SONY®

VIDEO PROJECTOR
VPL-HS51

PROTOCOL MANUAL
1st Edition

Table of Contents

1. Introduction

This protocol manual describes the basic configuration and basic operations of various commands used for projector. Projector can be controlled using the commands provided in "Appendix". Using an external CONTROLLER , etc., inputs can be switched and the power can also be turned on and off. In the following paragraphs, "CONTROLLER" means an external device such as a PC which controls projector using these commands.

2. Operating the Projector from a Computer

2-1. Accessing the Projector from a Computer

You can check the present status of the projector on a computer display and control the projector from a computer.
Confirm that the projector and computer are connected to the router/hub with the LAN cables, then turn on the projector, computer and router/hub.

1. Start Internet Explorer 5.0 (or later versions) on your computer.
2. Type "http://xxx.xxx.xxx.xxx (the IP address of the projector)" as the "Address", then press the ENTER key on your keyboard.
   You can check the IP address of the projector using the INFORMATION menu.
   Enter the IP address here.
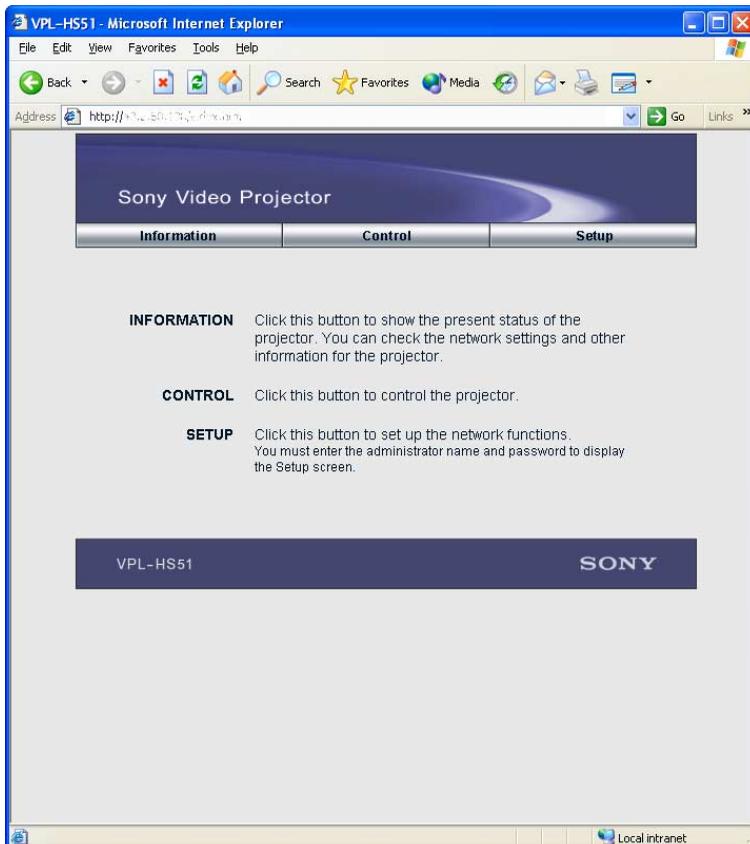
2-2. Checking the Status of the Projector

Click "Information". You can check the information and present status of the projector on a computer display. You can check the information and status in the window, but you cannot change the settings.

INFORMATION
The present status of the projector is displayed.

MENU
The present settings of the projector are displayed.

2-3. Controlling the Projector from a Computer

Click "Control". You can perform various adjustments and settings of the projector on a computer display.
The functions of the buttons in the windows are the same as those on the remote supplied with the projector.

