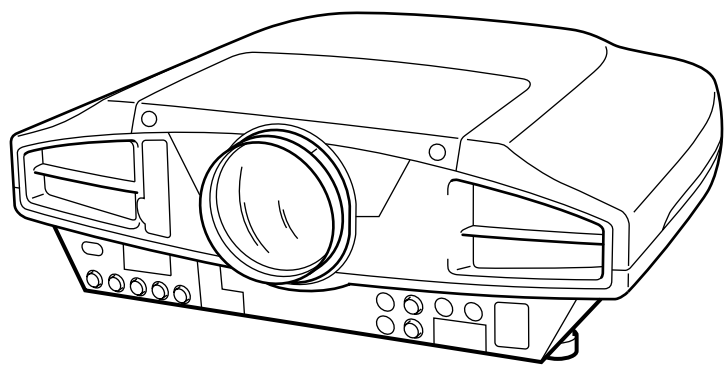


PROTOCOL MANUAL

MODEL	DEST.	MODEL	DEST.
VPL-FX50	WORLD	RM-PJM50	WORLD

VERSION 1.0

Projector Firmware ARC32



LCD DATA PROJECTOR

SONY[®]

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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 in the List of Commands provided in Section 9 “COMMANDS”. 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. Communication Specifications

<RS-232C Communication Signal>

- 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

START BIT	D0 (LSB)	D1	D2	D3	D4	D5	D6	D7 (MSB)	PARITY (EVEN)	STOP BIT
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EVEN Parity.....Total number of “1”s from D0 to D7 is an even number.

3. Command Block Format

The code from B0 to B7 as described below are transmitted.

	Transmission from the Master side	Transmission from the Master side	Reception in the Master side (With Data)		
B0	START CODE : 0 × A9				
B1	ITEM NUMBER	ACK / NAK	ITEM NUMBER		
B2					
B3	SET / GET	ACK	REPLY		
B4	DATA	DUMMY DATA	DATA		
B5					
B6	CHECK SUM				
B7	END CODE : 0 × 9A				

B0 START CORD
Common in the all FORMAT

B6 CHECK SUM
B1 to B5 are calculated by OR;

<Example of Calculation>

0 × A9	1010	1001	0 × A9	1010	1001
0 × A9	1010	1001	0 × 9A	1001	1010
Answer	1010	1001	Answer	1011	1011
		0 × A9			0 × BB

B7 END CODE
Common in the all FORMAT

4. Block Format

Transmission from the Master side		Data transmission to the Projector
B0	START CODE	Start of Command
B1	ITEM NUMBER	Set the Data Category Value desired. Refer to the Table 1 for details.
B2		
B3	SET / GET	SET: 0 x 00 (Set data) GET: 0 x 01 (Get data)
B4	DATA	SET: Data to be set (Refer to the Table 2) GET: Unused. Set Dummy data [0 x 00, 0 x 00]
B5		
B6	CHECK SUM	Check Sum
B7	END CODE	End of Command
Reception in the Master side		Receive results of the data transmission from the Projector.
B0	START CODE	Start of Command
B1	ACK / NAK	Results correspond with the data transmission Refer to the Table 3 for the data in detail.
B2		
B3	ACK	[0 x 03] Express Reply data either of ACK, or NAK
B4	DUMMY DATA	This data does not mean any senses. Dummy Data [0 x 00, 0 x 00] is stored.
B5		
B6	CHECK SUM	Check Sum
B7	END CODE	End of Command
Reception in the Master side (With Data)		Receive data from the Projector
B0	START CODE	Start of Command
B1	ITEM NUMBER	Received data Refer to the Table 1 in detail.
B2		
B3	REPLY	[0 x 02] Express data to be Reply data
B4	DATA	Received data Refer to the Table 2 in detail.
B5		
B6	CHECK SUM	Check Sum
B7	END CODE	End of Command

5. Connection

<RS-232C 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)

Pins 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 there is no handshake normally performed by RS-232C.

6. Communication Procedure

6-1. 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.

In some cases, CONTROLLER may receive data from DEVICE even though it has not sent a command. (For example, during SYS setting, SIRCS command, and switcher information when switcher is selected.)

Note: When Sircs Direct Command is sent, return data may not be returned in some cases.

7. Communication Rules

- When sending a command from CONTROLLER, the return data from PROJECTOR should be received 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 commands 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.)

8. Approximate Return Waiting Times

The await-return time is approx. 30 msec.

