

**SONY®**

VIDEO PROJECTOR

**VPL-VW1000ES**

**VPL-VW1100ES**

PROTOCOL MANUAL  
1st Edition (Revised 1)

## **⚠ 警告**

このマニュアルは、サービス専用です。  
お客様が、このマニュアルに記載された設置や保守、点検、修理などを行うと感電や火災、人身事故につながる可能性があります。  
危険をさけるため、サービストレーニングを受けた技術者のみご使用ください。

## **⚠ WARNING**

This manual is intended for qualified service personnel only.  
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

## **⚠ WARNUNG**

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.  
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

## **⚠ AVERTISSEMENT**

Ce manuel est destiné uniquement aux personnes compétentes en charge de l'entretien. Afin de réduire les risques de décharge électrique, d'incendie ou de blessure n'effectuer que les réparations indiquées dans le mode d'emploi à moins d'être qualifié pour en effectuer d'autres. Pour toute réparation faire appel à une personne compétente uniquement.

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# 1. Overview

## 1-1. Introduction

The projector is remotely controllable over RS-232C as well as Ethernet. It is useful for controlling the projector away from the operator.

This protocol manual describes the specifications such as packet format and procedures for controlling the projector.

In the following sections below, the term “CONTROLLER” is used as a device which controls the projector. CONTROLLER can be a PC or other specific device that is able to handle RS-232C or Ethernet.

Although most of commands are available for both RS-232C and Ethernet, some commands are dedicated to Ethernet.

\* Ethernet is a registered trademark of Xerox Corporation.

## 1-2. Glossary of Terms

Table 1-1 Glossary of Terms

Terms	Abbreviated	Description
CONTROLLER	–	Command initiator such as PCs.
PROJECTOR	–	Front projector. (device)
SDAP	Simple Display Advertisement Protocol	Protocol name for advertising the projector status over Ethernet.
SDCP	Simple Display Control Protocol	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 other intended devices.

## 1-3. Protocol Stack Structure

The protocol stack structure diagram is shown below. Though the stack is drawn for RS-232C and Ethernet separately, the following portions are common.

Table 1-2 Common Portions in Protocol Stack

Layer Name	Description
Sub Command	Value is assigned for projector's functions. Refer to the section 2-1 for detail description.
Simplified Command	Packet format for sending/receiving “Sub Command”. Refer to the section 3-6-1 for detail description.

(1) RS-232C

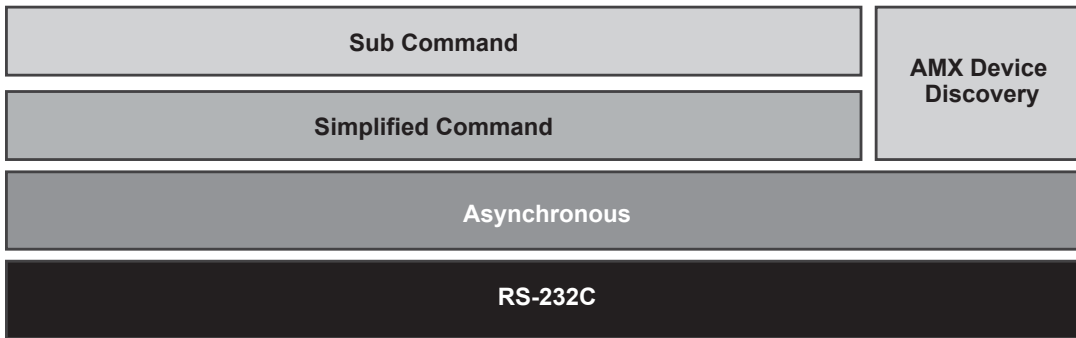


Fig. 1-1 RS-232C Protocol Stack

“RS-232C” layer is physical portion and “Asynchronous” is the traditional protocol layer as shown in the section 3-2.

