Abnormal		
Getting example		
@GHC<CR><LF>		Getting the system check result
@GHC,1,0<CR><LF>		<ul style="list-style-type: none"> <li>▪ Internal voltage status : Abnormal</li> <li>▪ Internal temperature status : Normal</li> </ul>

<b>@GIV</b>		<b>Device information</b>
Getting	Command	@GIV<CR><LF>
	Response	@GIV,id,ver<CR><LF>
id: Model number		
ver: Firmware version		
Getting example		
@GIV<CR><LF>		Getting the product information
@GIV,IMP-V31U,01.00.00<CR><LF>		<ul style="list-style-type: none"> <li>▪ Model number : IMP-V31U</li> <li>▪ Firmware version : 01.00.00</li> </ul>

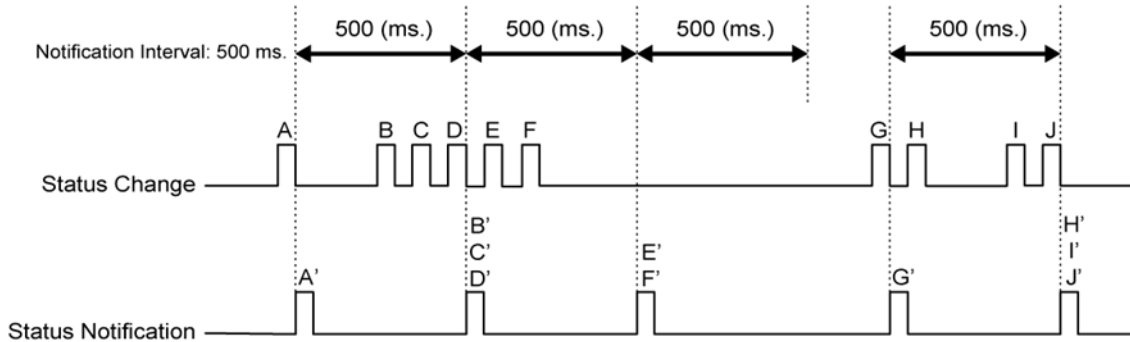


## Unsolicited status notification

Changes in I/O and internal statuses are notified to external devices over LAN communication (UDP).

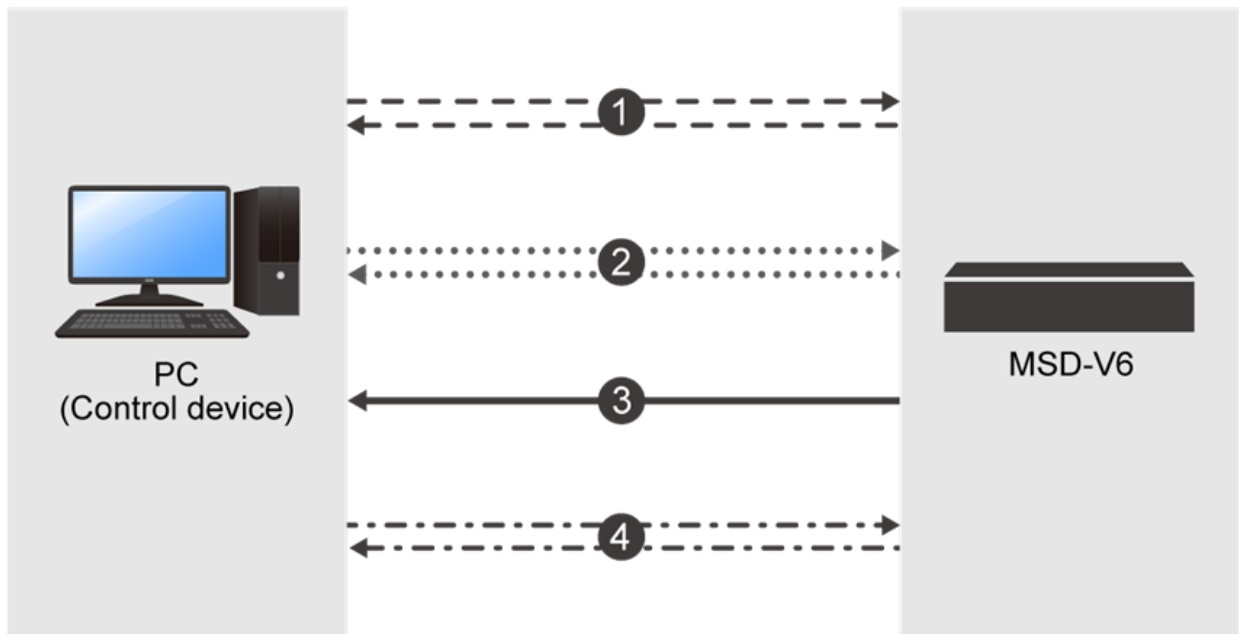
To enable the unsolicited notification, set the notification interval (“@GPH/@SPH (P.2727)”) to a value to a value other than [0] (OFF).

