

**SONY®**

# **DATA PROJECTOR VIDEO PROJECTOR**

PROTOCOL MANUAL  
(COMMON)  
1st Edition (Revised 2)



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The information contained in this manual does not guarantee compatibility or operability of the Sony projector models listed in this manual with all other equipment and systems.

Sony is not responsible for product malfunctions resulting from failure to follow the instructions and information contained herein. For details on the projector models listed herein, please refer to the Sony user manuals and operating instructions.

The information and specifications contained herein are subject to change without notice.

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## Related manuals

The following manual is provided for this unit in addition to this “Protocol Manual (COMMON) ”.

- **“Protocol Manual” (SUPPORTED COMMAND LIST)**

This manual describes the presence/absence of protocol support, initial setting, presence/absence of each command support and presence/absence of setting items such as API menu in each projector model.

Refer to the Protocol Manual (SUPPORTED COMMAND LIST) of each model.

# 1. Overview

This manual describes the basic configuration and operation to write the various commands to be used in the serial communication (RS-232C) and network communication for the projector. By using the commands described in this manual, you can operate the power supply and input selection, change the setting and obtain the device status from the external controller such as a personal computer (PC).

“Standby” refers to any of the following states: standby, network standby, or constant communication (network management: ON or standby mode: standard).

## Glossary of terms

Terms	Formal name	Description
SDAP	Simple Display Advertisement Protocol	Protocol name for advertising the projector status over Ethernet
ADCP	Advanced Display Control Protocol	Protocol name for controlling projector over RS-232C or Ethernet
PJLink	–	Protocol name for controlling projector over Ethernet
DDDP	Dynamic Device Discovery Protocol	AMX Device Discovery is the protocol name by AMX to enable to configure the AMX control system and the intended devices
SDDP	Simple Device Discovery Protocol	Protocol name by Control4 to allow devices to be easily added to a control system
CIP	Crestron Internet Protocol	Protocol name used in Crestron RoomView and control system by Crestron
PJ Control API	–	Protocol name for controlling this unit by posting a JSON format-based request over Ethernet using HTTP

2. Communication Specifications

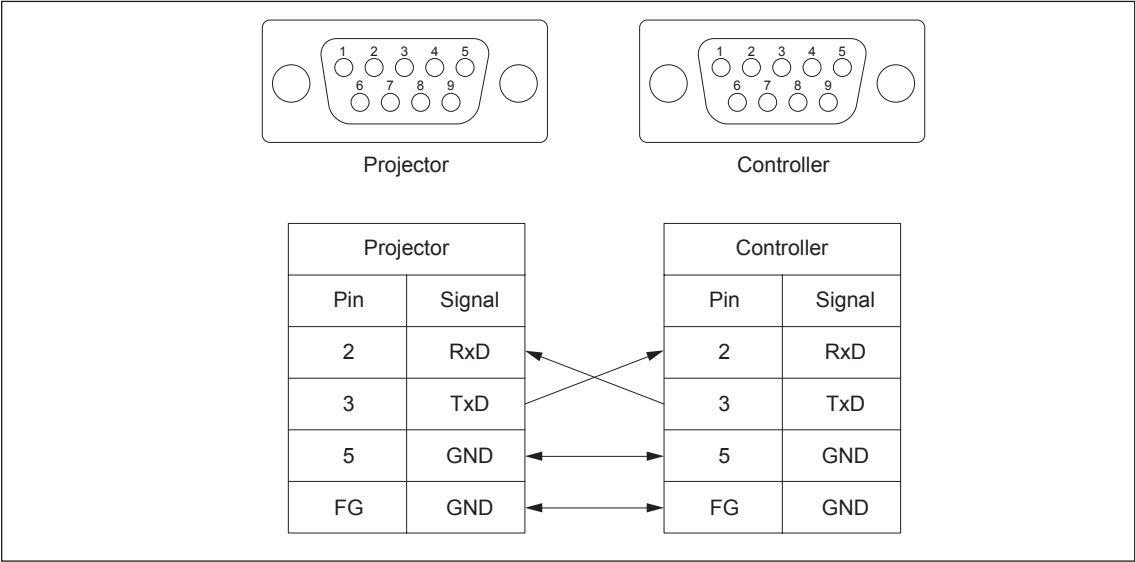
The connection specifications for serial communication (RS-232C) and network communication used in the remote control operation are described.

2-1. Serial Communication (RS-232C)

2-1-1. Connection

A D-Sub 9-pin cross (reverse) cable is used for connection.  
Guaranteed cable length: 15 m (However, the cable length may not be able to be guaranteed depending on the cable used.)  
A connection is used only TxD and RxD lines.

Cable connection diagram



## 2-1-2. Communication Specifications

Full duplex communication channel

Asynchronous system

No flow control

Transfer rate: 38,400 bps

The bit configuration is as follows:

1 start bit + 8-data bit + 1 parity bit + 1 stop bit

Even parity .....The 1's sum total of D0 to D7 is an even number. → 0

.....The 1's sum total of D0 to D7 is an odd number. → 1

START BIT	D0 (LSB)	D1	D2	D3	D4	D5	D6	D7 (MSB)	PARITY (EVEN)	STOP BIT
--------------	-------------	----	----	----	----	----	----	-------------	------------------	-------------

## 2-2. Network Communication

In the models having the Ethernet terminal, the network communication can be controlled by a network.

**Tip**

When performing the communication also during the standby state, set the unit as follows in the main unit menu.

“Standby mode” = “Standard” or

“Network management” = “ON”

For the support for each model, refer to the correspondence list of “Other items for each model” in “SUPPORTED COMMAND LIST”.