(2) Ethernet

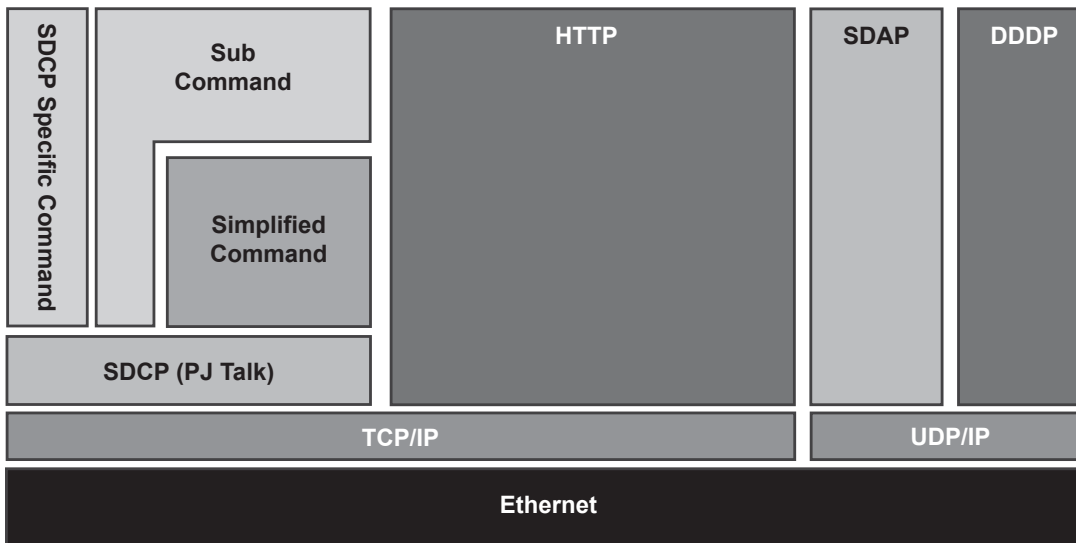


Fig. 1-2 Ethernet Protocol Stack

Because of traditional portions for Ethernet general layer, “TCP/IP”, “UDP/IP”, and “HTTP” are out of scope in this document.

SDCP specific command is described in the section 4-3-2.

SDAP and SDCP (PJ Talk) are SONY original protocol stack, which are described in the sections 4-3-1 and 4-3-2 respectively.

## 2. Common Commands

### 2-1. Sub Commands

Sub Command is the value which is used by Simplified Command. Value is assigned for executing function. For example, if you want to change the picture mode, the appropriate value assigned for the desired picture mode should be chosen.

#### 2-1-1. ITEM List

Item list tables are described below. Tables are shown per function category.

Table 2-1 ITEM List For Picture Quality Setting

<Table 1>			<Table 2>		Remarks
Item Number			Data		
Item	Upper byte	Lower byte	Data	Byte	
Calib. Preset	00h	02h	Cinema Film 1	0000h	Set/Get
			Cinema Film 2	0001h	
			Cinema Digital	0002h	
			REF	0003h	
			TV	0004h	
			Photo	0005h	
			Game	0006h	
			BRT CINE	0007h	
			BRT TV	0008h	
Contrast	00h	10h	Set Value	0000h to 0064h (0 to 100)	
Brightness	00h	11h	Set Value	0000h to 0064h (0 to 100)	
Color	00h	12h	Set Value	0000h to 0064h (0 to 100)	
Hue	00h	13h	Set Value	0000h to 0064h (0 to 100)	
Sharpness	00h	14h	Set Value	0000h to 0064h (0 to 100)	
Color Temp.	00h	17h	D93	0000h	
			D75	0001h	
			D65	0002h	
			Custom1	0003h	
			Custom2	0004h	
			Custom3	0005h	
			Custom4	0006h	
			DCI	0007h	
			Custom5	0008h	
Lamp Control	00h	1Ah	Low	0000h	
			High	0001h	
			Off	0000h	
Black Level Adj.	00h	1Ch	Low	0001h	
			High	0002h	
			Middle	0003h	

(Continued)

<Table 1>			<Table 2>		Remarks
Item Number			Data		
Item	Upper byte	Lower byte	Data	Byte	
Advanced Iris	00h	1Dh	Off	0000h	Set/Get
			Manual	0001h	
			Auto Full	0002h	
			Auto Limited	0003h	
Film Mode	00h	1Fh	Off	0000h	
			Auto1	0001h	
			Auto2	0002h	
Gamma Correction	00h	22h	Off	0000h	
			1.8	0001h	
			2.0	0002h	
			2.1	0003h	
			2.2	0004h	
			2.4	0005h	
			2.6	0006h	
			Gamma7	0007h	
			Gamma8	0008h	
			Gamma9	0009h	
NR	00h	25h	Off	0000h	
			Low	0001h	
			Middle	0002h	
			High	0003h	
Color Space	00h	3Bh	BT.709	0000h	
			DCI	0001h	
			Adobe RGB	0002h	
			Color Space1	0003h	
			Color Space2	0004h	
			Color Space3	0005h	
User Gain Red	00h	50h	Set Value	FFE2h to 001Eh (-30 to 30)	
User Gain Green	00h	51h	Set Value	FFE2h to 001Eh (-30 to 30)	
User Gain Blue	00h	52h	Set Value	FFE2h to 001Eh (-30 to 30)	
User Bias Red	00h	53h	Set Value	FFE2h to 001Eh (-30 to 30)	
User Bias Green	00h	54h	Set Value	FFE2h to 001Eh (-30 to 30)	
User Bias Blue	00h	55h	Set Value	FFE2h to 001Eh (-30 to 30)	
Iris Manual	00h	57h	Set Value	0000h to 0064h (0 to 100)	
Film Projection	00h	58h	Off	0000h	
			On	0001h	
Motion Enhancer	00h	59h	Off	0000h	
			Low	0001h	
			High	0002h	
xvColor	00h	5Ah	Off	0000h	
			On	0001h	
Reality Creation	00h	67h	Off	0000h	
			On	0001h	
Resolution	00h	68h	Set Value	0001h to 0064h (1 to 100)	

