BASIC SERIAL COMMAND

FUNCTIONAL SPECIFICATIONS

LC-W4

SANYO Electric Co., Ltd
Consumer Group
AV Solutions Company
Projector BU

CONTENTS

1   Overview

1.1   This specification defines projector control commands for LC-W4.

1.2   The projector control commands are used to remote control a projector through RS-232C from a computer.

1.3   Refer to [8. Command with Address Specification] when using commands with address.

2   Serial Interface Specification

2.1   Transfer Specification

Items	Specification
Synchronous system	Asynchronous
Transmission Speed	9600 / 19200
Data Length	8 bit
Parity	None
Stop Bit	1
Flow Control	None

1)   Transmission speed: initial setting value is 19200.

2)   Transmission speed can be changed in Service Mode.

2.2   Connection

Dedicated serial cables that come with a projector must be used for a connection to a computer and a projector.

PC
COM 1

Projector
Serial Port IN

CD	1		1	N.C.
RXD	2		2	RXD
TXD	3		3	TXD
DTR	4		4	N.C.
SG	5		5	SG
DSR	6		6	N.C.
RTS	7		7	RTS
CTS	8		8	CTS
RING	9		9	N.C.

(D-Sub 9Pin)   **(D-Sub 9Pin)**
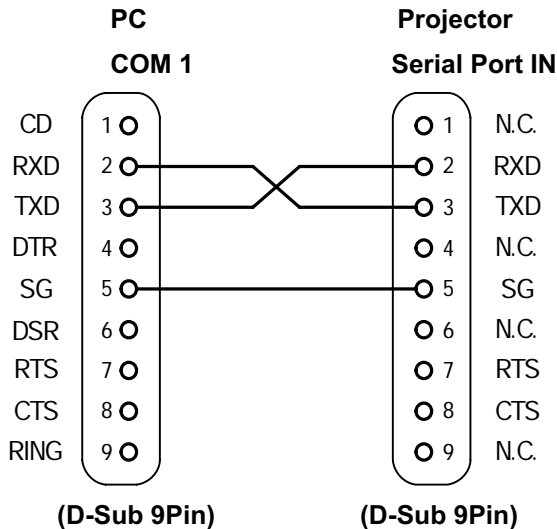
Connect COM port of a computer to SERIAL PORT IN of a projector.

COM Port (COM1 or COM2) of a computer is specified by control software of a computer.

3 Notes for Communication

3.1 The projector command is defined as one command / one line that starts with "C" and ends with carriage return (0x0D).

3.2 There are two types of commands: Functional Execution Commands and Status Read Commands.

Example of Functional Execution Command: "C05" [CR]

Example of Status Read Command: "CR0" [CR]

3.3 When it takes more than one second to receive one command, it is not executed.

When it takes more than one second until the projector receives carriage return since it has received the first data "C", it clears the information of buffer.

3.4 When executing the command pipelining, wait the interval of 100ms after the response.
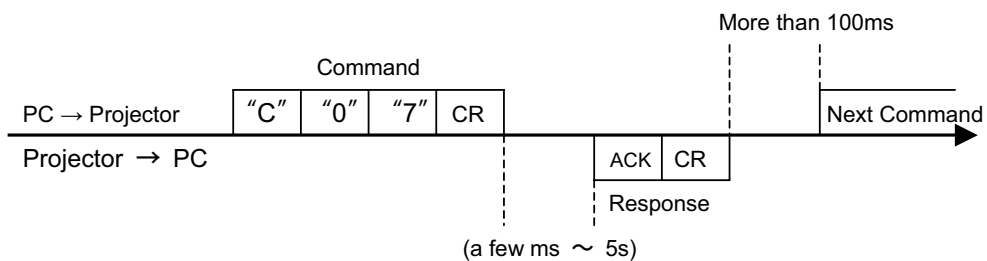
When a command is issued before receiving the response, the function is not executed properly. Except when there is no response for 5 seconds.