10Base-T or 100Base-TX can be automatically selected when using a network terminal.

When performing the communication via HDBaseT using the model that supports HDBaseT, the communication is enabled only with 100BaseTX.

**Tip**

Ethernet is a registered trademark of Xerox Corporation.

When you connect to the network by using the controller and Ethernet, perform the connection via the Ethernet router/hub or by using the Ethernet cross cable.

**Tip**

When performing the connection via HDBaseT using the model that supports HDBaseT, refer to the Operating Instructions of the model to be used.



### 3. Overview of Communication

The communication services below are available for controlling the projector from a remote location. For the presence/absence of protocol support in each mode, refer to the correspondence list of “Other items for each model” in “SUPPORTED COMMAND LIST”.

- Advertisement
- ADCP
- PJLink
- AMX Dynamic Device Discovery Protocol (DDDP)
- Control4 Simple Device Discovery Protocol (SDDP)
- Crestron Control
- SNMP
- PJ Control API

The various settings such as protocol On/Off is performed by opening the web setting screen on the Web browser. For details, refer to Operating Instructions of each model.

### 4. Glossary of Protocol

#### 4-1. Advertisement

The advertisement service is provided to facilitate development of a PC application that can automatically detect the projector on the network. This function is achieved by broadcasting the equipment information periodically to the network.

##### Tip

This service cannot be used in communication for which serial communication (RS-232C) was used. This service is invalid during initial setting.

##### [Information]

The equipment information below is sent as a broadcast packet at regular intervals.

Information	Description
Category	Category of the equipment
Equipment name	Name of the equipment
Serial number	Serial number of the equipment
Installation information	Installation location of the equipment
Community	Community name of the equipment
Power status	Power status of the equipment

##### Tip

- The category of the projector is 0Ah.
- The power status sets FFFFh if communication error occurs.

**[Protocol]**

The SDAP protocol is defined in order to provide this service.

Item	Description
Protocol name	SDAP (Simple Display Advertisement Protocol)
Transport	UDP
Port number	53862 (Factory-shipments value)
Broadcast interval	Once every 30 seconds (Factory-shipments value)

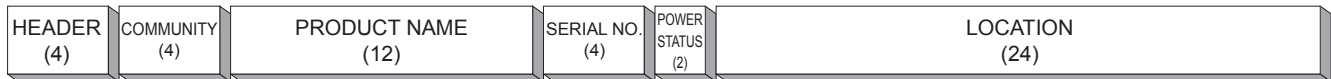
**[Setup Items]**

The items that can be set for the advertisement service are described below.

Setup items	Description
Community	Community name
Port No.	Port number
Interval	Broadcast interval
Broadcast Address	Add the transmission place.

**4-1-1. SDAP Packet Structure**

This section describes the SDAP packet structure. The number in the brackets shows byte.

**Packet structure****1. Header**

The header consists of ID (2 bytes), version (1 byte) and category (1 byte).

**HEADER****ID**

It is fixed to “4441h”.

**VERSION**

This indicates the version number of protocol.

It is fixed to 01h (version 1).

**CATEGORY**

Category number 0Ah of the projector is entered here.

**2. COMMUNITY**

The community that is set in the display equipment is entered.

**COMMUNITY**

### 3. Equipment Information

#### PRODUCT NAME

Name of equipment (Maximum twelve characters)

In case of less than twelve characters, 00h is entered in the blank space.

#### SERIAL NO.

Serial number is entered.

#### POWER STATUS

Power supply status of the equipment is entered.

#### LOCATION

Information of installation location (Maximum twenty four characters)

In case of less than twenty four characters, 00h is entered in the blank space.

## 4-2. ADCP (Advanced Display Control Protocol)

ADCP is a protocol for controlling a Sony projector from a remote location through serial and network connections. A text-based command is used for a protocol. A command can be easily sent or confirmed from the terminal program in PC.

### 4-2-1. Function

The projector can be controlled using commands below.

#### System command

This command can acquire the system status such as the power operation, power status, and error state of the projector.

#### Menu command

This command can switch the input terminal of the projector or operate an OSD menu.

#### Remote controller key command

This command can emulate the key operation of an infrared remote controller.

#### Tip

For the compatibility with the command in each model, refer to the separate “Protocol Manual (SUPPORTED COMMAND LIST)”.

**[Protocol]**

Use the protocols below when using this service through a network.

Item	Description
Protocol name	ADCP (Advanced Display Control Protocol)
Transport	TCP
Port number	53595 (Factory-setting value)
TCP connection time-out	60 seconds (Factory-setting value)
Authentication function	ON (Factory-setting value)
Authentication password	Projector (Factory-setting value) <b>Tip</b> This password becomes the same as the administrator password required when gaining access to the Web page.
Authentication system	Random number + Authentication based on the coincidence of a password to be hashed

**[Setting item]**

The items that can be set for ADCP are as follows.

Setting item	Description
Authentication function	Existence of authentication function
Port number	Port number
Time-out	TCP connection time-out time <b>Tip</b> The session of TCP is disconnected in case that TCP connection time-out time passed from when the termination of the previous communication was received.
Host address	Address of PC that can be connected <b>Tip</b> Connection from all PCs is accepted when this item is not set.

**Tip**

For the display example in using a PC, this manual differentiates between the characters displayed on the screen and the characters to be entered as shown below.

- Character code: US-ASCII
- ☐: Space (0x20).
- : Newline code CR + LF (0x0D + 0x0A).

**4-2-2. Serial Connection**

During connection with PC as a controller, the serial connection is described in an example in which a terminal program is used.

The projector is put into a standby state with “Standby mode” set to “Standard” or with “Network management” set to “ON” beforehand using a remote controller.