(Continued)



<Table 1>			<Table 2>		Remarks
Item Number			Data		
Item	Upper byte	Lower byte	Data	Byte	
Noise Filtering	00h	69h	Set Value	0001h to 0064h (1 to 100)	Set/Get
Reality Creation Database	00h	75h	Mastered in 4k	00h (VPL-VW1100ES only)	
			Normal	01h	
Color correction	00h	6Ah	Off	0000h	
			On	0001h	
Clear White	00h	6Bh	Off	0000h	
			Low	0001h	
			High	0002h	
MPEG NR	00h	6Ch	Off	0000h	
			Low	0001h	
			Middle	0002h	
			High	0003h	
Smooth Gradation	00h	6Dh	Off	0000h	
			Low	0001h	
			Middle	0002h	
			High	0003h	

Table 2-2 ITEM List For Screen Setting

<Table 1>			<Table 2>		Remarks
Item Number			Data		
Item	Upper byte	Lower byte	Data	Byte	
Picture Position	00h	66h	1.85:1	0000h	Set/Get
			2.35:1	0001h	
			Custom1	0002h	
			Custom2	0003h	
			Custom3	0004h	
Aspect	00h	20h	Normal	0001h	
			V Stretch	000Bh	
			1.85:1 Zoom	000Ch	
			2.35:1 Zoom	000Dh	
			Stretch	000Eh	
			Squeeze	000Fh	
Over Scan	00h	23h	Off	0000h	
			On	0001h	

Table 2-3 ITEM List For Initial Setting

<Table 1>			<Table 2>		Remarks
Item Number			Data		
Item	Upper byte	Lower byte	Data	Byte	
Input	00h	01h	Input A	0002h	Set/Get
			Component	0003h	
			HDMI1	0004h	
			HDMI2	0005h	
Picture Muting	00h	30h	Off	0000h	
			On	0001h	
HDMI1 Dynamic Range	00h	6Eh	Auto	0000h	
			Limit	0001h	
			Full	0002h	
HDMI2 Dynamic Range	00h	6Fh	Auto	0000h	
			Limit	0001h	
			Full	0002h	

Table 2-4 ITEM List For 3D Setting

<Table1>			<Table2>		Remarks
Item Number			Data		
Item	Upper byte	Lower byte	Data	Byte	
2D-3D Display Sel.	00h	60h	Auto	0000h	Set/Get
			3D	0001h	
			2D	0002h	
3D Format	00h	61h	Simulated 3D	0000h	
			Side-by-Side	0001h	
			Over-Under	0002h	
3D Depth Adjust	00h	62h	Set Value	FFFEh to 0002h (-2 to 2)	
Simulated 3D Effect	00h	63h	High	0000h	
			Middle	0001h	
			Low	0002h	
3D Brightness	00h	72h	High	0000h	
			Standard	0001h	

Table 2-5 ITEM List For Status

<Table 1>			<Table 2>		Remarks
Item Number			Data		
Item	Upper byte	Lower byte	Data	Byte	
Status Error	01h	01h	No Error	0000h	Get only
			Lamp Error	0001h	
			Fan Error	0002h	
			Cover Error	0004h	
			Temp Error	0008h	
			D5V Error	0010h	
			Power Error	0020h	
			Temp Warning	0040h	
			NVM Data Error	0080h	
Status Power	01h	02h	Standby	0000h	
			Start Up	0001h	
			Startup Lamp	0002h	
			Power On	0003h	
			Cooling1	0004h	
			Cooling2	0005h	
			Saving Cooling1	0006h	
			Saving Cooling2	0007h	
			Saving Standby	0008h	
Lamp Timer	01h	13h	Use Time	0000h to FFFFh <sup>*1</sup>	
Status Error (2)	01h	25h	No Error	0000h	
			Lens Shutter Error	0001h	
			Highland Warning	0020h	

\*1: Example) In case the lamp timer indicates 1000H, return value is [03E8h].

Table 2-6 ITEM List For Infrared Remote Command

<Table 1>			<Table 2>			Remarks
Item Number			Data			
Item	Upper byte	Lower byte	Data	Upper byte	Lower byte	
Infrared Remote Command (15 bit category)	17h	Refer to the section 2-1-2 <sup>*1</sup> . (Table 2-7 to Table 2-10)	–	00h	00h	Set Only
Infrared Remote Command (20 bit category)	19h	Refer to the section 2-1-2 <sup>*1</sup> . (Table 2-7 to Table 2-10)	–	00h	00h	
Infrared Remote Command (20 bit category)	1Bh	Refer to the section 2-1-2 <sup>*1</sup> . (Table 2-8, Table 2-11)	–	00h	00h	

\*1: By using this Item Number, it is possible to simulate the infrared remote controller.  
Choose your desired Code from the table in the section 2-1-2 and use it as the Lower byte of Item Number.