3.5 It takes about 5 seconds for internal initialization after plugging in AC power until it moves to Standby mode. During this time, it cannot process commands. Do not issue any command.

3.6 The number of characters of the response to Status Read Commands depends on commands. Please refer to [7. Status Read Command].

3.7 Characters for commands must be Capital (A - Z).

4. Functional Execution Command Table

Command	Item	Command	Item
C00	POWER ON	C43	FREEZE ON
C01	POWER OFF (Compulsory POWER OFF)	C44	FREEZE OFF
C05	INPUT 1	C46	ZOOM -
C06	INPUT 2	C47	ZOOM +
C07	INPUT 3	C4A	FOUCS -
C09	VOLUME +	C4B	FOUCS +
C0A	VOLUME -	C5D	LENS SHIFT UP
C0B	AUDIO MUTE ON	C5E	LENS SHIFT DOWN
C0C	AUDIO MUTE OFF	C70	FULL LAMP MODE SET
C0D	VIDEO MUTE ON	C71	HALF LAMP MODE 1 SET
C0E	VIDEO MUTE OFF	C72	HALF LMAP MODE 2 SET
C0F	SCREEN NORMAL SIZE (4:3)	C89	AUTO PC ADJ.
C10	SCREEN WIDE SIZE (16:9)	C8A	PRESENTATION TIMER
C1C	MENU ON	C8E	KEYSTONE +
C1D	MENU OFF	C8F	KEYSTONE -
C1E	DISPLAY CLEAR		
C27	IMAGE		
C30	D.ZOOM +		
C31	D.ZOOM -		
C3A	POINTER RIGHT		
C3B	POINTER LEFT		
C3C	POINITER UP		
C3D	POINITER DOWN		
C3F	ENTER		

5. Status Read Command Table

Command	Item	
CR0	Status Read	
CR1	Input Mode Read	
CR3	Lamp Time Read	
CR4	Setting Read	
CR6	Temp. Read	
CR7	Lamp Mode Read	
CR9	PC Type Read	
CRA	Status 2 Read	

6. Functional Execution Command

6.1 Format

6.1.1   PC issues a command in format as below:

"C" Command **[CR]**

Command: two characters (Refer to Functional Execution Command Table)

6.1.2   A projector changes the received data to decode and returns a result after being ready to receive next command.

[ACK] [CR]: (0x06, 0x0D) When received Functional Execution Commands.

6.1.3   When the received data cannot be decoded, it returns **"?" [CR]**

6.2 Command Pipelining

When some functions (Volume +/-, Zoom +/-, etc.) need the command pipelining, the performance is the same as that of the remote control.

6.2.1   System: issue any command every 100ms.

6.2.2   When receiving the appropriate command, the function is executed for 120ms from the moment.

6.2.3   When receiving the same command continuously within 120ms, the function is executed for another 120ms from the moment.

6.2.4   When there is no incoming command after 120ms, the execution of pipelining is stopped.

6.2.5   When the projector receives other incoming commands within 120ms, the execution of pipelining is stopped.

6.3 Transfer Example

Change to video mode with Basic Command.

	Command						
PC → Projector	"C"	"0"	"7"	CR			
Projector → PC						ACK	CR

Processing
(a few ms – 5s)
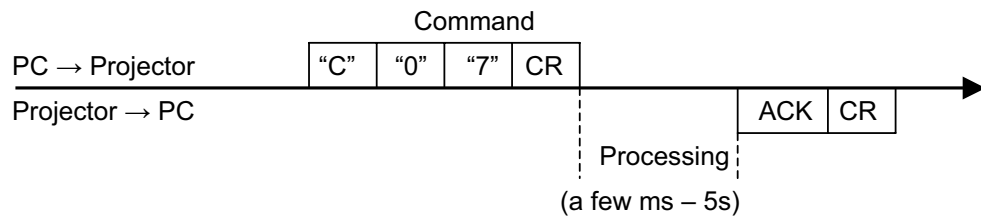
6.4   Operation Requirements

When the projector's status is in this below, Functional Execution Commands are limited.