Connect the controller (PC) and the projector using a serial cable and set the terminal program of PC as described below.

## Serial port setting

Setting item	Value
Port	COM port of your PC connected with the projector Example) COM6
Communication rate	38,400 bps
Data bit	8 bits
Parity bit	EVEN
Stop bit	1 bit
Flow control	None

## Terminal setting

Setting item	Value
Newline code (Reception)	CR + LF
Newline code (Transmission)	CR + LF
Local echo	Yes

Open the terminal and enter a command as described below to confirm the response. (Upper-and lower-case characters are distinguished in this case.)

power ☐ "on" 

Confirmation for connection succeeds if the response below is returned and if the power of the projector is turned on.

ok 

If any response is not returned, confirm the setting of a port and terminal.

If the error response below is returned, confirm the entered command.

err\_cmd  (Command format error)

err\_val  (Command value error)

## Communication procedure

The communication between a controller (PC) and the projector starts from when a command text begins to be input from the controller side. After a Newline code is transmitted, the projector sends a response (return data) to the controller side. The communication is then completed.

A command transmission starts when an ASCII character code is sent. It is completed when a Newline code CR + LF is sent.

A command response is also sent back when an ASCII character code is sent. It is completed when a Newline code CR + LF is sent.

The maximum size of a command sent to the projector is 512 bytes including a Newline code.

## Transmit command

Command character code	Maximum size of transmit command	Command termination	Command time-out
US-ASCII Text A command and parameter are delimited using a space character (x020)	512 bytes	Newline code CR + LF (0x0D + 0x0A)	When no Newline code is sent within 60 seconds after command entry.

**Command response**

Response	Type of error	Description
ok	No error	Normal termination
err_cmd	Command format error	No command can be recognized.
err_option	Command option error	Command option error
err_inactive	Invalid error	A command is temporarily invalidated.
err_val	Value error	The value set using a command is out of the range.
err_auth	Network authentication error	The authentication during start of network communication failed.
err_internal1	Internal communication error 1 of the projector	A communication error occurred in the projector.
err_internal2	Internal communication error 2 of the projector	A communication error occurred in the projector.

**ADCP command**

By optional designation, the command can set values and acquire values, settable choices, and command information.

Command name                    command  
Value to be set                txt\_param1  
Currently settable choice      txt\_param1, txt\_param2  
Settable choice in command    txt\_param1, txt\_param2, txt\_param3

In the case described above, commands conform to the formats below, respectively.

Setting of selected value: Sets the selected value in command. The selected value is enclosed in double quotation marks (" ").

command "txt\_param1" ↵

Return code:

ok ↵

Acquisition of selected value: Acquires the selected value that has been set.

command? ↵

Return code:

"txt\_param1" ↵ (The configured selected value is returned.)

Acquisition of settable choice: Acquires a list of parameter –selected values that can be set currently.

command? --range ↵

Return code:

["txt\_param1", "txt\_param2"] ↵

Acquisition of command information: Acquires the command information.

command? --info ↵

Return code:

```
{ "type": "cmd_type", "version": "1.0", "range": ["txt_param1", "txt_param2", "txt_param3"] } ↵
```

(A command type, command version, and list of maximum settable selected value using a command are returned as command information.)

The following are the formats in the case that the selected value is a numeric value.

For example, assume that the setting value is 88;

Setting of numeric value: Sets the value in command. Type the numeric value directly without enclosing it in the double quotation marks (" ").

command 88 

Return code:

ok 

Setting of relative numeric value: Sets the relative value based on the numeric value that has been set. As for the negative relative value, put a minus sign (-).

command --rel 1  (In the case of plus 1)

Return code:

ok 

command --rel -1  (In the case of minus 1)


Return code:

ok 


Acquisition of numeric value: Acquires the numeric value that has been set.

command? 


Return code:

88  (The numeric value that has been set is returned.)


Acquisition of settable choice: Acquires the range of parameter –numeric values that can be set currently.

command? --range 

Return code:

{"min":0, "max":100, "step":1}  (When the step of numeric value (STEP) that can be set is "1", it is omitted.)

Acquisition of command information: Acquires the command information.

command? --info 

Return code:

{"type":"cmd\_type", "version":"1.0", "range":{"min":0, "max":100}} 

(A command type, command version, and range of maximum settable numeric value using a command are returned as command information.)

The JSON format is used to display the values that are configured or obtained by command. The various values such as numeric value, character string, their arrays, and object can be handled by command. The following are examples displayed by the JSON format.

Character string: Value enclosed in the double quotation marks (" ").

"string"

Numeric value: Integer or decimal in decimal number.

88

Array: Comma-separated values enclosed in the square brackets [ ].

["item1", "item2", "item3"]

Object: Comma-separated pairs of name and value enclosed in the curly brackets { }. The name and value are separated by colon (:).

{"value1":10, "value2":20, "value3":30}

### Prescription in communication

- The entry of a command is canceled if 60 seconds or more pass from when a controller begins to enter a command text until a Newline code is issued. The data sent till then is invalidated in this case.
- After command transmission, receive the response (return data) from this unit and then send the next command. When the next command is sent without waiting for any response, the projector cannot properly receive a command and return any response. No error response may be able to be performed.
- The projector may not operate properly when it is controlled by the multiple controllers at a time. Wait for the response before sending the command also when the projector is controlled by the multiple controllers.
- When a communication error occurs, the projector invalidates the data received till then and enters a reception wait state.
- For an undefined command or when the projector judges to be invalid, the projector sends an error code to the controller side.
- Even if data is written when the input signal of the projector is unstable, notice that the value is not reflected.
- When the standby mode of the projector is set to “low” or the network management of the projector is set to “off”, an "err\_cmd" response is returned if a command is sent to the projector that is in a standby state. Send the second command continuously again. However, in VPL-GTZ series, VPL-VW series and VPL-HW series, an "err\_cmd" response is not returned. Wait up to 10 seconds, depending on the model though, and send the second command again.