**Note**

Depending on the category, different value (Upper byte) is assigned.

## 2-1-2. Infrared Remote Command Code

Tables are shown per function category.

- 15 bit PROJECTOR: Table 2-7 to Table 2-10
- 20 bit PROJECTOR-E: Table 2-7 to Table 2-10
- 20 bit PROJECTOR-EE: Table 2-8, Table 2-11

Table 2-7 Infrared Remote Command Code For Picture

CATEGORY		Code	Name
15 bit PROJECTOR	20 bit PROJECTOR-E		
○	–	05	MOTION ENHANCER TOGGLE
○	–	07	BLACK LEVEL TOGGLE
○	–	08	BLACK INSERTION
○	–	18	CONTRAST +HIGH
○	–	19	CONTRAST –LOW
○	–	1A	COLOR +HIGH
○	–	1B	COLOR –LOW
○	–	1E	BRIGHTNESS +BRIGHT
○	–	1F	BRIGHTNESS –DARK
○	–	20	HUE +GREENISH
○	–	21	HUE –PURPLISH
○	–	22	SHARPNESS +SHARP
○	–	23	SHARPNESS –SOFT
○	–	72	LENS SHIFT ↑
○	–	73	LENS SHIFT ↓
○	–	74	LENS FOCUS FAR
○	–	75	LENS FOCUS NEAR
○	–	77	LENS ZOOM LARGE
○	–	78	LENS ZOOM SMALL
–	○	09	ADJUST PICTURE TOGGLE
–	○	4B	COLOR SPACE TOGGLE
–	○	4C	REALITY CREATION PALETTE
–	○	51	CALIB. PRESET BRT TV
–	○	52	CALIB. PRESET TV
–	○	53	CALIB. PRESET CINEMA FILM 1
–	○	54	CALIB. PRESET CINEMA DIGITAL
–	○	55	CALIB. PRESET REF
–	○	56	CALIB. PRESET GAME
–	○	57	CALIB. PRESET PHOTO
–	○	58	CALIB. PRESET CINEMA FILM 2
–	○	59	CALIB. PRESET BRT CINE
–	○	5B	PICTURE MODE TOGGLE
–	○	5C	COLOR TEMP TOGGLE
–	○	5E	GAMMA COLLECTION TOGGLE
–	○	5F	IRIS MODE TOGGLE

Table 2-8 Infrared Remote Command Code For Screen

CATEGORY			Code	Name
15 bit PROJECTOR	20 bit PROJECTOR-E	20 bit PROJECTOR-EE		
-	-	○	20	PICTURE POSITION 1.85:1
-	-	○	21	PICTURE POSITION 2.35:1
-	-	○	22	PICTURE POSITION CUSTOM1
-	-	○	23	PICTURE POSITION CUSTOM2
-	-	○	24	PICTURE POSITION CUSTOM3
○	-	-	47	PITCH
○	-	-	48	SHIFT
-	○	-	61	PHASE
-	○	-	62	LENS ZOOM
-	○	-	63	LENS SHIFT
-	○	-	64	LENS FOCUS
-	○	-	6E	ASPECT
-	-	○	41	ASPECT NORMAL
-	-	○	44	ASPECT V STRETCH
-	-	○	45	ASPECT 1.85:1 ZOOM
-	-	○	46	ASPECT 2.35:1 ZOOM
-	-	○	47	ASPECT STRETCH
-	-	○	48	ASPECT SQUEEZE

Table 2-9 Infrared Remote Command Code For Setup

CATEGORY		Code	Name
15 bit PROJECTOR	20 bit PROJECTOR-E		
○	-	15	POWER ON/OFF *1
○	-	24	PICTURE MUTING
○	-	25	STATUS ON
○	-	26	STATUS OFF
○	-	29	MENU
○	-	2B	INPUT A
○	-	2C	COMPONENT
○	-	2E	POWER ON*1
○	-	2F	POWER OFF
○	-	33	CURSOR →
○	-	34	CURSOR ←
○	-	35	CURSOR ↑
○	-	36	CURSOR ↓
○	-	57	INPUT SELECT
○	-	5A	ENTER
○	-	6F	HDMI 1
○	-	70	HDMI 2
○	-	7B	RESET

\*1: Send the command twice when this unit is in standby mode (Low) state.