(Status Read Commands are available in this status)

Projector Status	Available Functional Execution Commands
Standby mode	C00: POWER ON
Processing Countdown	C00: POWER ON (Countdown is terminated)
Processing Cooling Down	NONE (No Execution)
Cooling Down due to Abnormal Temperature	NONE (No Execution)
Abnormal Temperature status	NONE (No Execution)
Processing Power Management / Cooling Down	NONE (No Execution)
Power Management status	C00: POWER ON C01: POWER OFF

Note) When the status is above, even if the projector receives other commands, it returns

[ACK] [CR].

6.5 POWER ON Command

COMMAND	"C00" [CR]	
Detail	Power ON When already Power is ON, no operation is needed. When sending this command during processing Countdown, Countdown is terminated.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.6 POWER OFF Command (Compulsory POWER OFF)

COMMAND	"C01" [CR]	
Detail	Power OFF (Standby) When Power is OFF with ON-OFF button of the projector and remote control, "Power OFF" is displayed. However, as soon as this command is sent, Compulsory Power OFF is executed.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.7 INPUT 1 Command

COMMAND	"C05" [CR]	
Detail	Select Input 1 Note) When there is no card inserted to Input 1, it is not executed.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.8 INPUT 2 Command

COMMAND	"C06" [CR]	
Detail	Select Input 2 Note) When there is no card inserted to Input 2, it is not executed.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.9 INPUT 3 Command

COMMAND	"C07" [CR]	
Detail	Select Input 3 Note) When there is no card inserted to Input 3, it is not executed.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.10 VOLUME + Command

COMMAND	"C09" [CR]	
Detail	Volume Up This command operates the same function as "VOLUME +" button of the projector and remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.11 VOLUME - Command

COMMAND	"C0A" [CR]	
Detail	Volume Down This command operates the same function as "VOLUME－" button of the projector and remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.12 AUDIO MUTE ON Command

COMMAND	"C0B" [CR]	
Detail	Sound Mute ON This command operates the same function as "MUTE" button of the remote control, but it works only for Mute ON, not for Mute OFF.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.13 AUDIO MUTE OFF Command

COMMAND	"C0C" [CR]	
Detail	Sound Mute OFF This command operates the same function as "MUTE" button of the remote control, but it works only for Mute OFF, not for Mute ON.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.14 VIDEO MUTE ON Command

COMMAND	"C0D" [CR]	
Detail	Video Mute ON This command operates the same function as "NO SHOW" button of the remote control, but it works only for No Show ON, not for No Show OFF.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.15 VIDEO MUTE OFF Command

COMMAND	"C0E" [CR]	
Detail	Video Mute OFF This command operates the same function as "NO SHOW" button of remote control, but it works only for No Show OFF, not for No Show ON.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.16 SCREEN NORMAL SIZE Command

COMMAND	"C0F" [CR]	
Detail	Set screen size to Normal (4:3)	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.17   SCREEN WIDE SIZE Command

COMMAND	"C10" [CR]	
Detail	Set screen size to Wide (16:9)	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.18   MENU ON Command

COMMAND	"C1C" [CR]	
Detail	Display Menu of On Screen Display	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.19   MENU OFF Command

COMMAND	"C1D" [CR]	
Detail	Clear Menu of On Screen Display	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.20   DISPLAY CLEAR Command

COMMAND	"C1E" [CR]	
Detail	Clear On Screen Display Clear On screen Display unconditionally.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.21   IMAGE Command

COMMAND	"C27" [CR]	
Detail	Switch Image setting This command operates the same function as "IMAGE" button of the projector and remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.22   D.ZOOM + Command

COMMAND	"C30" [CR]	
Detail	Enter Digital Zoom mode and expand image size This command operates the same function as "D.ZOOM ▲" button of the remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.23 D.ZOOM – Command