### Rough standard of command response wait time

The command response wait time is approximately 30 to 1000 msec.

#### Note

This time value is obtained under conditions in which communication is not disturbed due to some cause. Frequent communication may cause delay in the operation due to the load on the system.

## 4-2-3. Network Connection

The projector can be controlled through a network using ADCP.

When using ADCP through a network, authentication is required to start communication if an authentication function is valid. For the authentication method, refer to the communication procedure below.



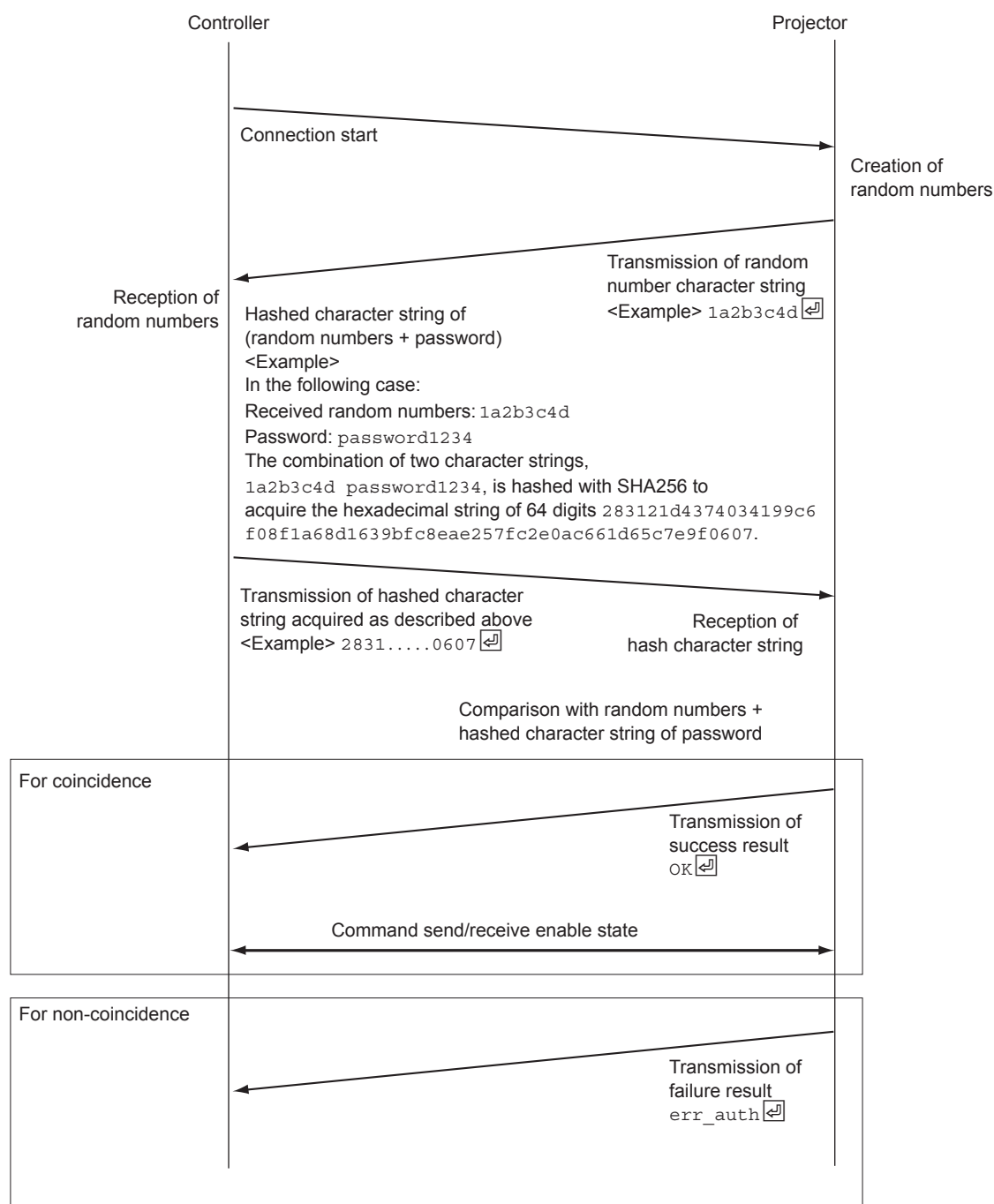
## Network communication procedure

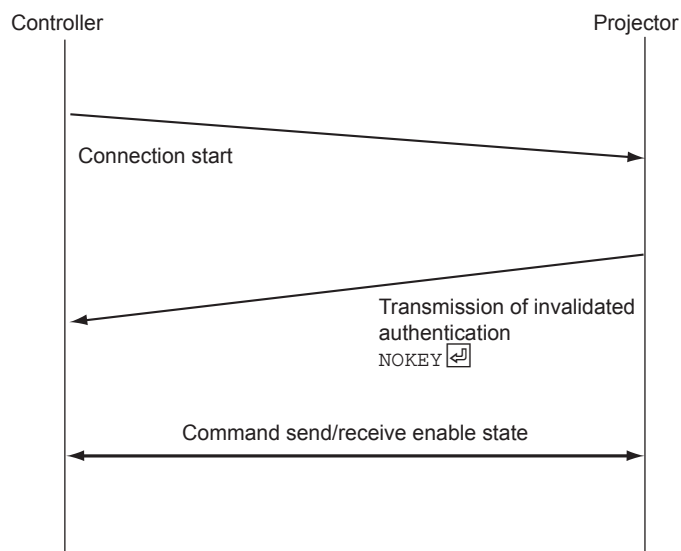
The communication sequence of ADCP via network is shown below. When an authentication function is set to ON, a character string of random numbers is sent from the projector during connection of a controller to the projector. It is required that the controller creates a hash character string using the random numbers and a password by the algorithm of SHA256, sends it together with a Newline code, and executes authentication.