The present setting status is indicated.
If you change the setting using the remote, click "Refresh" at the upper right-hand corner of the window to update the status.
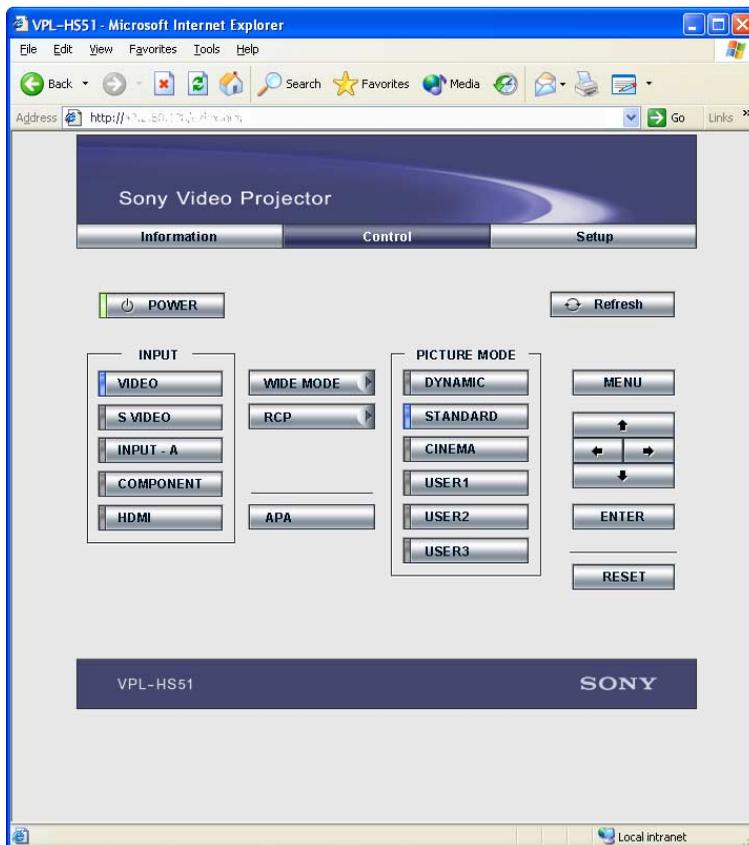
2-4. Setting Up the Projector

Click "Setup". The Password Properties dialog box appears. The name of the "User" account is preset without a password to "root" at the factory. You can set the owner information, etc.
Click "Apply" at the lower part of each window to update the projector to the data input in each window.
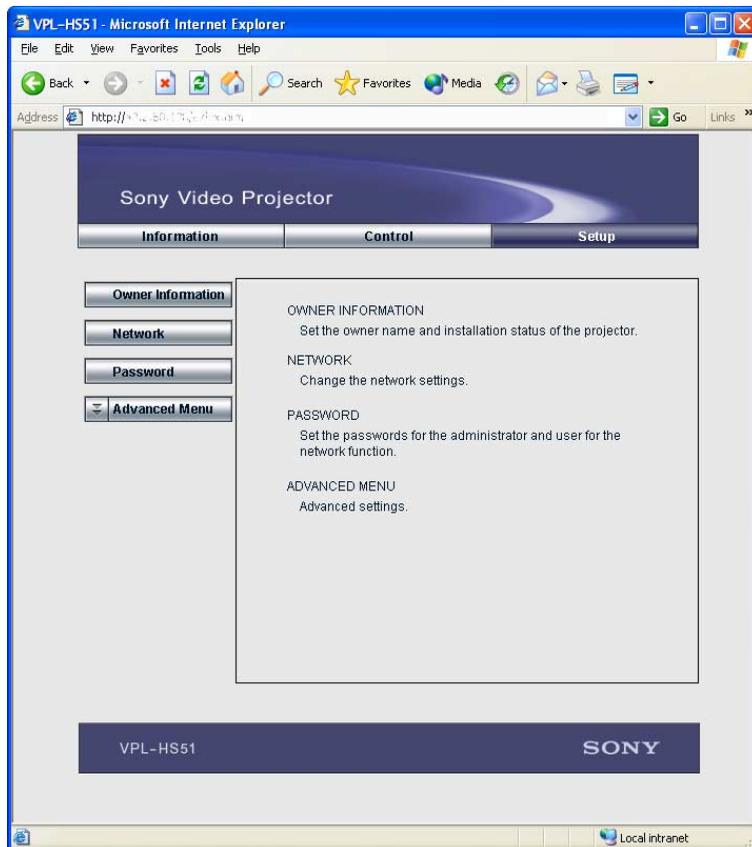
2-4-1. Owner and Projector Information

Click "Owner Information".

Owner
Enter owner information.

Projector
Enter the location of the projector.

Memo
Enter a memo, if required.

2-4-2. Network Settings

Click "Network".

Internet Protocol (TCP/IP)
Normally, set "Obtain an IP address automatically (DHCP)". If you select "Specify an IP address", set the necessary items.

2-4-3. Setting Passwords for "Administrator" and "User"

Click "Password". You can set passwords for each "Administrator" and "User".
The name of the "Administrator" account is preset to "root" at the factory. It cannot be changed.