If no change is detected during the interval, status is sent immediately after detecting a change.



### ■ Example:

1. Set the destination using “@GDA/@SDA IP address/UDP port number of destination (P.26)”.
2. Set the notification interval using “@GPH/@SPH (P.2727)”.
3. If any status changes, “@PSHUnsolicited status notification (P.28)” is sent to the set IP address destination over UDP protocol.
4. Get the changes in input signal, output signal, and alarm status using “@AIN (P.29)”, “@AOT Output signal status (For each channel) (P.31)”, and “@GAA Alarm status (P.33)”.



@GDA/@SDA		IP address/UDP port number of destination
Getting	Command	@GDA,reserve<CR><LF>
	Response	@GDA,reserve,unit_1,unit_2,unit_3,unit_4,port<CR><LF>
Setting	Command	@SDA,reserve,unit_1,unit_2,unit_3,unit_4,port<CR><LF>
reserve: 1 (Fixed)		
unit_1 to unit_4 = Upper bit of the IP address to Lower bit of the IP address 0 to 255    192.168.1.200		
port: UDP port number 1 to 65535    1147		
Getting example		
@GDA,1<CR><LF> @GDA,1,192,168,1,200,1147<CR><LF>		Getting the IP address/UDP port number of destination <ul style="list-style-type: none"> <li>• IP address            : 192.168.1.200</li> <li>• UDP port number : 1147</li> </ul>
Setting example		
@SDA,1,192,168,1,201,1148<CR><LF>		Set the IP address/UDP port number of destination to 192.168.1.201 and 1148, respectively.
Remarks: If status notification function is enabled (“@GPH/@SPH (P.27)” is set to a value other than [0](OFF)), this command cannot be set.		

@GPH/@SPH		Notification interval																																																																																				
Getting	Command	@GPH<CR><LF>																																																																																				
	Response	@GPH,time,save<CR><LF>																																																																																				
Setting	Command	@SPH,time(,save)<CR><LF>																																																																																				
<p>time: Notification time  <b>0 = OFF</b>    1 to 50 = 100 ms to 5000 ms</p> <table border="1"> <thead> <tr> <th>time</th> <th>ON/OFF</th> <th>Time</th> <th></th> <th>time</th> <th>ON/OFF</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>OFF</td> <td>—</td> <td></td> <td>40</td> <td>ON</td> <td>4000 ms</td> </tr> <tr> <td>1</td> <td>ON</td> <td>100 ms</td> <td></td> <td>41</td> <td>ON</td> <td>4100 ms</td> </tr> <tr> <td>2</td> <td>ON</td> <td>200 ms</td> <td></td> <td>42</td> <td>ON</td> <td>4200 ms</td> </tr> <tr> <td>3</td> <td>ON</td> <td>300 ms</td> <td></td> <td>43</td> <td>ON</td> <td>4300 ms</td> </tr> <tr> <td>4</td> <td>ON</td> <td>400 ms</td> <td></td> <td>44</td> <td>ON</td> <td>4400 ms</td> </tr> <tr> <td>5</td> <td>ON</td> <td>500 ms</td> <td>to</td> <td>45</td> <td>ON</td> <td>4500 ms</td> </tr> <tr> <td>6</td> <td>ON</td> <td>600 ms</td> <td></td> <td>46</td> <td>ON</td> <td>4600 ms</td> </tr> <tr> <td>7</td> <td>ON</td> <td>700 ms</td> <td></td> <td>47</td> <td>ON</td> <td>4700 ms</td> </tr> <tr> <td>8</td> <td>ON</td> <td>800 ms</td> <td></td> <td>48</td> <td>ON</td> <td>4800 ms</td> </tr> <tr> <td>9</td> <td>ON</td> <td>900 ms</td> <td></td> <td>49</td> <td>ON</td> <td>4900 ms</td> </tr> <tr> <td>10</td> <td>ON</td> <td>1000 ms</td> <td></td> <td>50</td> <td>ON</td> <td>5000 ms</td> </tr> </tbody> </table>			time	ON/OFF	Time		time	ON/OFF	Time	0	OFF	—		40	ON	4000 ms	1	ON	100 ms		41	ON	4100 ms	2	ON	200 ms		42	ON	4200 ms	3	ON	300 ms		43	ON	4300 ms	4	ON	400 ms		44	ON	4400 ms	5	ON	500 ms	to	45	ON	4500 ms	6	ON	600 ms		46	ON	4600 ms	7	ON	700 ms		47	ON	4700 ms	8	ON	800 ms		48	ON	4800 ms	9	ON	900 ms		49	ON	4900 ms	10	ON	1000 ms		50	ON	5000 ms
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9	ON	900 ms		49	ON	4900 ms																																																																																
10	ON	1000 ms		50	ON	5000 ms																																																																																
<p>save: Saving setting  <b>0 = Not save</b> (the notification time will be set to [0] automatically at the next start-up.)  <b>1 = Saves the setting</b>  If this parameter is not specified, the setting is not saved.</p>																																																																																						
Getting example																																																																																						
@GPH<CR><LF>		Getting notification time																																																																																				
@GPH,5,1<CR><LF>		<ul style="list-style-type: none"> <li>▪ Notification time : 500 ms.</li> <li>▪ Saving the setting : Saving the interval setting</li> </ul>																																																																																				
Setting example																																																																																						
@SPH,50,1<CR><LF>		Setting the interval to 5000 ms. and saving the setting																																																																																				