When an authentication function is set to OFF, a character string of "NOKEY" is sent during connection of the projector to a controller. The controller can directly send an ADCP command.

When authentication fails, a character string of "err\_auth" is sent from the projector.

### When an authentication function is set to ON;



**When an authentication function is set to OFF;**

Like serial connection, a command response can be confirmed using a terminal program when a command is put into a send/receive enable state. Refer to the following for details of the setting.

**Setting of network connection**

Setting item	Value
Connection destination address	IP address of the projector
Port number	53595*

※: Conforms to the setting of the projector.

**Terminal setting**

Setting item	Value
Newline code (Reception)	CR + LF
Newline code (Transmission)	CR + LF
Local echo	Yes

Refer to the Serial Connection (Section 4-2-2.) for the overview on command transmission and reception or the prescription in communication.

### 4-3. PJLink

This unit supports the PJLink class1 protocol.

For details about this protocol, refer to the PJLink specifications published from JBMIA.

When the authentication setting is changed, the connected controller will be disconnected.

#### Tip

PJLink is a registered trademark of Japan Business Machine and Information System Industries Association.

#### 1. Command Details

Command	Data	Remark
POWR	0	Changes the projector's power status to 'Standby'.
	1	Changes the projector's power status to 'Lamp ON'.
POWR ?		The following values are returned: 0 : Standby 1 : Lamp ON 2 : Cooling state 3 : Warm-up state 4 : Unacceptable period 5 : Projector defects.
INPT	1*	Changes the projector input to 'RGB*'.
	2*	Changes the projector input to 'VIDEO*'.
	3*	Changes the projector input to 'DIGITAL*'.
	4*	Changes the projector input to 'STORAGE*'.
	5*	Changes the projector input to 'NETWORK*'.
INPT ?		The following values are returned: 1*: RGB* 2*: VIDEO* 3*: DIGITAL* 4*: STORAGE* 5*: NETWORK*
AVMT	10	Cancels the projector's video muting.
	11	Sets the projector's video muting.
	20	Cancels the projector's audio muting.
	21	Sets the projector's audio muting.
	30	Cancels the projector's video + audio muting.
	31	Sets the projector's video + audio muting.
AVMT ?		The following values are returned: 11 : Projector video muting ON 21 : Projector audio muting ON 30 : Projector video + audio muting OFF 31 : Projector video + audio muting ON

Command	Data	Remark
ERST ?		<p>The following values are returned:</p> <p>6th digit : Fan error</p> <p>5th digit : Lamp error</p> <p>4th digit : Temperature error</p> <p>3rd digit : Cover open error</p> <p>2nd digit : Filter error</p> <p>1st digit : Other error</p> <p>The following values are assigned to each digit :</p> <p>0 : No error, or detection impossible</p> <p>1 : Warning</p> <p>2 : Error occurring</p>
LAMP ?		<p>The following values are returned:</p> <p>Lamp accumulative time (0 to 65535)</p> <p>'1' when the lamp is on, '0' when off.</p> <p>Returns data for each lamp if there are multiple lamps.</p>
INST ?		<p>The following values are returned:</p> <p>Source No. of the input that can be switched</p> <p>For source Nos., refer to the section on INPT.</p>
NAME ?		Returned value is a projector name (Max. 64 characters).
INF1 ?		Returned value is a manufacturer name (Max. 32 characters).
INF2 ?		Returned value is a model name (Max. 32 characters).
INFO ?		Returned value is desired information (Max. 32 characters).
CLSS ?		Returned value is the class of the corresponding PJLINK.

## Specifications

The specifications of PJLink installed on the projector are as follows:

- Used port  
4352
- Maximum number of controllers simultaneously connected  
1 unit
- Authentication setting  
Can be set on the Web screen.

### Note

When the authentication setting is changed, the connected controller will be disconnected.

## 2. PJLink Protocol Connection

When connecting a controller, the authentication procedure is required.

The projector responds as follows at the time of authentication:

- |   |  |
|---|--|
| When starting connection with authentication setting enabled :  | Returns "PJLINK 1 random number".<br>The random number converts a four-byte integer into a character string. |
| When authentication is successful :                             | Waits for a command.   |
| When authentication failed :                                    | Returns "PJLINK ERRA".   |
| When starting connection with authentication setting disabled : | Returns "PJLINK 0", and then waits for a command.  |

## 3. PJLink Protocol Command

This section provides explanation for each command.

### (1) [Power control command] POWR

This command sets the projector's power status.

The available parameters are as follows:

Parameter 1 : Projector power ON

Parameter 0 : Projector power OFF

The projector responds as follows:

- |  |                 |
|--|-----------------|
| When processed properly:   | Returns "OK".   |
| When parameter is out of range:  | Returns "ERR2". |
| Unacceptable period (when the power status is other than Standby or Power ON): | Returns "ERR3". |
| Projector error occurring (including warning):                                 | Returns "ERR4". |

### (2) [Power status inquiry] POWR?

This command obtains the projector's power status.