2-4-4. Advanced Setting

Click "Advanced Menu" to display the Advertisement button, PJ Talk button and SNMP button. These settings are mainly for professional use. These contents are indicated by the PROTOCOL manual.

3. NETWORK

This section describes the performance, operations and protocol to be used of advertisement and PJ Talk.

3-1. Advertisement

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

3-1-1. Function

The equipment information shown below is transmitted as the broadcast packet periodically (at certain 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

Notes

- The category of projector is 0x0a.
- 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)

3-1-2. Setup Items

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

Setup items	Description
Port No.	Port number
Interval	Broadcast interval
Broadcast Address	Adding the transmission place.

3-2. PJ Talk

The remote control service is provided that can control the projector from remote location via network.

3-2-1. Function

This responds to the control command and requests for acquiring the status and information supplied from clients.

Control request
Enables the input to be selected and picture control to be adjusted.

SIRCS request
Enables remote control by sending the SIRCS code.

Status request
Enables equipment status information such as power status, error information and power-on time to be acquired.

Information request
Enables equipment information such as equipment name, serial number and installation information to be acquired.

Protocol

Item	Description
Protocol name	SDCP (Simple Display Control Protocol)
Transport	TCP
Port number	53484 (Factory-shipments value)
TCP connection timeout	30 seconds (Factory-shipments value)

3-2-2. Setup Items

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

Setup item	Description
Port No.	Port number
Timeout	TCP connection timeout time
Host Address	IP address of connectable PC

3-3. SDAP Protocol
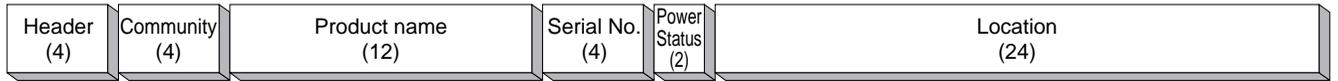
This section describes the SDAP packet structure.

Header (4)	Community (4)	Product name (12)	Serial No. (4)	Power Status (2)	Location (24)

Fig.1 Packet structure

1) Header

The header consists of ID (16 bit), version (8 bit) and category (8 bit).

```
0                           1                           2                           3    (Bit position)
0  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6  7  8  9  0  1
                  "DA" (16)                        |        Version (8)        |       Category (8)
```

Fig. 2 Header

ID

It is fixed to "DA".

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

When the community data matches the community that is set in the display equipment, the request is executed. Community consists of four alphanumeric characters (case sensitive). All display equipment has the default value "SONY" when shipped from the factory.

```
0                           1                           2                           3    (Bit position)
0  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6  7  8  9  0  1
                                    Community (32)
```

Fig. 3 Community

3) Equipment Information

Product Name

Name of equipment (Maximum twelve characters)
In case, 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, less than twenty four characters, 00h is entered in the blank space.

3-4. SDCP Protocol

This section describes the packet structure of version 2.

Header (2)	Community (4)	Command (4)	Data (n)

Fig. 1 Packet structure

3-4-1. Format

3-4-1-1. Header

The header consists of version (8 bits) and category (8 bits).

```
0                      1        (Bit position)
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
|     Version (8)   |  Category (8)  |
```
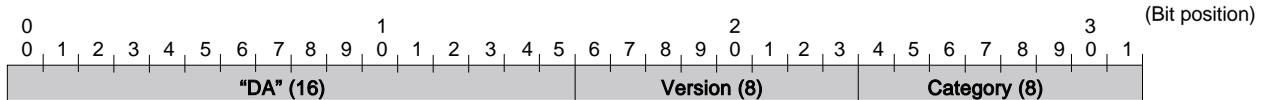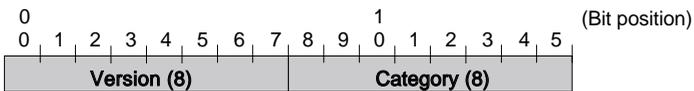
Fig. 2 Header structure

Version

This indicates the version number of protocol.
It is fixed to 02h (version 2).

Category

Category number 0Ah of the projector is entered here. Projector checks the category number. If a different category number is entered, the request is ignored.

