Media Production Suite

Video Mixer Plugin

External Control API Specification

Version 1.0

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Panasonic Entertainment & Communication Co., Ltd.

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1 Introduction

1.1 Purpose of this document

This document specifies the communication interface specification for the external control API that controls the Video Mixer plugin for the Media Production Suite software. As a communication interface, HTTP and TCP are supported.

1.2 Terms Used in this Manual

・**AI Keying**

AI Keying is a function that uses AI to isolate an element of a video from its background.

With the help of this function, the chroma key effect can be easily achieved without the need for a green screen or special lighting.

However, since AI processing uses background subtraction, the following limitations are applicable.

・The camera position (angle of view) needs to be fixed.

・A background image (AI Keying Background image) without the subject needs to be taken in advance.

・**AI Keying Background image**

The AI Keying Background image is a background image without the subject and is necessary for the AI Keying processing.

When using AI Keying, it is necessary to take an AI Keying Background image with the camera position (angle of view) fixed.

2 Interface

2.1 HTTP Communication Specifications

The HTTP communication specification conforms to the HTTP 1.1 communication specification, and the control of this software is realized as an HTTP request to a URL on the Web server. All HTTP requests are GET methods.

2.1.1 Format

The format (URL) of the control command provided as Web API is as follows.

[Send]

http://[IP Address]:[Port No]/cgi-bin/video_mixer?cmd=[Command]&[Parameter]=[Value]&...

Table 2.11-1 Transmission Format Details

No	name	explanation
1	IP Address	IP address of the Web application.
2	Port No	The standby port number of the Web application. Currently fixed at 1337.
3	Command	The control command string. The list of commands that can be used in 2.3 List of Supported Commands is specified.
4	Parameter	The control command parameter. You can use an "&" to specify several parameters. Since it is specified in each command, refer to each section in 3 Details of Commands.
5	Value	The value is set in the control command parameter. Since it is specified in each command, refer to each section in 3 Details of Commands.

[Receive]

The following two patterns are defined for the format of the response data returned to the command issuer.

Pattern 1: Return of only the response value

200 OK [Response]: [Response Value]

Pattern 2: Return of the Response value and image file

200 OK [Response]:[Response Value],Image file (PNG)

Table 2.11-2 Reception Format Details

No	name	explanation	Related Commands
1	Response	"resp" is saved as a fixed string.	All commands
2	Response value	"ack" or "nack" is saved as the response value.	All commands
3	Image file	Contains PNG image file.	Capture Screenshot

2.2 TCP Communication Specifications

When using the external control API for TCP communication, send data conforming to the following format to TCP communication listening port number 1437.

2.2.1 Format

The command format for sending and receiving is as follows.

Format
<STX> Command Name: Parameter1: Parameter2: Parameter3<ETX>

Format Description
<STX>   ⇒   Start of Text(=0x02)
Command name ⇒ See list of supported commands (4 alphabetic characters)
: Parameter 1   ⇒ Refer to each command parameter value
: Parameter 2   ⇒ Refer to the value of each command parameter (omitted if there is no parameter)
<ETX>   ⇒ End of Text(=0x03)
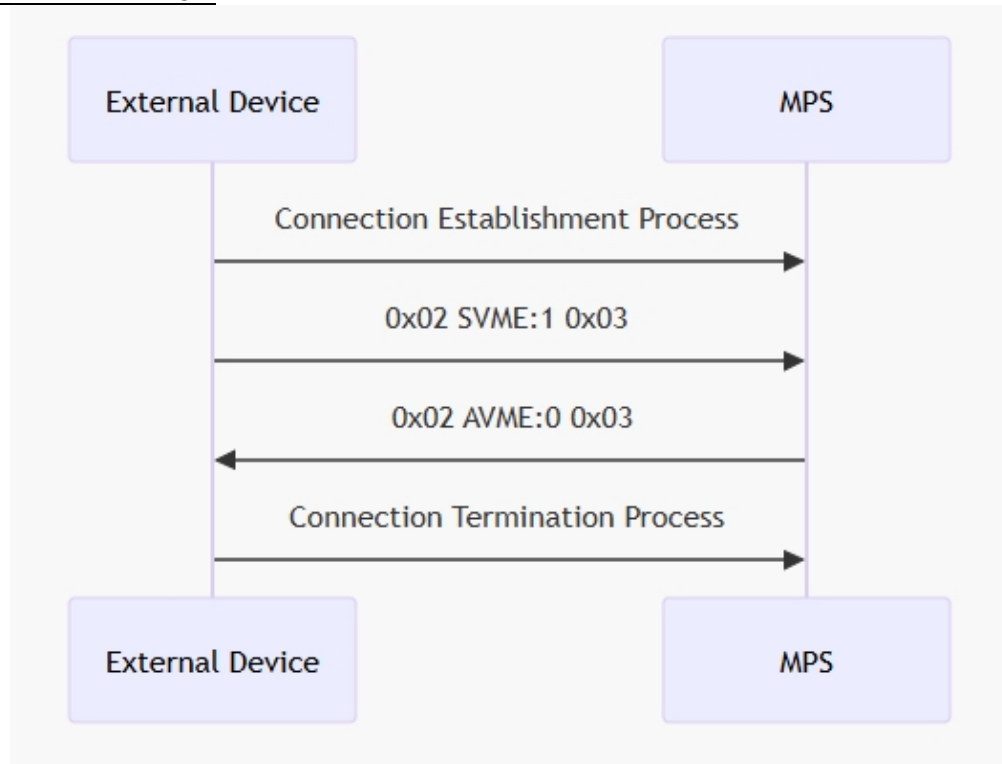
e.g. Video Mixer Enable ON