Table 2-10 Infrared Remote Command Code For Installation

CATEGORY			Code	Name
15 bit PROJECTOR	20 bit PROJECTOR-E	20 bit PROJECTOR-EE		
–	○	–	02	LENS SHIFT ←
–	○	–	03	LENS SHIFT →
–	–	○	18	LENS POSITION
–	○	–	3B	3D ON/OFF
–	○	–	78	LENS TOGGLE

Table 2-11 Infrared Remote Command Code For 3D

CATEGORY	Code	Name
<b>20 bit PROJECTOR-EE</b>		
○	12	2D-3D DISPLAY SEL. TOGGLE
○	13	3D FORMAT TOGGLE
○	15	3D DEPTH + HIGH
○	16	3D DEPTH – LOW
○	17	SIMULATED 3D EFFECT TOGGLE
○	1B	3D BRIGHTNESS
○	32	2D-3D DISPLAY SEL. AUTO
○	33	2D-3D DISPLAY SEL. 3D
○	34	2D-3D DISPLAY SEL. 2D
○	35	3D FORMAT OVER-UNDER
○	36	3D FORMAT SIDE-BY-SIDE
○	37	3D FORMAT SIMULATED 3D
○	3B	SIMULATED 3D EFFECT HIGH
○	3C	SIMULATED 3D EFFECT MIDDLE
○	3D	SIMULATED 3D EFFECT LOW
○	50	3D BRIGHTNESS [HIGH]
○	51	3D BRIGHTNESS [LOW]

## 2-2. Reply

<Table 3>			
Item Number		Data	
Item	Data	Upper byte	Lower byte
ACK	Complete	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 Run Error		40h
	Other Comm Error		50h

### Error description

#### Check Sum Error

A check sum error occurred.

#### Framing Error

A framing error occurred.

#### Parity Error

A parity error occurred.

#### Over Run Error

An overrun error occurred.

#### Other Comm Error

Other error occurred.

### 3. RS-232C

#### 3-1. Connection

Communication is enabled by the use of a D-Sub 9 Pin cross (reverse) cable.  
 The pin assignment of D-Sub 9 Pin and D-Sub 25 Pin is as follows.

D-Sub 9 Pin	D-Sub 25 Pin	Name	
Shell = FG	1	FG	Grounding for safety protection or cable shield
3	2	TxD	Transmission data
2	3	RxD	Reception data
7	4	RTS	Transmission request
8	5	CTS	Transmission permission
6	6	DSR	Data set ready
5	7	SG	GND for signal
1	8	DCD	Data channel signal carrier detection
4	20	DTR	Data terminal ready
9	22	RI	Calling display (Presence/absence of calling signal)

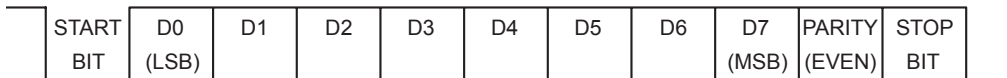
Pin numbers not indicated as D-Sub 25 Pin are not used.  
 Assured cable length: 15 m (However, assurance may not be applicable for some cables.)

The software for controlling the projector from a PC is intended for performing transmission and reception for only the TxD and RxD lines.  
 Therefore the handshake normally performed by RS-232C is not necessary.

#### 3-2. Communication Specifications

- Full duplex communication channels (Flow control not performed.)
- Start-stop synchronism system
- Baud rate: 38.4 kbps (bits per second)
- The bit configuration is defined as follows.

1 START Bit + 8 DATA Bits + 1 PARITY Bit + 1 STOP Bit



EVEN Parity ..... Total number of “1”s from D0 to D7 is an even number. ⇒ 0  
 ..... Total number of “1”s from D0 to D7 is an odd number. ⇒ 1



### 3-3. Communication Procedure

#### 3-3-1. Outline of Communication

All communication between CONTROLLER (PC, etc.) and DEVICE (PROJECTOR) is performed by the command block format. Communication is started by the issue of a command at CONTROLLER and ended when the return data is sent to CONTROLLER after DEVICE receives the command. CONTROLLER is prohibited from sending several commands at one time. This means that after CONTROLLER sends one command, it cannot send other commands until DEVICE returns the return data. DEVICE sends the return data after processing the command. The time from when CONTROLLER sends the command until the return data is returned differs according to the contents of the command.

#### Note

When Sircs Direct Command is sent, return data is not sent.

### 3-4. Communication Rules

- When sending a command from CONTROLLER (PC, etc.), the return data from DEVICE (PROJECTOR) should be received first before sending the next command. Even if the next command is sent before receiving the return data, since DEVICE will not be able to receive that command, it does not return a response to CONTROLLER. Consequently, no error code is also sent.  
For detail of the waiting times for DEVICE to return the return data after CONTROLLER sends the command, refer to the section 3-5.
- When a communication error occurs, DEVICE ignores the data received until now, and set into the reception standby state.
- For undefined commands or commands determined as invalid by DEVICE, DEVICE will send the “NAK” return data to CONTROLLER .
- Take note that when data is written when the input signal of DEVICE 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.)

### 3-5. Approximate Return Waiting Times

The await-return time is approx. 30 to 5100 msec.