@PSH		Unsolicited status notification						
Getting		@PSH,in,out,alarm<CR><LF>						
in: Input status 0 = No changes    1 to FF= Changes								
bit	7	6	5	4	3	2	1	0
in						IN3	IN2	IN1
[1] appears for the detected channel, the value is displayed in hex. 1: Changes in IN1								
out: Output status 0 = No changes    1 to FF = Changes								
bit	7	6	5	4	3	2	1	0
out								OUT A
[1] appears for the detected channel, the value is displayed in hex. 1: Changes in OUT A								
alarm: Alarm status 0 = No changes    1 = Changes								
Getting example								
@PSH,1,0,0<CR><LF>					Getting the status change			
					<ul style="list-style-type: none"> <li>▪ Input status    : IN1</li> <li>▪ Output status   : No changes</li> <li>▪ Alarm status    : No changes</li> </ul>			
Remarks: Only if status notification function is enabled (“@GPH/@SPH (P.27)” is set to a value other than [0] (OFF)), the command can be sent.								

@AIN		Input signal status (For each channel) (Cont'd)
Getting	Command	@AIN,in<CR><LF>
	Response	@AIN,status_1,status_2,status_3,status_4,status_5,status_6,status_7,status_8, status_9,status_10,status_11,status_12,status_13,status_14,status_15,status_16, status_17,status_18,status_19<CR><LF>
in: Input connector 1 to 3 = IN1 to IN3		
status_1: Input connector 1 to 3 = IN1 to IN3		
status_2: Model number		
status_3: Firmware version		
status_4: The number of valid data = 15 (Fixed)		
status_5: 1 (Fixed)		
status_6: Horizontal resolution of input video 0 = No signal is input. 1920 = 1920 pixels		
status_7: Vertical resolution of input video 0 = No signal is input. 1080 = 1080 lines		
status_8: Vertical sync frequency of input video 0 = No signal is input. 59.94 = 59.94Hz		
status_9: Progressive or interlace scan 0 = No signal is input. 1 = Progressive 2 = Interlace		
status_10: HDMI/DVI mode of input video 0 = No signal is input. 1 = DVI 2 = HDMI		
status_11: Video signal format of input video 0 = No signal is input. 1 = RGB 2 = YCbCr 4:2:2 3 = YCbCr 4:4:4 4 = YCbCr 4:2:0 255 = Unknown		
status_12: Color range of input video 0 = No signal is input. 1 = Limited range 2 = Full range		
status_13: Color depth of input video 0 = No signal is input. 1 = 24 bit/pixel (8 bit/component) 2 = 30 bit/pixel (10 bit/component) 3 = 36 bit/pixel (12 bit/component)		
status_14: DDC 5 V input status 0 = No signal is input 1 = Signal is input		
status_15: Presence of HDCP 0 = No signal is input. 1 = Without HDCP 2 = HDCP 1.4 3 = HDCP 2.2 Type 0 4 = HDCP 2.2 Type 1		
status_16: Format of input audio 0 = No signal is input. 1 = LPCM 2 = Bitstream audio		
status_17: Sampling frequency of input audio 0 = No signal is input. 1 = 22.05 kHz 2 = 24 kHz 3 = 32 kHz 4 = 44.1 kHz 5 = 48 kHz 6 = 88.2 kHz 7 = 96 kHz 8 = 176.4 kHz 9 = 192 kHz 10 = 768 kHz 11 = 64 kHz 12 = 128 kHz 255 = Unknown		
status_18: Bit length of input audio 0 = No signal is input. 1 = 16 bit 2 = 17 bit 3 = 18 bit 4 = 19 bit 5 = 20 bit 6 = 21 bit 7 = 22 bit 8 = 23 bit 9 = 24 bit 255 = Unknown		
status_19: HBR mode of input audio 0 = No signal is input. More other than HBR (LPCM, other Bitstream audio) 2 = HBR mode		