The projector responds as follows:

Returns the following values when the power status is obtained:

- |  |                 |
|--|-----------------|
| Standby or power-saving state:                             | Returns "0".    |
| Power ON state:  | Returns "1".    |
| Cooling state, or cooling state during power-saving state: | Returns "2".    |
| Startup state:   | Returns "3".    |
| Projector error occurring (including warning):             | Returns "ERR4". |

## (3) [Input switch command] INPT

This command switches the projector's inputs.

The available parameter examples are as follows:

(The input assignment is an example. The assignment of parameter and input varies depending on the model.)

Parameter 21 : Projector input	Video
Parameter 22 : Projector input	S-Video
Parameter 11 : Projector input	Input A (analog RGB)
Parameter 12 : Projector input	Input B (analog RGB)
Parameter 31 : Projector input	Input C (digital DVI/HDMI, etc.)
Parameter 32 : Projector input	Input D (digital DVI/HDMI, etc.)
Parameter 41 : Projector input	USB
Parameter 51 : Projector input	Network

The projector responds as follows:

When processed properly : Returns "OK".

When inexistent input is specified : Returns "ERR2".

Unacceptable period (when the power status is other than Power ON) : Returns "ERR3".

Projector error occurring (including warning) : Returns "ERR4".

## (4) [Input switch inquiry] INPT?

This command obtains the projector's input status.

The projector responds examples as follows:

Returns the following values when the input status is obtained. (The input assignment is an example.

The assignment of parameter and input varies depending on the model.)

When Projector input is Video: Returns "21".

When Projector input is S-Video: Returns "22".

When Projector input is Input A (analog RGB): Returns "11".

When Projector input is Input B (analog RGB): Returns "12".

When Projector input is Input C (digital DVI/HDMI, etc.): Returns "31".

When Projector input is Input D (digital DVI/HDMI, etc.): Returns "32".

When Projector input is USB: Returns "41".

When Projector input is Network: Returns "51".

Unacceptable period (when the power status is other than Power ON) : Returns "ERR3".

Projector error occurring (including warning) : Returns "ERR4".

## (5) [AV muting command] AVMT

This command sets the projector's AV muting setting.

The available parameter examples are as follows:

Parameter 11: Projector video muting ON

Parameter 10: Projector video muting OFF

Parameter 21: Projector audio muting ON

Parameter 20: Projector audio muting OFF

Parameter 31: Projector video + audio muting ON

Parameter 30: Projector video + audio muting OFF

The projector v responds as follows:

When processed properly: Returns "OK".

When parameter is out of range:

Returns "ERR2".

Unacceptable period (when the power status is other than Power ON):

Returns "ERR3".

Projector error occurring (including warning):

Returns "ERR4".

## (6) [AV muting status inquiry] AVMT?

This command obtains the projector's AV muting status.

The projector responds as follows:

Returns the following values when the AV muting status is obtained:

When the projector video muting is ON: Returns "11".

When the projector audio muting is ON: Returns "21".

When the projector video + audio muting is ON: Returns "31".

When the projector video + audio muting is OFF: Returns "30".

Unacceptable period (when the power status is other than Power ON):

Returns "ERR3".

Projector error occurring (including warning):

Returns "ERR4".

## (7) [Error status inquiry] ERST?

This command obtains the projector's error status.

The projector responds as follows:

Returns the response for the error status in the following format.

The error status is expressed with a six-digit number.

6th digit: Fan error

5th digit: Lamp error

4th digit: Temperature error

3rd digit: Cover open error

2nd digit: Filter error

1st digit: Other error

The number in each digit has the following meaning:

0 : No error detected

1 : Warning

2 : Error

For example, when the Fan error and the Temperature warning occur, the response will be as follows:

"201000"

## (8) [Lamp count/lamp time inquiry] LAMP?

This command obtains the number of the projector's lamps and the lamp time.

The projector responds as follows:

When normal:

Returns the lamp accumulative time and the lamp illuminated state for only the available number of lamps.

For the lamp illuminated state, "1" represents lit, while "0" represents unlit.

The following table shows an example of the response from a projector.

Lamp count	Lamp 1 accumulative time	Lamp 1 illuminated state	Lamp 2 accumulative time	Lamp 2 illuminated state	Response
1	40	Lit	—	—	40 1
1	40	Unlit	—	—	40 0
2	40	Lit	20	Lit	40 1 20 1
2	40	Lit	20	Unlit	40 1 20 0
2	40	Unlit	20	Lit	40 0 20 1
2	40	Unlit	20	Unlit	40 0 20 0

Projector error occurring (including warning): Returns "ERR4".

## (9) [Input switch list inquiry] INST?

This command obtains the input switch list.

The projector responds as follows:

When normal:

Returns a source No. whose input can be switched.

The source Nos. examples are as follows : (The input channel varies depending on the model.)

Source No. 21: Projector input Video

Source No. 22: Projector input S-Video

Source No. 11: Projector input Input A (analog RGB)

Source No. 12: Projector input Input B (analog RGB)

Source No. 31: Projector input Input C (digital DVI/HDMI, etc.)

Source No. 32: Projector input Input D (digital DVI/HDMI, etc.)

Source No. 41: Projector input USB

Source No. 51: Projector input Network

Therefore, the response will be as follows for example:

(The number of the input varies depending on the model.)

"21 22 31 32 33"

Unacceptable period (when the power status is other than Power ON): Returns "ERR3".

Projector error occurring (including warning): Returns "ERR4".



## (10)[Projector name inquiry] NAME?

This command obtains the projector name.

The projector responds as follows:

When normal :

Returns a projector name. (The projector name is displayed as a nickname for the projector's GUI.)

Returns a space when no projector name is set.

