SONY

VIDEO PROJECTOR

VPL-VW95ES

PROTOCOL MANUAL

1st Edition

⚠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ことがあります。
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 manual 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.

Table of Contents

1. Overview

2. Common Commands

3. RS-232C

1. Overview

1-1. Introduction

This projector is remotely controllable over RS-232C. It is useful for setting up 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 is a PC or other specific device that has the RS-232C terminal.
The command is only RS-232C.

1-2. Glossary of Terms

Table 1-1 Glossary of Terms

Terms	Abbreviated	Description
CONTROLLER	–	Command initiator such as PCs.
PROJECTOR	–	Front projector (device).

1-3. Protocol Stack Structure

The protocol stack structure diagram is shown below. The stack is for RS-232C.

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

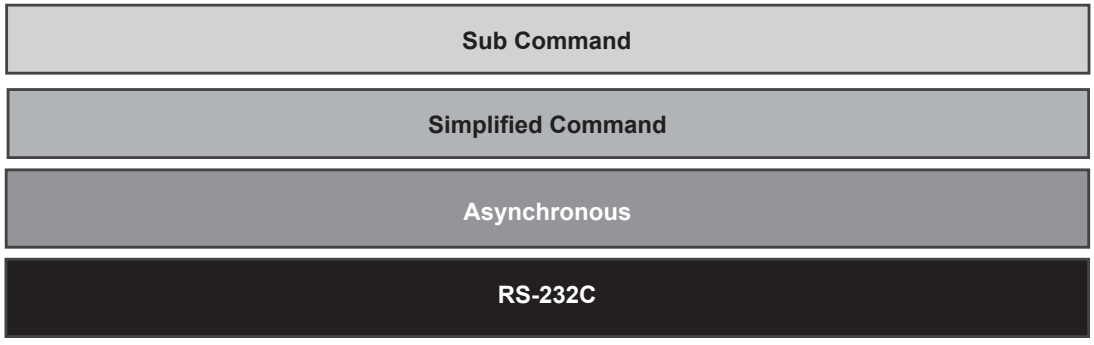


Fig. 1-1 RS-232C Protocol Stack

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

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

<Table 1>			<Table 2>		Remarks
Item Number			Data		
Item	Upper byte	Lower byte	Data	Byte	
Picture Mode	00h	02h	Dynamic	0000h	Set/Get
			Standard	0001h	
			Cinema1	0002h	
			Cinema2	0003h	
			Cinema3	0004h	
			Game	0005h	
			Photo	0006h	
			User1	0007h	
			User2	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	High	0000h	
			Mid	0001h	
			Low1	0002h	
			Custom1	0003h	
			Custom2	0004h	
			Custom3	0005h	
			Custom4	0006h	
			Low2	0007h	
			Custom5	0008h	
Lamp Control	00h	1Ah	Low	0000h	
			High	0001h	
Black Level Adj.	00h	1Ch	Set Value	FFFDh to 0003h (–3 to 3)	

<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	
			Auto1	0002h	
			Auto2	0003h	
Real Color Processing	00h	1Eh	Off	0000h	
			User1	0001h	
			User2	0002h	
			User3	0003h	
Film Mode	00h	1Fh	Off	0000h	
			Auto1	0001h	
			Auto2	0002h	
Gamma Correction	00h	22h	Off	0000h	
			Gamma 1	0001h	
			Gamma 2	0002h	
			Gamma 3	0003h	
			Gamma 4	0004h	
			Gamma 5	0005h	
			Gamma 6	0006h	
			Gamma 7	0007h	
			Gamma 8	0008h	
			Gamma 9	0009h	
			Gamma 10	000Ah	
NR	00h	25h	Off	0000h	
			Low	0001h	
			Middle	0002h	
			High	0003h	
Block NR	00h	26h	Off	0000h	
			Low	0001h	
			Middle	0002h	
			High	0003h	
Mosquito NR	00h	27h	Off	0000h	
			Low	0001h	
			Middle	0002h	
			High	0003h	
White Level Adj.	00h	28h	Set Value	FFFDh to 0003h (–3 to 3)	
Color Space	00h	3Bh	Normal	0000h	
			Wide1	0001h	
			Wide2	0002h	
			Wide3	0003h	