 <STX>SVME:1<ETX>

String notation	<STX>	S	V	M	And	:	1	<ETX>
Hexadecimal notation	02	53	56	4D	45	3A	31	03

2.2.2 Sequence

The connection sequence in TCP is as shown in the figure below.

e.g. Video Mixer Enable ON

In a TCP connection, an external device sends a control command, and the MPS sends a response command (including an error response). If the external device no longer needs to send the command after receiving the response command, terminate the connection for TCP communication.

MPS disconnects the connection if the TCP connection has been active for more than 20 seconds since the last response command was sent. When reconnecting after disconnecting, perform the connection establishment process again.

For more information about each control and response command, refer to each section in3 Details of Commands.
For more information about how to respond in the event of an unusual anomaly, refer to each section in 4.2.2 Processing of Error Commands.

2.3 List of Supported Commands

The following is a list of commands supported by the Video Mixer plugin of the Media Production Suite software.

For details on each command, see 3 Details of Commands.

Table 2.3-1 List of Supported Commands

No	Name	Control Command	Response Command	Description
1	Switch PGM	SPGM	APGM	Multi view PGM switching command
2	DSK	SDSK	ADSK	Down Stream Key ON/OFF Control Command
3	Capture Screenshot	SCAP	ACAP	PGM and KEY Image Capture Commands
4	Capture AI BKGD	PAUSE	AAIB	AI Keying Background Image Capture Command

3 Details of Commands

3.1 Switch PGM

The Switch PGM command is used when switching PGM.

3.1.1 HTTP Communication Specification

The transmission parameters for HTTP communication are as follows.

Table 3.11-1 List of Transmission Parameters

Name	Usage	Type	Description
cmd	Mandatory	string	SPGM
cell	Mandatory	Integer value	Specify the cell number of Multi View (1~12,13(A),14(B)). The number specified for each Multi View layout changes. Please refer to the figure below.

Layout 1

1	2	A	
3	4		
5	6	7	8
9	10	11	12

Layout 2

A		1	2
		3	4
5	6	7	8
9	10	11	12

Layout 3

A		B	
1	2	3	4
5	6	7	8

Figure 3.2 Cell Numbers for Each Layout

The received response is stored as either "ack" to indicate a successful response or "nack" to indicate a negative response.

Command example:

In this example, switching PGM to the video in cell number 1 of the Video Mixer plugin running on the PC with IP address 192.168.0.200.

PGM switch to cell number 1

   http://192.168.0.200:1337/cgi-bin/ video_mixer?cmd=SPGM&cell=1

3.1.2 TCP Communication Specifications

The parameters of TCP communication are as follows.