Projector error occurring (including warning): Returns "ERR4".

## (11)[Manufacturer name inquiry] INF1?

This command obtains the manufacturer name.

The projector responds as follows:

When normal:

Returns a manufacturer name (SONY).

Projector error occurring (including warning) : Returns "ERR4".

## (12)[Model name inquiry] INF2?

This command obtains the model name.

The projector responds as follows:

When normal:

Returns a model name.

Projector error occurring (including warning): Returns "ERR4".

## (13)[Other information inquiry] INFO?

This command obtains other information.

The projector responds as follows:

When normal :

Returns a space.

Projector error occurring (including warning): Returns "ERR4".

## (14)[Class information inquiry] CLSS?

This command obtains the class information.

The projector responds as follows:

When normal :

Returns "1".

Projector error occurring (including warning): Returns "ERR4".

#### 4-4. AMX Dynamic Device Discovery Protocol (DDDP)

DDDP is a protocol that conforms to “Dynamic Device Discovery” stipulated by AMX.

For details about DDDP, contact AMX.

The serial and network connections are supported.

IPv6 is not supported.

**Note**

Proper communication may not be possible without setting the default gateway.

**Tip**

AMX is a trademark of AMX Corporation.

#### 4-5. Control4 Simple Device Discovery Protocol (SDDP)

This unit is equipped with the protocol conforming SDDP stipulated by Control4.

For details about SDDP, contact Control4.

IPv6 is not supported.

**Note**

Proper communication may not be possible without setting the default gateway.

#### 4-6. Crestron Control

Crestron Control is a protocol that operates in the related application “Crestron RoomView” provided by Crestron.

Crestron RoomView is an integrated control system which enables the integrated monitoring and control of multiple devices connected over the network.

For details of Crestron RoomView, refer to the Crestron website.

IPv6 is not supported.

#### 4-7. SNMP (Simple Network Management Protocol)

SNMP (Simple Network Management Protocol) is a protocol that performs the remote monitoring of the projector connected to the network. IPv6 is not supported.

## 4-8. PJ Control API

### 4-8-1. Overview

PJ Control API provides a function that acquires and controls the information or status on a projector, made by Sony, over the Ethernet.

Enabling or disabling an authentication function and an authentication key can also be specified.

### 4-8-2. Basic Information

The HTTP request whose processing contents were specified based on a JSON format is transmitted by a post method and the obtained result is received based on a JSON format as an HTTP response.

The HTTP request can be executed from a Web browser using javascript because it can be used for CORS.

#### Tip

- JSON is an abbreviation for JavaScript Object Notation. It is lightweight data description language.
- CORS is an abbreviation for Cross-origin resource sharing. It specifies the data exchange in a cross domain.

The restrictions, data format, and request response format or their examples when using API are described below. For the API to be used, refer to the Protocol Manual (Supported Command List).

#### Restriction

The transport supports HTTP/1.0 and HTTP/1.1.

The upper-limit value of the request body size is 1024 bytes.

The request time-out value is 30 seconds.

This API cannot be used for SDDP (Simple Service Discovery Protocol).

#### Post destination to projector

Specify the post destination to a projector as described below.

http:// <Base URL>/<service name>

Base URL is <IP address of this unit>/sony.

The service name varies in designation depending on the API used. For more details, refer to the description on the syntax of the post destination to a projector in the “API reference” item of a Protocol Manual (Supported Command List). “/” must not be contained at the rear of the service name.

- Concerning [IP is the IP address of this unit], IPv4 or IPv6 can be specified.
- A port is fixed to 80.

**API version**

The version indicated by X and Y is set to each API.

Even if an API name is the same, the API name may vary in behavior when its version differs. For more details, refer to the “API reference” item.

	Type	Description
X	Number	major version
Y	Number	minor version

**Data types and conventions**

The data types to be expressed are as shown in the table below. Data is described through the combined use of them.

The data is restricted and extended to the JSON’s specifications prescribed by RFC.

**• Data types**

Type	Explanation
boolean	True or false value is stored.
boolean-array	Multiple true or false values are stored in an array.
integer	Integer number, ranging from $-2147483648$ to $2147483647$ , is stored.
integer-array	Multiple integer numbers are stored in an array.
double	Double number, ranging from $-2.2250738585072014e-308$ to $1.7976931348623157e+308$ , is stored.
double-array	Multiple double numbers are stored in an array.
string	String value. Unless otherwise mentioned in each API spec, string is encoded with UTF-8.
string-array	Multiple string data are stored in an array.

**• Convention**

multiplicity	1 : Required Once
	? : Zero or Once
	* : Zero or More
default	Default is the value that data receiver must regard as if it were sent from sender in case specific parameter is missing.

## **Authentication function**

This function supports authentication using a pre-shared key.

### **• Authentication Level**

Any of the authentication levels has been set in API. An authentication function conforms to this authentication level only when it is enabled by setting. For the authentication level of each API, refer to the “Authentication level” in an “API reference” item.

Authentication Level	Criteria
private	Authentication required. The APIs that provide information which is not personal information (information that can be used to identify an individual), but information like device id or information that might differ with user of the device.
generic	Authentication required. The APIs that control device or change device status.
none	Authentication not required. The APIs that do not match above criteria.

### **• Authentication system**

A pre-shared key must be contained in HTTP request header X-Auth-PSK.

X-Auth-PSK: [Pre-Shared Key]

#### **Tip**

It is not necessary to set a pre-shared key when an authentication function is disabled. In this case, the pre-shared key is ignored even if it is set.

## **Transmission of request**

A JSON format-based request compatible with each API is put in an HTTP body for posting.