#### Note

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



## 3-7. Packet Examples

### 3-7-1. Change “ASPECT” to “1.85:1 Zoom”

START CODE = A9h  
ITEM NUMBER = 0020h (ASPECT)  
SET/GET = 00h (SET)  
DATA = 000Ch (1.85:1 Zoom)  
CHECK SUM = 23h  
END CODE = 9Ah

You will receive the packet below if the process is successfully completed.

START CODE = A9h  
ACK/NAK = 0000h (Complete)  
ACK = 03h  
DUMMY DATA = 0000h  
CHECK SUM = 0Ch  
END CODE = 9Ah

There's another way to realize the same purpose. There is “ASPECT” key on the infrared remote control. By using this key, aspect can be changed. Issue the Infrared Remote Command for this key several times to set aspect “1.85:1 Zoom”. Packet format will make as follows. Refer to the Table 2-8 for ASPECT.

START CODE = A9h  
ITEM NUMBER = 196Eh (ASPECT)  
SET/GET = 00h (SET)  
DATA = 0000h  
CHECK SUM = 7Fh  
END CODE = 9Ah

## 3-8. AMX Device Discovery

This model is equipped with the protocol that conforms to the Device Discovery stipulated by AMX. Contact AMX for details about the Device Discovery.

**Tip**

AMX is a trademark of AMX Corporation.

## 4. Ethernet

### 4-1. Service

#### 4-1-1. 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.

This protocol is set to ON by default.

#### [Information]

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

## 4-1-2. PJ Talk

By using PJ Talk, it is possible to communicate with PROJECTOR over Ethernet network. Both of set and get method are provided.

This protocol is set to ON by default.

### [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)

### [Setup Items]

Setup item	Description
Port No.	Port number
Timeout	TCP connection timeout time
Host Address	Address of connectable PC
Community	Header community

## 4-2. Communication Procedure

Communication sequence is shown below. SDCP commands must be issued by CONTROLLER and PROJECTOR responds to it. On the other hand, SDAP commands are sent by PROJECTOR and have no response from CONTROLLER.

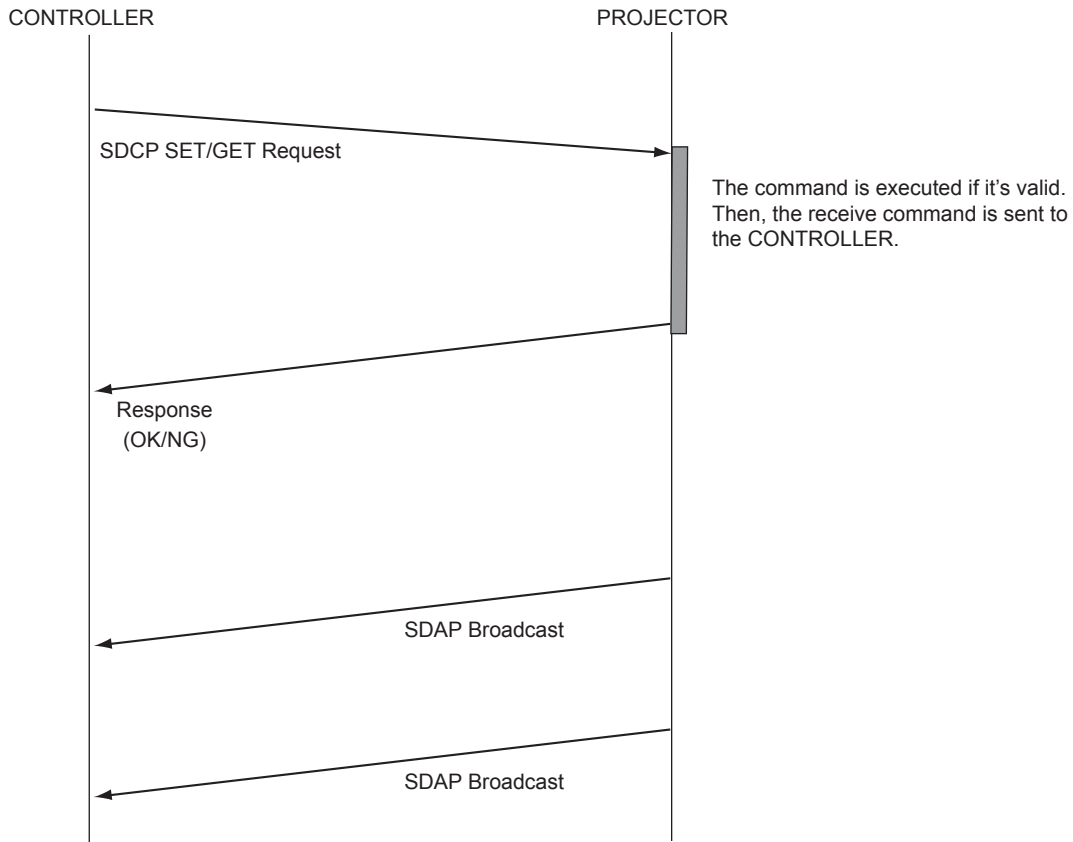


Fig. 4-1 Command Sequence

It is prohibited that CONTROLLER send another command before receiving the response to the previous command. Since PROJECTOR executes the command before sending the return data, CONTROLLER must wait a while before receiving the response. The waiting time depends on not only the commands but also network traffic.