COMMAND	"C31" [CR]
Detail	Enter Digital Zoom mode and compress image size This command operates the same function as "D.ZOOM ▼" button of the remote control.
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.24 POINTER RIGHT Command

COMMAND	"C3A" [CR]
Detail	Move Pointer of On Screen Display Menu to the right This command operates the same function as "►" button of the projector and remote control.
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.25 POINTER LEFT Command

COMMAND	"C3B" [CR]
Detail	Move Pointer of On Screen Display Menu to the left This command operates the same function as "◄" button of the projector and remote control.
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.26 POINTER UP Command

COMMAND	"C3C" [CR]
Detail	Move Up Pointer of On Screen Display Menu This command operates the same function as "▲" button of the projector and remote control.
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.27 POINTER DOWN Command

COMMAND	"C3D" [CR]
Detail	Move Down Pointer of On Screen Display Menu This command operates the same function as "▼" button of the projector and remote control.
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.28 ENTER Command

COMMAND	"C3F" [CR]
Detail	This command operates the same function as "SELECT" button of the projector and remote control.
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.29   FREEZE ON Command

COMMAND	"C43" [CR]	
Detail	Freeze picture on-screen This command operates the same function as "FREEZE" button of the remote control, but it works only for Freeze ON, not for Freeze OFF.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.30   FREEZE OFF Command

COMMAND	"C44" [CR]	
Detail	Cancel Freeze function This command operates the same function as "FREEZE" button of the remote control, but it works only for Freeze Off, not for Freeze ON.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.31   ZOOM + Command

COMMAND	"C47" [CR]	
Detail	Make screen image larger This command operates the same function as "ZOOM ▲" button of the projector and remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.32   ZOOM – COMMAND

COMMAND	"C46" [CR]	
Detail	Make screen image smaller This command operates the same function as "ZOOM ▼" button of the projector and remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.33   FOCUS + Command

COMMAND	"C4B" [CR]	
Detail	Adjust focus of screen image (sharp and clear) with a long-focal-length (∞) (The lens direction is backward) This command operates the same function as "FOCUS ▲" button of the projector and remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.34   FOCUS – Command

COMMAND	"C4A" [CR]	
Detail	Adjust focus of screen image (sharp and clear) with a short-focal-length (The lens direction is forward) This command operates the same function as "FOCUS ▼" button of the projector and remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.35   LENS SHIFT UP Command

COMMAND	"C5D" [CR]	
Detail	Move screen image up This command operates the same function as "LENS SHIFT" + "▲" button of the projector and "LENS ▲" button of the remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.36   LENS SHIFT DOWN Command

COMMAND	"C5E" [CR]	
Detail	Move screen image down This command operates the same function as "LENS SHIFT" + "▼" button of the projector and "LENS ▼" button of the remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.37   FULL LAMP MODE SET Command

COMMAND	"C70" [CR]	
Detail	Set all 2 lamps to ON When switching to 1 lamp from 2 lamps then to 2 lamps again, or switching to 2 lamps from 1 lamp then to 1 lamp again, it is unable to switch for 90 seconds for the light preparation.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.38   HALF LAMP MODE 1 SET Command

COMMAND	"C71" [CR]	
Detail	Set to HALF LAMP Mode (1 lamp mode) The lamp No.1 is set. Usually when setting HALF LAMP Mode, the projector automatically chooses lamps, but with this command, Lamp No.1 is first chosen. When switching to 1 lamp from 2 lamps then to 2 lamps again, or switching to 2 lamps from 1 lamp then to 1 lamp again, it is unable to switch for 90 seconds for the light preparation.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.39 HALF LAMP MODE 2 SET Command

COMMAND	"C72" [CR]	
Detail	Set to HALF LAMP Mode (1 lamp mode) The lamp is No.2. Usually, when setting HALF LAMP Mode, the projector automatically chooses lamps, but with this command, Lamp No.2 is first chosen. When switching to 1 lamp from 2 lamps then to 2 lamps again, or switching to 2 lamps from 1 lamp then to 1 lamp again, it is unable to switch for 90 seconds for the light preparation.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.40 AUTO PC ADJ. Command