@AIN	Input signal status (For each channel) (Cont'd)
Getting example	
<pre>@AIN,1&lt;CR&gt;&lt;LF&gt; @AIN,1,IMP-V31U,01.00.00,15,1, 1920,1080,59.94,1,2,1,2,1,1,2,1,5, 9,1&lt;CR&gt;&lt;LF&gt;</pre>	<pre>Getting IN1 input signal status • Input connector : IN1 • Model number : IMP-V31U • Firmware version : 01.00.00 • The number of valid data : 15 • 1 (Fixed) • Horizontal resolution of input video : 1920 pixels • Vertical resolution of input video : 1080 lines • Vertical sync frequency of input video : 59.94 Hz • Progressive or interlace scan : Progressive • HDMI/DVI mode of input video : HDMI • Video signal format of input video : RGB • Color range of input video : Full range • Color depth of input video : 24 bit/pixel (8 bit/component) • DDC 5 V input status : Signal is input • Presence of HDCP : HDCP 1.4 • Format of input audio : LPCM • Sampling frequency of input audio : 48 kHz • Bit length of input audio : 24 bit • HBR mode of input audio : Mode other than HBR</pre>

@AOT		Output signal status (For each channel)
Getting	Command	@AOT,out<CR><LF>
	Response	@AOT,status_1,status_2,status_3,status_4,status_5,status_6,status_7,status_8, status_9,status_10,status_11,status_12,status_13,status_14,status_15,status_16, status_17,status_18,status_19,status_20,status_21,status_22,status_23,status_24, status_25<CR><LF>
out: Output connector 1 = OUT A		
status_1: Output connector 1 = OUT A		
status_2: Model number		
status_3: Firmware version		
status_4: The number of valid data = 21 (Fixed)		
status_5: 1 (Fixed)		
status_6: Selected input channel (Main window) 0 = OFF 1 to 3 = IN1 to IN3		
status_7: Horizontal resolution of output video 0 = No signal is output. 1920 = 1920 pixels		
status_8: Vertical resolution of output video 0 = No signal is output. 1080 = 1080 lines		
status_9: Vertical sync frequency of output video 0 = No signal is output. 59.94 = 59.94 Hz		
status_10: Progressive or interlace scan 0 = No signal is output. 1 = Progressive 2 = Interlace		
status_11: HDMI/DVI mode of output video 0 = No signal is output. 1 = DVI 2 = HDMI		
status_12: Video signal format of output video 0 = No signal is output. 1 = RGB 2 = YCbCr 4:2:2 3 = YCbCr 4:4:4 4 = YCbCr 4:2:0		
status_13: Color range of output video 0 = No signal is output. 1 = Limited range 2 = Full range		
status_14: Color depth of output video 0 = No signal is output. 1 = 24 bit/pixel (8 bit/component) 2 = 30 bit/pixel (10 bit/component) 3 = 36 bit/pixel (12 bit/component)		
status_15: Hot plug detection 0 = NO hot plug is detected. 1 = Hot plug is detected.		
status_16: HDCP encryption 0 = No HDCP encryption 1 = HDCP is being encrypted. 2 = HDCP is being encrypted. 3 = HDCP is being encrypted. 4 = HDCP encryption ends normally. 5 = HDCP encryption ends abnormally.		
status_17: HDCP output 0 = No HDCP output 1 = HDCP 1.4 2 = HDCP 2.2 Type 0 3 = HDCP 2.2 Type 1		
status_18: Output audio format 0 = No signal is output. 1 = LPCM 2 = Bitstream audio		
status_19: Reading EDID 0 = Sink device is not connected. 1 = Failed 2 = Completed 255 = N/A		
status_20: HDMI/DVI mode (Sink) 0 = Sink device is not connected. 1 = DVI 2 = HDMI (LPCM supported) 3 = HDMI (Bitstream audio supported) 255 = N/A		