Table 3.11-2 List of TCP communication Parameters

Format	Control Commands	Response Commands
Command	SPGM	APGM
Parameter 1	01 (0x30 0x31): PGM switch to cell number 1 02 (0x30 0x32): PGM switch to cell number 2 : 12 (0x31 0x32): PGM switch to cell number 12 13 (0x31 0x33): PGM switch to cell number A 14 (0x31 0x34): PGM switch to cell number B	00 (0x30 0x30): Normal response 01 (0x30 0x31): Parameter error 02 (0x30 0x31): Operation disabled*1 03(0x30 0x31): VideoMixerEnable operation while OFF
Parameter 2	None	None

The correspondence of cell numbers varies from layout to layout. See Figure 3.2.

*1 The cases in which the operation is disabled are as follows.

    - You specified a cell number that does not exist in the current layout.

    - A request was made for a cell that cannot be switched to PGM.

    - A request was made for a cell that has already been selected for PGM.

Command example:

PGM switch to cell number 1
  <STX>SPGM:01<ETX>

Switching PGM to cell number 12
  <STX>SPGM:12<ETX>

Normal response
  <STX>APGM:00<ETX>

Error response (parameter error)
  <STX>APGM:01<ETX>

3.2 DSK

The DSK command is used to turn on/off the superposition of DSK (Down Stream Key). To use this function, it is necessary to set the DSK image (DSK Source) on the Multi View screen of the WEB GUI in advance and set the output Type to "PGM + DSK" on the I/O Setting screen.

3.2.1 HTTP Communication Specification

The transmission parameters for HTTP communication are as follows.

Table 3.22-1 List of Transmission Parameters

Name	Usage	Type	Description
cmd	Mandatory	string	SDSK
control	Mandatory	Integer value	Specify either ON or OFF. 　0 : DSK OFF 　1 : DSK ON

The received response is stored as either "ack" to indicate a successful response or "nack" to indicate a negative response.

Command example:

In this example, turn on/off the DSK output of the Video Mixer plug-in running on a PC with IP address 192.168.0.200.

DSK ON

　http://192.168.0.200:1337/cgi-bin/ video_mixer?cmd=SDSK&control=1

DSK OFF

　http://192.168.0.200:1337/cgi-bin/ video_mixer?cmd=SDSK&control=0

3.2.2 TCP Communication Specifications

The parameters of TCP communication are as follows.

Table 3.22-2 List of TCP communication Parameters

Format	Control Commands	Response Commands
Command	SDSK	ADSK
Parameter 1	0(0x30): DSK OFF 1(0x31): DSK ON	00 (0x30 0x30): Normal response 01 (0x30 0x31): Parameter error 02 (0x30 0x31): Operation disabled*1 03(0x30 0x31): VideoMixerEnable operation while OFF
Parameter 2	None	None

*1 The following are the cases in which an operation invalid error is reported.

- There is no DSK file setting.

- A DSK ON (OFF) request has been made while DSK ON (OFF) is already ON.

- PGM is not set in MultiView on the web screen.

Command example:

DSK ON
  <STX>SDSK:1<ETX>

DSK OFF
  <STX>SDSK:0<ETX>

Normal response
  <STX>ADSK:00<ETX>

Error response (parameter error)
  <STX>ADSK:01<ETX>

3.3 Capture Screenshot

The Capture Screenshot command captures PGM and KEY images. KEY video can only be captured when PGM is selected for the Scene cell containing AI Keying.

To use this function, it is necessary to set the capture and save folder on the Multi View screen of the WEB GUI in advance.

3.3.1 HTTP Communication Specification

The transmission parameters for HTTP communication are as follows.

Table 3.33-1 List of Transmission Parameters

Name	Usage	Type	Description
cmd	Mandatory	string	SCAP
control	Mandatory	Integer value	Specify either PGM or KEY. 1: Capture PGM video 2: KEY Video Capture
image	Mandatory	Integer value	Specify whether an image file is attached to the response. 0: No image attached 1: Image attached

The received response is stored as either "ack" to indicate a successful response or "nack" to indicate a negative response.

If the Image parameter is "1", attach a PNG image of the captured file to the Body of the response.

Command example:

In this example, send a command to the Video Mixer plug-in running on a PC with IP address 192.168.0.200.