COMMAND	"C89" [CR]	
Detail	Execute Auto PC Adj. function This command operates the same function as "AUTO PC ADJ." button of the projector and remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.41 PRESENTATION TIMER Command

COMMAND	"C8A" [CR]	
Detail	Start timer to count time for presentation This command operates the same function as "P-TIMER" button of the remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.42 KEYSTONE + Command

COMMAND	"C8E" [CR]	
Detail	Correct keystone distortion by reducing upper part of image This command operates the same function as "KEYSTONE" and "▲" button of the remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.43 KEYSTONE – Command

COMMAND	"C8F" [CR]	
Detail	Correct keystone distortion by reducing lower part of image. This command operates the same function as "KEYSTONE" and "▼" button of the remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

7.　Status Read Command

7.1　Format

7.1.1　PC issues a command in format as below:

"CR" Command **[CR]**

Command: one character (Refer to Status Read Command Table)

7.1.2　When a projector receives the appropriate command, it returns a character line as the required data.

Required Data **[CR]**

Required Data: A character line (Refer to Status Read Command Table)

7.1.3　When the received data cannot be decoded, the projector returns "**?" [CR]**.

7.2　Transfer Example

Get the selected input for the projector by Basic Commands.

Command (issue the current input read command)

| PC → Projector | "C" | "R" | "1" | CR | | | |

| Projector → PC | | | | | | "1" | CR |

Response

(A few ms - 1s)

(Showing Input 1 is selected)

7.3 Status Read Command

COMMAND	"CR0" [CR]	
Detail	Get the projector status	
Response	Acceptable	"%1" [CR]
	%1	"00" = Power ON "80" = Standby "40" = Processing Countdown "20" = Processing Cooling Down "10" = Power Failure "28" = Processing Cooling Down due to Abnormal Temperature "02" = Invalid RS-232C Command "24" = Processing Power Management / Cooling Down "04" = Power Management "21" = Processing Cooling Down after Off due to lamp failure "81" = Standby after Cooling Down due to lamp failure
	Unacceptable	"?" [CR]

【Details for Response】

7.3.1 "00" [CR]

Status: Power ON

Normal image is on screen.

7.3.2 "80" [CR]

Status: Standby

When the status is Standby, Status Read Commands are always acceptable, but Functional Execution Commands are not acceptable except POWER ON Command.

7.3.3 "40" [CR]

Status: Processing Countdown

When "Display" in Setting menu is ON and Power ON is executed, it starts processing Countdown.

When "Display" in Setting menu is OFF, processing Countdown is canceled and the status moves to Power ON.

7.3.4 "20" [CR]

Status: Processing Cooling Down

When the status is Power ON, and POWER OFF Command ("C01" [CR]) is executed, it moves to Cooling Down status.

This status automatically moves to Standby when the lamp is turned off and the fan spin finishes after about 90 seconds.

This function is used to cool down lamps and other optical parts, and is quite important for projector's liability.

During this time, Functional Execution Commands are invalid.

7.3.5 "10" [CR]

Status: Power Failure

When the power supply voltage inside the projector reaches abnormal status, the status moves to Power OFF automatically.

The projector returns "10" [CR], which shows it moves to Power OFF status due to power failure.

Fan also stops unlike Cooling Down status.

7.3.6   "28" [CR]

Status: Processing Cooling Down due to Abnormal Temperature

When the internal temperature increases abnormally, it automatically starts Cooling Down. Response for this status is "28" [CR].

Even if the temperature decreases during this process, Cooling Down is executed and it moves to Standby mode. During this time, the response "28" stays.