## 4-3. Protocols

### 4-3-1. SDAP

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

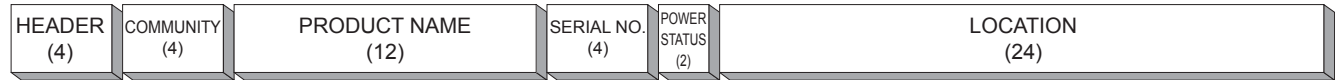


Fig.4-2 Packet structure

#### 1. Header

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



Fig. 4-3 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 (Refer to 3. of the section 4-3-2.)

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



Fig. 4-4 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.

## 4-3-2. SDCP

### 1. Packet Structure

The Fig. 4-5 shows SDCP packet format. The number in the brackets shows byte. The statement for each field is described below.



Fig. 4-5 SDCP Packet Structure

### 2. HEADER Field

The HEADER field consists of VERSION and CATEGORY sub field shown below. The length of each sub field is 1 byte.



Fig. 4-6 HEADER Field

#### (1) VERSION sub field

This is a fixed value of 02h, which means “version2”.

#### (2) CATEGORY sub field

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. COMMUNITY Field

When the community data matches the community that is set in the display equipment, the request is executed. COMMUNITY field should consist of four alphanumeric characters (case sensitive). All display equipment has the default value “SONY” when shipped at the factory.

#### Note

COMMUNITY field should be filled with four characters. Three characters or less are not allowed.



#### 4. COMMAND Field

There are 2 types of COMMAND field, which are REQUEST and RESPONSE. REQUEST command is sent to the PROJECTOR from CONTROLLER. On the other hand, RESPONSE command is sent by PROJECTOR as a response to the REQUEST command.

##### (1) REQUEST Command

COMMAND field for REQUEST has 3 sub fields shown as follows.

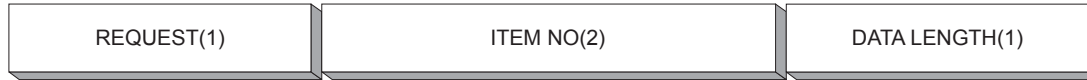


Fig. 4-7 COMMAND Field for REQUEST

##### 1) REQUEST sub field

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.

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.

##### 2) ITEM NO sub field

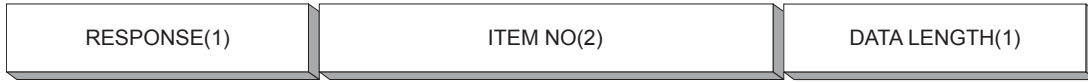
Refer to 6. of the section 4-3-2.

##### 3) DATA LENGTH sub field

This sub field shows the length in byte of the DATA field in the SDCP packet. The maximum data length is 128 bytes. If there is no data to be sent, its value should be 0h.

**(2) RESPONSE Command**

COMMAND field for RESPONSE has 3 sub fields shown as follows.



**Fig. 4-8 COMMAND Filed for RESPONSE**

1) RESPONSE sub field

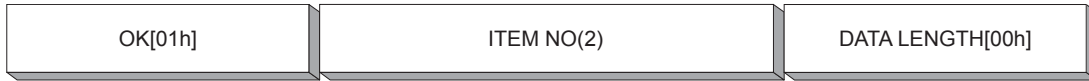
The response returns the result of the request.

OK (01h) Indicates that the request was executed correctly.

NG (00h) Indicates that the request is illegal or cannot be executed.

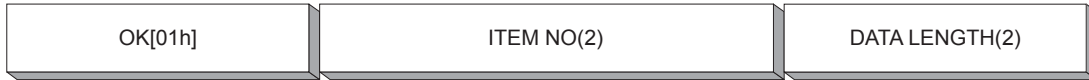
(1-1) OK Response

For SET Request, the packet format will be as follows.



If the response for SET Request is OK, DATA field should be 00h. Therefore, DATA LENGTH field should be 00h as well.

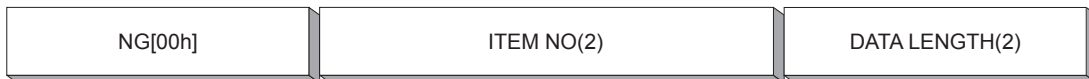
For Get Request, the packet format will be as follows.



If the response for GET Request is OK, the DATA field which follows the DATA LENGTH field should be filled with returned data.