The request is specified in the HTTP body according to the JSON format with the basic structure below.

```
{
  "method": "<API name>",
  "params": [<params' Elements>],
  "id": integer
}
```

- “id” must be an integer of 1 to 2147483647.
- “params” must be a fixed-length array.

**Example of response**

A response example corresponding to the result of processing is described below.

- **When a request succeeds:**

**Status Code**

200 OK

**Headers**

Content-Type: application/json; charset=UTF-8

**Body**

```
{"result": [<result's Elements>], "id": 1}
```

- “result” is a fixed-length array.
- “id” is a value specified in a compatible request.

- **When a PJ Control API function is disabled:**

**Status Code**

503 Service Not Available

**Headers**

Content-Type: text/html

**Body**

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.
dtd">
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en"
lang="en">
  <head>
    <title>503 Service Not Available</title>
  </head>
  <body>
    <h1>503 Service Not Available</h1>
  </body>
</html>
```

- **When a non-existent API is requested:**

**Status Code**

200 OK

**Headers**

Content-Type: application/json; charset=UTF-8

**Body**

```
{"error": [12, "API name"], "id": 1}
```

- “API name” is a method value specified in a request.
- “id” is a value specified in a compatible request.

- **When no authority exists: (This does not occur when an authentication function is set to OFF.)**

**Status Code**

403 Forbidden

**Headers**

Content-Type: application/json; charset=UTF-8

**Body**

```
{ "error": [403, "Forbidden"], "id": 1 }
```

- “id” is a value specified in a compatible request.

- **Incorrect request whose body is empty or whose ID does not exist**

**Status Code**

400 Bad Request

**Headers**

Content-Type: text/plain; charset=UTF-8

**Body**

```
{ "error": [5, "Illegal JSON"] }
```

- **Request based on a non-JSON format**

**Status Code**

400 Bad Request

**Headers**

text/plain; charset=UTF-8

**Body**

JSON Format Error

- **When a request fails in processing:**

**Status Code**

200 OK

**Headers**

Content-Type: application/json; charset=UTF-8

**Body**

```
{ "error": [error_code, error_message], "id": 1 }
```

- “error” is an array. It is stored in the order of integer error\_code and string error\_message.
- “error\_message” is information used only for debugging. Judge which error has occurred using “error\_code”.
- “id” is a value specified in a compatible request.

### • Error code

An error code is represented using an integer of 0 to 65535.

Main error codes are shown in the table below.

#### HTTP Major error code

code	Reason phrase example	JSON example	Explanation
403	Forbidden	"error": [403, "Forbidden"]	The server understood the request, but is refusing to fulfill it. Client does not have permission to access.
404	Not Found	"error": [404, "Not Found"]	For cases where request is not matched to any supported API version.
413	Request Entity Too Large	"error": [413, "Request Entity Too Large"]	The accepted body size of a client request exceeds maximum.
414	Request-URI Too Long	"error": [414, "Request-URI Too Long"]	The accepted URI length of a client request exceeds maximum.
501	Not Implemented	"error": [501, "Not Implemented"]	When the request method is not implemented on the server.
503	Service Unavailable		When server is in temporally unavailable state which may occur due to over concurrent connections.

#### Common error code

code	Reason phrase example	JSON Example	Explanation
1	Any	"error": [1, "Any"]	A generic error code which can be used with any error.
2	Timeout	"error": [2, "Timeout"]	For cases server cannot reply in time.
3	Illegal Argument	"error": [3, "Illegal Argument"]	For cases "params" value in request does not follow API specification.
5	Illegal Request	"error": [5, "Illegal Request"]	For cases request body is empty, has no id or invalid id, has no method, has no params, or params is not an array.
7	Illegal State	"error": [7, "Illegal State"]	For cases server cannot handle the request at this time.
12	No Such Method	"error": [12, "No Such Method"]	For cases requested API does not exist.
14	Unsupported Version	"error": [14, "Unsupported Version"]	For cases requested API version is not supported in the specified service.
15	Unsupported Operation	"error": [15, "Unsupported Operation"]	For cases server cannot handle the request with respect to the specified parameters.



**Example of operation using a curl command**

To experience PJ Control API easily, an example of the way for gaining access to API using a curl command is introduced below.

What is curl?

<http://curl.haxx.se/>

<http://ja.wikipedia.org/wiki/CURL>

In the example of command execution below, the IP address of a projector is 192.168.10.11 and a pre-shared key is sony1234.

- **Example given when the power is turned on**

When an authentication function is enabled, a pre-shared key must be contained in a request header because API that changes the power state requires authentication

```
curl -H "x-auth-psk:sony1234" -i -d "{¥"method¥":¥"setPowerStat
us¥", ¥"params¥":[ {¥"status¥":true}], ¥"version¥":¥"1.0¥", ¥"id¥":1}"
http://192.168.10.11/sony/system
```

When API is properly executed, the result below is output.

```
HTTP/1.1 200 OK
Content-Type: application/json; charset=UTF-8
Content-Length: 20
{"result": [], "id":1}
```

- **Example given when a power state is acquired**

It is not necessary to contain a pre-shared key in a request header because API that acquires a power state requires no authentication. (The pre-shared key is ignored even if it is contained in the request header.)

```
curl -i -d "{¥"method¥":¥"getPowerStatus¥", ¥"params¥":[], ¥"ver-
sion¥":¥"1.0¥", ¥"id¥":1}" http://192.168.10.11/sony/system
```

When API is properly executed, the result below is output.

```
HTTP/1.1 200 OK
Content-Type: application/json; charset=UTF-8
Content-Length: 39
{"result": [{¥"status¥":¥"active¥"}], "id":1}
```