3-4-1-2. Community

When the community data matches the community that is set in the display equipment, the request is executed. Community consists of four alphanumeric characters (case sensitive). All display equipment has the default value "SONY" when shipped from the factory.
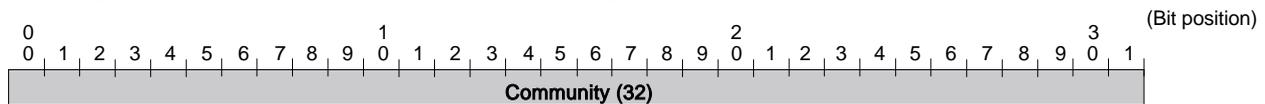
```
0                    1                    2                    3    (Bit position)
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
|                          Community (32)                        |
```
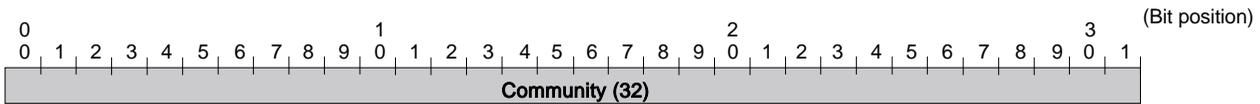
Note

Community should be entered with four characters. Three characters or less are not accepted.

3-4-1-3. Command

This section describes the format of the request command and the response command.

```
0                       1                       2                       3    (Bit position)
0  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6  7  8  9  0  1
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
    Request/Response (8)              Item No (16)                      Data Length (8)
```

(1) Request

This section describes the format of the request command that is issued from the host PC to the projector.
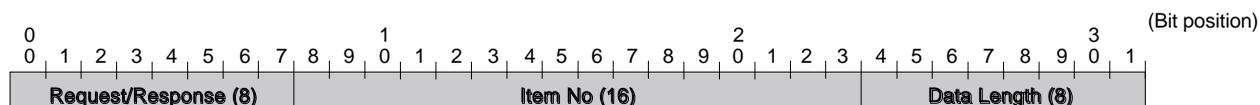
Community

This is the same alphanumeric characters as those of community that is set in the projector to which request is going to be sent.

Request

There are only two types of request. One is the GET request to acquire the projector information and status. The other is the SET request to modify the projector setup.

Request	Contents
SET (00h)	Used to control turning the power on/off and to control the input selector, and to change the various setups.
GET (01h)	Used to acquire the installation information, equipment status and various setup values.

Item No.

This is the item number of the request target.

Data Length

This is the length of the data accompanying the request. The maximum length is 128 bytes. If there is no data, it is 0.

Data

This is the data accompanying the request.

(2) Response

This section describes the format of the response command which is used to return a response to the host PC from the projector.

Community

The same alphanumeric characters as those of the request is entered.

Response

The response returns the result of executing the request from the host PC.

Response	Contents
NG (00h)	Indicates that the request is illegal or cannot be executed.
OK (01h)	Indicates that the request was executed correctly.

Item No.

The same value as those of the request is entered.

Data Length

This is the length of the data accompanying the response. The maximum length is 128 bytes. If there is no data, it is 0.

Data

This is the data accompanying the response.

3-4-1-4. SET Request

The SET request is used to set a new value in the specified item. Details of the request and the response are described below.

Request

├─ Request ─┤	├──── Item No. ─────┤	Data Length	├──────── Data ──────────┤
SET (00h)	Item No.	n	Set Data (n byte)

Response

OK (01h)	Item No.	0

3-4-1-5. GET Request

The GET request is used to acquire the value of the specified item. Details of the request and the response are described below.

Request

├─ Request ─┤	├──── Item No. ─────┤	Data Length
GET (01h)	Item No.	0

Response

OK (01h)	Item No.	n	Get Data (n byte)

3-4-1-6. ERROR Response

When an error occurs in the contents of a request or in the result of execution, NG is returned as the response.

NG (00h)	Item No.	2	Error Code (16)

3-4-2. Items

Category	Contents	SET	GET
00**h	Used to control and to change the various setups.	○	○
01**h	Used to acquire the status.		○
03**h	Used to reset memory.	○	
17**h	Sircs (15 bit category)	○	
19**h	Sircs (20 bit category)	○	
80**h	Used to acquire equipment information.		○
90**h	Used to acquire network setup information.		○

3-4-2-1. Model Dependent Category

The supported contents of 00**h, 01**h, 03**h, 17**h and 19**h change depending on the model.
Details are shown on Appendix.

3-4-2-2. Equipment Information Acquisition (80**h)

Used to acquire the equipment information.