7.3.7   "02" [CR]

Status: RS-232C Commands are invalid

When receiving this response, re-send Status Read Command.
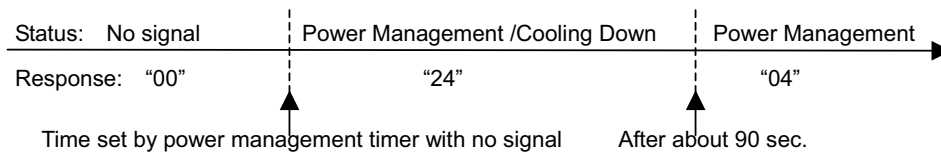
7.3.8   "24" [CR]

Status: Processing Power Management /Cooling Down

Power management function in the Setting menu works and the status goes to Power Management /Cooling Down.

During this time, any Functional Execution Commands are invalid.

The status moves to Power Management at set hours after the operation of Power Management / Cooling Down.

Status: No signal	Power Management /Cooling Down	Power Management
Response: "00"	"24"	"04"

Time set by power management timer with no signal   After about 90 sec.

7.3.9   "04" [CR]

Status: Power Management

This shows it moves to Power Management status by Power management function in the Setting menu.

7.3.10   "21" [CR]

Status: Processing Cooling Down after Off due to lamp failure

When a projector is turned off because of lamp failure, it automatically starts Cooling Down. It returns "21" [CR].

The response "21" [CR] stays during Cooling Down.

7.3.11   "81" [CR]

Status: Standby after Cooling Down due to lamp failure

The projector status is restored from lamp failure.

When the status moves to Standby after Cooling Down due to lamp failure, it returns "81" [CR]. This shows the status turns to Standby because of lamp failure. This status stays until next operation is done.

When Power ON is executed, the information of lamp failure is canceled and normal operation is executed.

7.4   Input Mode Read Command

COMMAND	"CR1" [CR]	
Detail	Get selected Input	
Response	Acceptable	Acceptable
	%1	"1" = Input 1 is selected "2" = Input 2 is selected "3" = Input 3 is selected
	Unacceptable	"?" [CR]

7.5   Lamp Time Read Command

COMMAND	"CR3" [CR]	
Detail	Get total lamp running hours	
Response	Acceptable	"%1__%2" [CR]
	%1, %2	There is lamp 1 data, once space, and lamp 2 data. %1 = lamp No.1 %2 = lamp No.2 Ex: "0410__0410" [CR] ▪▪▪▪ → Lamp No.1 = 410 Hours Lamp No.2 = 410 Hours
	Unacceptable	"?" [CR]

7.6   Setting Read Command

COMMAND	"CR4" [CR]	
Detail	Get screen setting status such as Ceiling/Rear	
Response	Acceptable	"%1" [CR]

	%1	"11" [CR] = Normal Screen Setting
		"10" [CR] = Picture is top/bottom reversed
		             (Status: Rear & Ceiling ON)
		"01" [CR] = Picture is left/right reversed (Status: Rear ON)
		"00" [CR] = Picture is top/bottom and left/right reversed
		             (Status: Ceiling ON)

	Unacceptable	"?" [CR]

7.7   Temp. Read Command

COMMAND	"CR6" [CR]
Detail	Get the temperature information inside the projector With some temperature sensors installed in the projector, it is possible to get all temperatures at once.
Response	

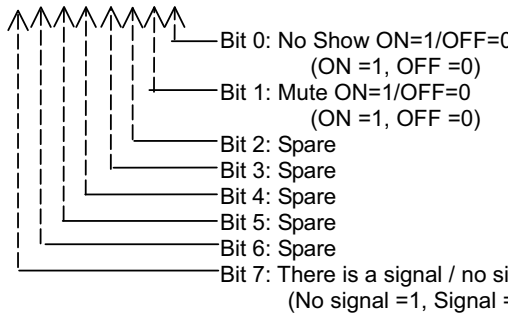|	Acceptable	"%1__%2" [CR]
Response	%1 %2	%1 = Sensor 1 temperature %2 = Sensor 2 temperature Temperature data is shown as "00.0". When the temperature sinks to -, the first character is "-" like "-05.5" [CR]. When no temperature data returns due to hardware problems, the first character is "E" like" E00.0" [CR]. With some temperature sensors installed, the projector sends commands continuously. "□31.5□□35.2" [CR] There is the sensor 1 data, one space, and the sensor 2 data.
	Unacceptable	"?" [CR]

7.8   Lamp Mode Read Command

COMMAND	"CR7" [CR]
Detail	Get Lamp Mode for the multiple-lamp projector It is possible to get Lamp Mode for the multiple-lamp projector. When lamp failure occurs, it can get that information too.