PGM Capture (No Image Attached)

   http://192.168.0.200:1337/cgi-bin/ video_mixer?cmd=SCAP&control=1&image=0

KEY Capture (Image attached)

   http://192.168.0.200:1337/cgi-bin/ video_mixer?cmd=SCAP&control=2&image=1

3.3.2 TCP Communication Specifications

The parameters of TCP communication are as follows.

Note that TCP communication does not support attaching image files. If you need to retrieve an image file, use the HTTP communication command.

In the case of a successful response, the file name stored in the specified folder is returned in parameter 2.

Table 3.33-2 List of TCP communication Parameters

Format	Control Commands	Response Commands
Command	SCAP	ACAP
Parameter 1	1 (0x31) :P GM Video Capture 2 (0x32): Capture KEY video	00 (0x30 0x30): Normal response 01 (0x30 0x31): Parameter error 02 (0x30 0x31): Operation disabled*1 03(0x30 0x31): VideoMixerEnable operation while OFF
Parameter 2	None	When parameter 1 is 00 (normal response) Contains a string of file names When parameter 1 is other than 00 (normal response) None

*1 The following are the cases in which an operation invalid error is reported.

- The destination folder name is set to not exist.

- PGM is selected for a Multi view cell that does not have a KEY output.

Command example:

PGM Capture
  <STX>SCAP:1<ETX>

KEY Capture
  <STX>SCAP:2<ETX>

Normal response of PGM Capture (if the captured file name is pgm_24112215000000.png)
  <STX>ACAP:00: pgm_24112215000000.png<ETX>

Error response (parameter error)
  <STX>ACAP:01<ETX>

3.4 Capture AI Background

The Capture AI Background command is used to capture a background image for AI Keing.

3.4.1 HTTP Communication Specification

The list of transmission parameters for HTTP communication is as follows.

Table 3.44-1 List of Transmission Parameters

Name	Usage	Type	Description
cmd	Mandatory	string	SAIB
input	Mandatory	Integer value	Specify the input number to be captured (1~4).
bkgd	Mandatory	Integer value	Specify the BKGD number to be captured (1~4).

The received response is stored as either "ack" to indicate a successful response or "nack" to indicate a negative response.

Command example:

In this example, send an AI Keying background image capture command with input=1 and BKGD=3 to the Video Mixer plug-in running on a PC with IP address 192.168.0.200.

http://192.168.0.200:1337/cgi-bin/ video_mixer?cmd=SAIB&input=1&bkgd=3

3.4.2 TCP Communication Specifications

The parameters of TCP communication are as follows.

Table 3.44-2 List of TCP communication Parameters

Format	Control Commands	Response Commands
Command	SAIB	AAIB
Parameter 1	1 (0x31): Input1 to be captured 2 (0x32): Input2 to be captured 3 (0x33): Input3 to be captured 4 (0x34): Input4 to be captured	00 (0x30 0x30): Normal response 01 (0x30 0x31): Parameter error 02 (0x30 0x31): Operation disabled*1 03(0x30 0x31): VideoMixerEnable operation while OFF
Parameter 2	1 (0x31): Capture to BKGD number 1 2 (0x32): Capture to BKGD number 2 3 (0x33): Capture to BKGD number 3 4 (0x34): Capture to BKGD number 4	None

The correspondence of cell numbers varies from layout to layout. See Figure 3.2.

*1 The following are the cases in which an operation invalid error is reported.
- I/F requested Input with None setting
- Reception made a request for Input in the OFF state.

Command example:

AI Keying background image capture with input=1 and BKGD=3
 <STX>SAIB:1:3<ETX>

Normal response
 <STX>AAIB:00<ETX>

Error response (parameter error)
 <STX>AAIB:01<ETX>

4　Processing of Error Commands

4.1 HTTP communication

As an error handling of HTTP communication, "nack", which indicates a negative acknowledgment, must be saved in the reception response to the transmission of all error commands that are not specified in 3 Details of Commands.

4.2 TCP communication

After the control command is sent, an error response is issued if an abnormality occurs outside the specified error.
The format of the error response is as follows:

Table 4.2-1 List of Error Formats

Format	Description
Command	EROR
Parameter 1	01 (0x30 0x31): API format error
	02 (0x30 0x32): Undefined command
	03 (0x30 0x33): Communication error
	04 (0x30 0x34): Communication timeout
Parameter 2	None

e.g. In the case of a format error
　<STX>EROR:01<ETX>