Lower byte	Contents	SET	GET
00h	Category Code		○
01h	Model name		○
02h	Serial number		○
03h	Installation location	○	○

0x8000 Category code
1 byte

0x8001 Model name
Alphanumeric 12 characters
If the number of characters is less than 12, the remaining digits are filled with 00h.

0x8002 Serial number
4 bytes
| Note |
The serial number is in the range of 00000000 to 99999999.

0x8003 Installation location
Alphanumeric 24 characters
If the number of characters is less than 24, the remaining digits are filled with 00h.

3-4-2-3. Network Information Acquisition (90**h)

Used to acquire the network setup information.

Lower bytes	Contents	SET	GET
00h	MAC Address		○
01h	IP Address		○
02h	Subnet Mask		○
03h	Default Gateway		○
04h	DHCP		○

0x9000 Mac Address
6 bytes

0x9001 IP Address
4 bytes

0x9002 Subnet Mask
4 bytes

0x9003 Default Mask
4 bytes

0x9004 DHCP
1 byte
DHCP invalid: 0
DHCP valid :   1

3-4-3. Error Code

The error code list is shown below with a detailed description of each.

Category	Error	Error Code
Item Error (01**h)	Invalid Item	01h
	Invalid Item Request	02h
	Invalid Length	03h
	Invalid Data	04h
	Short Data	11h
	Not Applicable Item	80h
Community Error (02**h)	Different Community	01h
Request Error (10**h)	Invalid Version	01h
	Invalid Category	02h
	Invalid Request	03h
	Short Header	11h
	Short Community	12h
	Short Command	13h
Network Error (20**h)	Timeout	01h
Comm Error (F0**h)	Timeout	01h
	Check Sum Error	10h
	Framing Error	20h
	Parity Error	30h
	Over Run Error	40h
	Other Comm Error	50h
	Unknown Response	F0h
NVRAM Error (F1**h)	Read Error	10h
	Write Error	20h

3-4-3-1. Item Error

This error occurs when the Item No. of a request is illegal or its data is illegal. The conditions for occurrence of the respective errors are shown below.

Invalid Item

An unsupported Item No. is specified.

Example 1: The unsupported category 0xA** is specified.
Example 2: The unsupported Item No. 0x8010 is specified.

Invalid Item Request

The Item No. is supported but an unsupported Request is issued.

Example: An attempt is made to set data in the Model Name (0x8001).

Invalid Length

Data length of the specified Item No. is too long.

Example: An attempt is made to set 25 byte data in the installation location (0x8003).

Invalid Data

Data of the specified Item No. is outside the setting range.

Example: An attempt is made to set 101 in the Item when the setting range of the Item is 1 to 100.

Short Data

The length of data is shorter than the value specified by the data length.

Example: The actual data length is 9 bytes but data length is 10.

Not Applicable Item

An item that is not valid at present is specified.

Example: The item to switch the display is specified when the main power is off.

3-4-3-2. Community Error

This error occurs when community is different.

Example: "ABCD" is specified when "SONY" is set.

3-4-3-3. Request Error

This error occurs when header or command is illegal. The conditions of occurrence of the respective errors are shown below.

Invalid Version

The version of the header is other than 2.

[Note]

When another version is supported, an error occurs in all versions other than the supported version.

Invalid Category

The category does not match.

Example: 0x0B is specified in the device of category = 0x0A.

Invalid Request

An unsupported request is specified.

Example: Request = 0x02 is specified.

Short Header

The received data is 1 byte.

Short Community

The received data is in the range of 2 to 5 bytes.

Short Command

The received data is in the range of 6 to 9 bytes.

3-4-3-4. Network Error

This is an error that occurs in TCP/IP. The conditions of occurrence of the respective errors are shown below.

Timeout

Communication was interrupted.

3-4-3-5. Comm Error

This is an error in communication with the main control microprocessor of the display.

Timeout
Reception data is not returned after data is sent.

Check Sum Error
A check sum error occurred in the main control microprocessor of the display.

Framing Error
A framing error occurred.

Parity Error
A parity error occurred.

Over Run Error
An overrun error occurred.

Other Comm Error
Another error occurred.

Unknown Response
The data cannot be processed was received.

3-4-3-6. NVRAM Error

Read Error
Reading from NVRAM was failed.

Write Error
Writing to NVRAM was failed.