<Table 1>			<Table 2>		Remarks
Item Number			Data		
Item	Upper byte	Lower byte	Data	Byte	
User Gain Red	00h	50h	Set Value	FFE2h to 001Eh (–30 to 30)	Set/Get
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 Sensitivity	00h	56h	Recommend	0000h	
			Fast	0001h	
			Slow	0002h	
Iris Manual	00h	57h	Set Value	0000h to 0064h (0 to 100)	
Film Projection	00h	58h	Off	0000h	
			Mode1	0001h	
			Mode2	0002h	
Motion Enhancer	00h	59h	Off	0000h	
			Low	0001h	
			High	0002h	
xvColor	00h	5Ah	Off	0000h	
			On	0001h	
Picture Position	00h	66h	Position1	0000h	
			Position2	0001h	
			Position3	0002h	
			Position4	0003h	
			Position5	0004h	

Table 2-2 ITEM List For Screen

<Table 1>			<Table 2>		Remarks
Item Number			Data		
Item	Upper byte	Lower byte	Data	Byte	
Wide Mode	00h	20h	Full	0000h	Set/Get
			Normal	0001h	
			Wide Zoom	0002h	
			Zoom	0003h	
			Full1	0007h	
			Full2	0008h	
			Anamorphic Zoom	000Bh	
Over Scan	00h	23h	Off	0000h	
			On	0001h	
Screen Area	00h	24h	Full	0000h	
			Through	0001h	

Table 2-3 ITEM List For Setup

<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	
Input-A Signal Sel	00h	32h	Auto	0000h	
			Computer	0001h	
			Component	0002h	
			Video GBR	0003h	

Table 2-4 ITEM List For 3D

<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 Glasses Brightness	00h	65h	Set Value	0000h to 0004h (0 to 4)	

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 *1	
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 *1. (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 *1. (Table 2-7 to Table 2-10)	–	00h	00h	
Infrared Remote Command (20 bit category)	1Bh	Refer to the section 2-1-2 *1. (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
–	○	08	RCP
–	○	09	ADJUST PICTURE TOGGLE
–	○	4B	COLOR SPACE TOGGLE
–	○	51	PICTURE MODE DYNAMIC
–	○	52	PICTURE MODE STANDARD
–	○	53	PICTURE MODE CINEMA1
–	○	54	PICTURE MODE CINEMA2
–	○	55	PICTURE MODE CINEMA3
–	○	56	PICTURE MODE GAME
–	○	57	PICTURE MODE PHOTO
–	○	58	PICTURE MODE USER1
–	○	59	PICTURE MODE USER2
–	○	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		
○	–	–	47	PITCH
○	–	–	48	SHIFT
–	○	–	60	APA
–	○	–	61	PHASE
–	○	–	62	LENS ZOOM
–	○	–	63	LENS SHIFT
–	○	–	64	LENS FOCUS
–	○	–	6E	WIDE MODE TOGGLE
–	–	○	3E	WIDE MODE WIDE ZOOM
–	–	○	3F	WIDE MODE FULL1
–	–	○	40	WIDE MODE FULL2
–	–	○	41	WIDE MODE NORMAL
–	–	○	42	WIDE MODE FULL
–	–	○	43	WIDE MODE ZOOM
–	–	○	44	WIDE MODE ANAMORPHIC ZOOM

Table 2-9 Infrared Remote Command Code For Setup

CATEGORY		Code	Name
15 bit	20 bit		
PROJECTOR	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		
–	○	–	00	V KEYSTONE +
–	○	–	01	V KEYSTONE –
–	○	–	02	LENS SHIFT ←
–	○	–	03	LENS SHIFT →
–	–	○	18	LENS POSITION
–	○	–	3A	V KEYSTONE
–	○	–	3B	3D ON/OFF
–	○	–	78	LENS TOGGLE