(1-2) NG Response

For SET/GET Request



If the response for SET/GET Request is no good, DATA field which follows the DATA LENGTH field should be filled with "ERROR CODE". "ERROR CODE" are defined in 7. of the section 4-3-2.

2) ITEM NO sub field

Refer to 6. of the section 4-3-2.

3) DATA LENGTH sub field

This sub field shows the length in byte of the DATA field in the SDCP packet. The maximum data length is 128 bytes. If there is no data to be sent, its value should be 0h.

## 5. DATA Field

The content to be filled in this field depends on the COMMAND field. For SET Request commands, appropriate DATA value accompanied with ITEM NO should be chosen. ITEM NO (item number) and its data is shown in the section 2-1-1.

For the GET REQUEST and OK RESPONSE, this field should not be provided. In that case, DATA LENGTH should be 0h.

## 6. Items

ITEM NO sub field has 2 bytes long. Some of the value for ITEM NO (item number) are defined in the section 2-1-1 as a part of the Sub Command.

**Table 4-1 ITEM List For SDCP**

ITEM NO	Remarks	SET	GET
0000h – 00FFh	Item Numbers are defined in the section 2-1-1. Use the value of <Table2> (Data) for DATA Field.	○	○
0100h – 01FFh	Item Numbers are defined in the section 2-1-1. Use the value of <Table2> (Data) for DATA Field.	○	○
1700h – 17FFh	Item Numbers are defined in the section 2-1-1. Use the value of <Table2> (Data) for DATA Field.	○	–
1900h – 19FFh	Item Numbers are defined in the section 2-1-1. Use the value of <Table2> (Data) for DATA Field.	○	–
1B00h – 1BFFh	Item Numbers are defined in the section 2-1-1. Use the value of <Table2> (Data) for DATA Field.	○	–
7000h – 7001h	This is the RS-232C encapsulation mode. “Simple Command” can be encapsulated in the DATA field. For the packet format of the command, refer to the section 3-6-1. Use 7000h for the command which the response is expected. Use 7001h for the command which no response is expected.	○	–
8000h – 80FFh	For acquiring equipment information. Refer to the (1).	–	○
9000h – 90FFh	For acquiring the network setup information. Refer to the (2).	–	○

### [SDCP Specific Command]

#### (1) Acquire Equipment Information

This is for acquiring information of PROJECTOR. While the higher byte is fixed as 80h shown in the table above, the lower byte is defined as follows.

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.

**(2) Acquire Network Setup Information**

This is for acquiring network setting of PROJECTOR. While the upper byte is fixed as 90h, the lower byte is defined as follows.

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 Gateway**

4 bytes

**0x9004 DHCP**

1 byte

DHCP disable: 0

DHCP enable: 1

## 7. ERROR CODE

ERROR CODE has 2 bytes long. The table below shows the error code. Each error category is explained as follows.

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

#### (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 A\*\*h is specified.

Example 2: The unsupported Item No. 8010h 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 (8001h).

##### **Invalid Length**

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

Example: An attempt is made to set 25 bytes data in the installation location (8003h).

##### **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 the specified value 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.

#### (2) Community Error

This error occurs when community is different.

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

### (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.

#### **Invalid Category**

The category does not match.

Example: 0Bh is specified in the device of category = 0Ah.

#### **Invalid Request**

An unsupported request is specified.

Example: Request = 02h 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.

### (4) Network Error

There is something wrong with TCP/IP.

#### **Timeout**

Communication was interrupted.

(5) Comm Error

Communication between Ethernet controller and main CPU has been failed.

**Timeout**

Timeout occurred.

**Check Sum Error**

A check sum error occurred.

**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.

(6) NVRAM Error

**Read Error**

Reading from NVRAM was failed.

**Write Error**

Writing to NVRAM was failed.

**8. Packet Examples**

For setting the picture mode to dynamic, the packet should be as follows.

HEADER (VERSION, CATEGORY) = (02h, 0Ah)

COMMUNITY = "SONY" = (534F4E59h)

COMMAND (REQUEST, ITEM NO, DATA LENGTH) = (00h, 0002h, 02h)

DATA = 0000h

The same result can be obtained by using ENCAPSULATION mode as well.

HEADER (VERSION, CATEGORY) = (02h, 0Ah)

COMMUNITY = "SONY" = (534F4E59h)

COMMAND (REQUEST, ITEM NO, DATA LENGTH) = (00h, 7000h, 08h)

DATA (START CODE, ITEM NO, SET/GET, DATA, CHECK SUM, END CODE)

= (A9h, 0002h, 00h, 0000h, 02h, 9Ah)



### 4-3-3. DDDP

This unit is equipped with the protocol conforming DDDP stipulated by AMX.

For details about DDDP, contact AMX.

You can turn on or off DDDP from the Web setting screen > Setup > Advanced Menu > Service.

This protocol is set to OFF by default.

**Note**

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



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