Appendix

Communication Rules

· When sending a command from CONTROLLER, the return data from PROJECTOR should be re-
 ceived first before sending the next command. Even if the next command is sent before receiving the
 return data, since PROJECTOR will not be able to receive that command, it does not return a response
 to CONTROLLER. Consequently, no error code is also sent.
 The following lists the approximate waiting times for PROJECTOR to return the return data after
 CONTROLLER sends the command.

· When a communication error occurs, PROJECTOR ignores the data received until now, and set into the
 reception standby state.

· For undefined commands or commends determined as invalid by PROJECTOR, PROJECTOR will
 send the "NAK" return data to CONTROLLER .

· Take note that when data is written when the input signal of PROJECTOR is unstable, that data (value)
 will not be incorporated.

· When INDEX specified SIRCS direct command is transmitted, leave an interval of 45 msec until the
 next transmission. (Do not return the return data (ACK, NAK) when the SIRCS direct command is
 received.)

<Table 1>			<Table 2>			Remarks
Item Number			**Data**			
Item	**Upper byte**	**Lower byte**	**Data**	**Upper byte**	**Lower byte**	
Input	00h	01h	Video	00h	00h	Set/Get
			S-Video	00h	01h	
			Input-A	00h	02h	
			Component	00h	03h	
			HDMI	00h	04h	
Picture Mode	00h	02h	Dynamic	00h	00h	
			Standard	00h	01h	
			Cinema	00h	02h	
			User1	00h	03h	
			User2	00h	04h	
			User3	00h	05h	
Contrast	00h	10h	Setting value (0 to 100)	00h	00h to 64h	
Brightness	00h	11h	Setting value (0 to 100)	00h	00h to 64h	
Color	00h	12h	Setting value (0 to 100)	00h	00h to 64h	
Hue	00h	13h	Setting value (0 to 100)	00h	00h to 64h	
Sharpness	00h	14h	Setting value (0 to 100)	00h	00h to 64h	
Color Temp	00h	17h	High	00h	00h	
			Mid	00h	01h	
			Low	00h	02h	
			Custom1	00h	03h	
			Custom2	00h	04h	
			Custom3	00h	05h	
Lamp Control	00h	1Ah	Low	00h		
			High	01h		
DDE	00h	1Bh	Off	00h		
			Progressive	01h		
			Film	02h		
Black Level Adj.	00h	1Ch	Off	00h		
			Low	01h		
			High	02h		
Advanced Iris	00h	1Dh	Off	00h		
			On	01h		
			Auto	02h		
RCP (Real Color Processing)	00h	1Eh	Off	00h		
			User 1	01h		
			User 2	02h		
			User 3	03h		

<Table 1>			<Table 2>			Remarks
Item Number			**Data**			
Item	**Upper byte**	**Lower byte**	**Data**	**Upper byte**	**Lower byte**	
Wide Mode	00h	20h	Full	00h		Set/Get
			Normal	01h		
			Wide Zoom	02h		
			Zoom	03h		
			Subtitle	04h		
PictureMuting	00h	30h	Off	00h	00h	
			On	00h	01h	
Input-A Signal Sel	00h	32h	Auto	00h	00h	
			Computer	00h	01h	
			Component	00h	02h	
			Video GBR	00h	03h	
USER Gain Red	00h	50h	Setting value (−30 to 30)	E2h to 1Eh (−30 to 30)		
USER Gain Green	00h	51h	Setting value (−30 to 30)	E2h to 1Eh (−30 to 30)		
USER Gain Blue	00h	52h	Setting value (−30 to 30)	E2h to 1Eh (−30 to 30)		
USER Bias Red	00h	53h	Setting value (−30 to 30)	E2h to 1Eh (−30 to 30)		
USER Bias Green	00h	54h	Setting value (−30 to 30)	E2h to 1Eh (−30 to 30)		
USER Bias Blue	00h	55h	Setting value (−30 to 30)	E2h to 1Eh (−30 to 30)		
Gain Red	00h	80h	Setting value (0 to 255)	00h	00h to FFh	
Gain Green	00h	81h	Setting value (0 to 255)	00h	00h to FFh	
Gain Blue	00h	82h	Setting value (0 to 255)	00h	00h to FFh	
Bias Red	00h	83h	Setting value (0 to 255)	00h	00h to FFh	
Bias Green	00h	84h	Setting value (0 to 255)	00h	00h to FFh	
Bias Blue	00h	85h	Setting value (0 to 255)	00h	00h to FFh	
Status Error	01h	01h	No Error	00h	00h	Get only
			Lamp Error	00h	01h	
			Fan Error	00h	02h	
			Cover Error	00h	04h	
			Temp Error	00h	08h	
			D5V Error	00h	10h	
			Power Error	00h	20h	
			Temp Warning Error	00h	40h	
			NVM Data Error	00h	80h	
Status Power	01h	02h	Standby	00h	00h	
			Start Up	00h	01h	
			Start Up Lamp	00h	02h	
			Power On	00h	03h	
			Cooling1	00h	04h	
			Cooling2	00h	05h	
			Saving Cooling1	00h	06h	
			Saving Cooling2	00h	07h	
			Saving Standby	00h	08h	