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

9. Appendix

< Table 1>			<Table 2>			
Item Number			Data			Remarks
Iteme	Upper byte	Lower byte	Data	Upper byte	Lower byte	
INPUT	00h	01h	VIDEO	00h		Set/Get
			S VIDEO	01h		
			INPUT A	02h		
			INPUT B	03h		
			INPUT C	04h		
CONTRAST	00h	10h	00h ~ 64h (0 ~ 100)			
BRIGHTNESS	00h	11h	00h ~ 64h (0 ~ 100)			
COLOR	00h	12h	00h ~ 64h (0 ~ 100)			
HUE	00h	13h	00h ~ 64h (0 ~ 100)			
SHARPNESS	00h	14h	00h ~ 64h (0 ~ 100)			
RGBENHANCER	00h	15h	00h ~ 64h (0 ~ 100)			
VOLUME	00h	16h	00h ~ 64h (0 ~ 100)			
COLTEMP	00h	17h	LOW	00h		
			HIGH	01h		
DDE	00h	18h	OFF	00h		
			PROGRESSIVE	01h		
			FILM	02h		
ASPECT	00h	20h	16 : 9	00h		
			4 : 3	01h		
SCANCONV	00h	21h	OFF	00h		
			ON	01h		
PICTUREMUTING	00h	30h	OFF	00h		
			ON	01h		
INPUTA	00h	32h	COMPUTER	00h		
			COMPORNENT	01h		
			VIDEO GBR	02h		
LAMP MODE	00h	40h	STANDARD	00h		
			LOW	01h		
GAINRED	00h	80h	00h ~ FFh (0 ~ 255)			
GAINGREEN	00h	81h	00h ~ FFh (0 ~ 255)			
GAINBLUE	00h	82h	00h ~ FFh (0 ~ 255)			
BIASRED	00h	83h	00h ~ FFh (0 ~ 255)			
BIASGREEN	00h	84h	00h ~ FFh (0 ~ 255)			
BIASBLUE	00h	85h	00h ~ FFh (0 ~ 255)			
STATUSERROR	01h	01h	NO ERROR	00h		Get only
			LAMP ERROR	01h		
			FAN ERROR	02h		
			COVER ERROR	04h		
			TEMP ERROR	08h		
			D5V ERROR	10h		
			POWER ERROR	20h		
			WARNING ERROR	40h		

< Table 1>			<Table 2>				
Item Number			Data			Remarks	
Iteme	Upper byte	Lower byte	Data	Upper byte	Lower byte		
STATUSPOWER	01h	02h	STANBY	00h			
			START UP	01h			
			STARTUP LAMP	02h			
			POWER ON	03h			
			COOLING1	04h			
			COOLING2	05h			
			SAVING COOLING1	06h			
			SAVING COOLING2	07h			
			SAVING STABY	08h			
CONTROLMODESEL	01h	05h	USER	00h			
			SERVICE	01h			
LAMPTIMER	01h	13h	USE TIME	00h-ffffh			
ROM VERSION	01h	1Dh	ROM VER				
SC ROM VERSION	01h	1Eh	SC VER				
Channel Memory Reset	03h	01h					Set only
Status Memory Reset		02h					
Set Memory Reset		03h					
W/B All Save		04h					
W/B Low Save		05h					
W/B High Save		06h					
Sircs (15bit category)	17h	Refer to the Table4				Set only (Subject to the command only)	
Sircs (20bit category)	19h						

< 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

∞ **List of SIRCS CODE**
(1) 15BIT Category

	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	xA	xB	xC	xD	xE	xF
0x																
1x						POWER ON/OF			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	INPUT B		POWER ON	POWER OFF
3x				CURSOR →	CURSOR ←	CURSOR ↑	CURSOR ↓									
4x								RGB SIZE	RGB SHIFT							
5x								INPUT SELECT	BLANKING		ENTER				MEMORY	S VIDEO
6x																INPUT C
7x			LENS SHIFT ↑	LENS SHIFT ↓	FOCUS F	FOCUS N		ZOOM L	ZOOM S			RESET			PATTERN	

(2) 20BIT Category

	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	xA	xB	xC	xD	xE	xF
0x																
1x																
2x																
3x											KEystone					
4x																
5x																
6x	APA	DOT PHASE	LENS ZOOM	LENS SHIFT	LENS FOCUS			FREEZE			DIGITAL ZOOM +	DIGITAL ZOOM –				
7x																