Table 2-11 Infrared Remote Command Code For 3D

CATEGORY	Code	Name
20 bit PROJECTOR-EE		
○	12	2D-3D DISPLAY SEL. TOGGLE
○	13	3D FORMAT TOGGLE
○	15	3D DEPTH + HIGH
○	16	3D DEPTH – LOW
○	17	SIMULATED 3D EFFECT TOGGLE
○	19	3D GLASSES BRIGHTNESS+
○	1A	3D GLASSES 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

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)

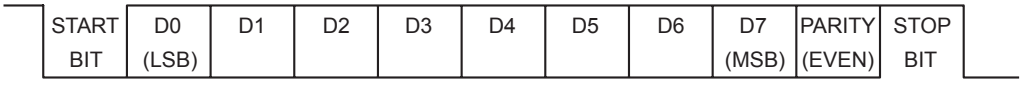
Pin numbers not indicated as D-Sub 25 Pin are not used.
Assured cable length: 15 m (However, assurance may not be applicable for some cables.)

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 3200 msec.

Note

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

3-6. Command Block Format

The block format of Simplified Command for RS-232C as shown in the Fig. 1-1. In this section, the block format for Simplified Command is provided.

3-6-1. Simplified Command

[Send]

The block format for sending request is shown below.

B0	START CODE	[A9h]
B1	ITEM NUMBER	Put the item number. Refer to the item list in the sections 2-1-1 and 2-1-2.
B2		
B3	TYPE	SET: 00h (Set data) GET: 01h (Get data)
B4	DATA	SET: Put the Data value described in the item list in the sections 2-1-1 and 2-1-2. GET: Unused. Set Dummy data [00h, 00h]
B5		
B6	CHECK SUM*1	Check Sum
B7	END CODE	[9Ah]

[Receive (without data)]

The block format for response which includes no return data is shown below. Response is always sent by PROJECTOR.

B0	START CODE	[A9h]
B1	ACK / NAK	Refer to the reply definition table in the section 2-2.
B2		
B3	TYPE	[03h]
B4	DUMMY DATA	This data does not mean any senses. Dummy Data [00h, 00h] is stored.
B5		
B6	CHECK SUM*1	Check Sum
B7	END CODE	[9Ah]

[Receive (with data)]

The block format for response which includes return data is shown below. Response is always sent by PROJECTOR.

B0	START CODE	[A9h]
B1	ITEM NUMBER	Refer to the item list in the sections 2-1-1 and 2-1-2.
B2		
B3	TYPE	[02h] Express data to be Reply data
B4	DATA	Data value described in the item list in the sections 2-1-1 and 2-1-2.
B5		
B6	CHECK SUM*1	Check Sum
B7	END CODE	[9Ah]

∗1: CHECK SUM: B1 to B5 are calculated by OR. Refer to the example below.

<Example of Calculation>

0xA9	1010	1001	0xA9	1010	1001
0xA9	1010	1001	0x9A	1001	1010
Answer	1010	1001	Answer	1011	1011
		0xA9			0xBB

3-7. Packet Examples

3-7-1. Change “Wide Mode” to “Zoom”

START CODE = A9h
ITEM NUMBER = 0020h (Wide Mode)
SET/GET = 00h (SET)
DATA = 0003h (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 = 03h
END CODE = 9Ah

There’s another way to realize the same purpose. There is “WIDE MODE TOGGLE” key on the infrared remote controller. By using this key, wide mode can be changed. Issue the Infrared Remote Command for this key several times to set wide mode “Zoom”. Packet format will make as follows. Refer to the Table 2-8 for WIDE MODE TOGGLE.

START CODE = A9h
ITEM NUMBER = 196Eh (WIDE MODE TOGGLE)
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.

VPL-VW95ES (CN)
VPL-VW95ES (J)
VPL-VW95ES (SY)
VPL-VW95ES (U) J, E
9-968-899-01

Sony Corporation

Printed in Japan
2011. 9 32