<Table 1>			<Table 2>			Remarks
Item Number			**Data**			
Item	**Upper byte**	**Lower byte**	**Data**	**Upper byte**	**Lower byte**	
Control Mode	01h	05h	User Mode	00h	00h	Get only
			Service Mode	00h	01h	
Lamp Timer	01h	13h	Lamp Use Time	0000h-FFFFh *1		
ROM Version	01h	1Dh	MAIN ROM Version	*2		
SC1 ROM Version	01h	1Eh	SC1 ROM Version	*2		
NVM Data Version	01h	27h	NVM Data VERSION	*3		
W/B All Save		04h	–	00h	00h	Set only
W/B Low Save	03h	05h				
W/B High Save		06h				
Sircs(15 bit category)	17h	Refer to Table4	–	00h	00h	Set only *4
Sircs(20 bit category)	19h	Refer to Table5	–	00h	00h	

*1 Example) In case the lamp timer indicates 1000H, return values are [03h] upper byte and [E8h] lower byte.
*2 Example) In case the software version is 1.03, return values are [01h] upper byte and [03h] lower byte.
*3 Example) In case the NVM data version is 3, return values are [00] upper byte and [03] lower byte.
*4 It is corresponded to single command only.
    When Sircs Direct Command is sent, return data may not be returned.

<Table 3>			
Item Number		**Data**	
Item	**Data**	**Upper byte**	**Lower byte**
ACK	–	00h	00h
NAK	Undefined Command	01h	01h
	Size Error		04h
	Select Error		05h
	Range Over		06h
	Not Applicable		0Ah
	Check Sum Error	F0h	10h
	Framing Error		20h
	Parity Error		30h
	Over Rub Error		40h
	Other Comm Error		50h

Approximate Return Waiting Times
The await-return time is approx. 200 msec.

Note

This is the case, unless the communications are interfered anyway.

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List of SIRCS CODE

(1) 15BIT category

<Table 4>

	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	xA	xB	xC	xD	xE	xF
0x																
1x						POWER ON/OF *1			CONTRAST+ HIGH	CONTRAST- LOW	COLOR+ HIGH	COLOR- LOW			BRITNESS+ BRIGHT	BRITNESS- DARK
2x	HUE+ PURPLISH	HUE- GREENISH	SHARPNESS+ SHARP	SHARPNESS- SOFT	PICTURE MUTING	STATUS ON	STATUS OFF			MENU	VIDEO	INPUT A	COMPONENT		POWER ON/OF *1	POWER OFF
3x				CURSOR ↑	CURSOR ↓	CURSOR ←	CURSOR →									
4x		ADJ R	ADJ G	ADJ B				RGB SIZE	RGB SHIFT							
5x			W/B GAIN	W/B BIAS				INPUT SELECT			ENTER				MEMORY	S VIDEO
6x																HDMI
7x												RESET				

*1: When the standby mode is set to "Low", the projector main unit goes into the power saving mode in approx. 1 minute after standby state. When a command is sent during the power saving mode, "Not Applicable" is returned. However, the command is carried out when it is sent again.

(2) 20BIT category

<Table 5>

	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	xA	xB	xC	xD	xE	xF
0x									RCP	ADJUST PICTURE TGL						
1x																
2x																
3x											KEYSTONE					
4x													DDE TGL			
5x		PICTURE MODE DYNAMIC	PICTURE MODE STANDARD	PICTURE MODE CINEMA	PICTURE MODE USER1	PICTURE MODE USER2	PICTURE MODE USER3					PICTURE MODE TGL			WIDE MODE TGL	
6x	APA	DOT PHASE														
7x																

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