@AOT	Output signal status (For each channel) (Cont'd)							
status_21: Video signal format (Sink)								
bit	7	6	5	4	3	2	1	0
Color	N/A	-	-	-	YCbCr 4:2:0	YCbCr 4:4:4	YCbCr 4:2:2	RGB
<ul style="list-style-type: none"> <li>• "1" appears for supported video signal format, the value is displayed in decimal.</li> <li>• [0] : Sink device is not connected.</li> <li>• [128] : N/A</li> </ul>								
status_22: Color depth (Sink)								
0 = Sink device is not connected.    1 = 24 bit/pixel (8 bit/component) 2 = 30 bit/pixel (10 bit/component)    3 = 36 bit/pixel (12 bit/component)    255 = N/A								
status_23: HDCP (Sink)								
0 = Sink device is not connected.    1 = HDCP is not supported.    2 = HDCP 1.4 supported 3 = HDCP 2.2 supported    255 = N/A								
status_24: SCDC (Sink)								
0 = Sink device is not connected.    1 = SCDC is not supported.    2 = SCDC supported    255 = N/A								
status_25: HDR (Sink)								
0 = Sink device is not connected.    1 = HDR is not supported.    2 = HDR supported    255 = N/A								
Getting example								
<pre>@AOT,1&lt;CR&gt;&lt;LF&gt; @AOT,1,IMP-V31U, 01.00.00,21,1,1,1920, 1080,59.94,1,2,1,2,1,1, 4,1,1,2,2,7,1,2,2,2 &lt;CR&gt;&lt;LF&gt;</pre>	Getting the OUT A output signal statuses <ul style="list-style-type: none"> <li>• Output connector : OUT A</li> <li>• Model number : IMP-V31U</li> <li>• Firmware version : 01.00.00</li> <li>• The number of valid data : 21</li> <li>• 1 (Fixed)</li> <li>• Selected input channel (Main window) : IN1</li> <li>• Horizontal resolution of output video : 1920 pixels</li> <li>• Vertical resolution of output video : 1080 lines</li> <li>• Vertical sync frequency of output video : 59.94 Hz</li> <li>• Progressive or interlace scan : Progressive</li> <li>• HDMI/DVI mode of output video : HDMI</li> <li>• Video signal format of output video : RGB</li> <li>• Color range of output video : Full range</li> <li>• Color depth of output video : 24 bit/pixel (8 bit/component)</li> <li>• Hot plug detection : Hot plug is detected.</li> <li>• HDCP encryption : HDCP encryptions ends normally.</li> <li>• HDCP output : HDCP 1.4</li> <li>• Output audio format : LPCM</li> <li>• Reading EDID : Completed</li> <li>• HDMI/DVI mode (Sink) : HDMI (LPCM supported)</li> <li>• Video signal format (Sink) : RGB, YCbCr 4:4:4, and YCbCr 4:2:2 supported</li> <li>• Color depth (Sink) : 24 bit/pixel (8 bit/component)</li> <li>• HDCP (Sink) : HDCP 1.4 supported</li> <li>• SCDC (Sink) : SCDC supported</li> <li>• HDR (Sink) : HDR supported</li> </ul>							



@GAA		Alarm status
Getting	Command	@GAA<CR><LF>
	Response	@GAA,status_1,status_2,status_3,status_4,status_5<CR><LF>
status_1: Model number		
status_2: Firmware version		
status_3: The number of valid data = 2 (Fixed)		
status_4: Power voltage status 0 = Normal 1 = Abnormal		
status_5: Temperature status 0 = Normal 1 = Abnormal		
Getting example		
@GAA<CR><LF>		Getting alarm status
@GAA,IMP-V31U,01.00.00,2,0,0,0<CR><LF>		<ul style="list-style-type: none"> <li>▪ Model number : IMP-V31U</li> <li>▪ Firmware version : 01.00.00</li> <li>▪ The number of valid data : 2</li> <li>▪ Power voltage status : Normal</li> <li>▪ Temperature status : Normal</li> </ul>

**HDMI/USB-C Switcher**

# **IMP-V31U**

**Command Guide**



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