	Acceptable	"%1" [CR]

Response	%1	Ex: "0F"[CR]
		The first digit indicates Lamp Mode.
		   0 = 2 lamps Mode
		   1 = 1 lamp Mode (Lamp No.1)
		   2 = 1 lamp Mode (Lamp No.2)
		
		The second digit indicates if the lamp is ON or OFF.
		Data is shown as "0-9" and "A-F" which is regarded as 4 bit data.
		Assign each bit for each lamp data.
		Ex: 0 = ALL is OFF
		      1 = No.1 is ON, the other is OFF
		      2 = No.2 is ON, the other is OFF
		      3 = ALL is ON

	Unacceptable	"?" [CR]

7.9   PC Type Read Command

COMMAND	"CR9" [CR]
Detail	Get the current displayed PC Type

	Acceptable	"%1" [CR]
Response	%1	"Stand_by" -------------------------------------- Standby "AV_Mode" ------------------------------------- AV Mode Current Table such as "UXGA1" ---------- PC Mode "Mode1~5" --------------------------------- Mode1~5 "Go_PC_adj." ------------------------------- Auto "No_signal" ---------------------------------- No signal
	Unacceptable	"?" [CR]

7.10 Status 2 Read Command

COMMAND	"CRA" [CR]	
Detail	Get the operating status of Video Mute & Volume Mute	
Response	Acceptable	"%1" [CR]

	%1	Return hexadecimal digit of 1 byte as a two-figure character line. Hexadecimal digit is regarded as eight bits and each bit is defined as below:
		
		Bit 0: No Show ON=1/OFF=0 (ON =1, OFF =0)
		Bit 1: Mute ON=1/OFF=0 (ON =1, OFF =0)
		Bit 2: Spare
		Bit 3: Spare
		Bit 4: Spare
		Bit 5: Spare
		Bit 6: Spare
		Bit 7: There is a signal / no signal (No signal =1, Signal =0)
		
		Example:
		  1) When No Show is ON: ++++ +++1
		     Sound Mute ON: ++++ ++11 → "03"
		     Sound Mute OFF: ++++ ++01 → "01"
		     There is no signal: 1+++ +++1 → "81"
		  2) When No Show is OFF: ++++ +++0
		     Sound Mute ON: ++++ ++10 → "02"
		     Sound Mute OFF: ++++ ++00 → "00"
		     There is no signal: 1+++ +++0 → "80"
		
		When it is in Standby mode or processing Cooling Down, it returns "FF" [CR] [LF] in spite of the conditions above.

	Unacceptable	"?" [CR]

8. Command with Address Specification

8.1 Overview

8.1.1 Commands with address are used to remote control multiple projectors through RS-232C by one computer.

8.1.2 The command with address is defined as one command / one line that starts with "A" and ends with carriage return (0x0D).

8.1.3 When a projector receives carriage return (0x0D), it starts decoding.

8.1.4 This command is represented as Basic Command or Expand Command with address such as "A001". (The commands are the same when controlling one projector by one computer.)

> (Ex) Functional Execution Command
>
> > "A001C05" [CR]
>
> (Ex) Status Read Command
>
> > "A001CR0" [CR]

8.1.5 Projectors have the function to set up its address in Service Mode.

> Initial setting is "No. 001"
>
> Possible range is "001" to "999"

8.1.6 It clears the received buffer in this case as below:

- When receiving LF (0x0A) or EOF (0x1A).

- When it takes more than one second to receive one command.

  (When it takes more than 1 second to receive carriage return since the projector has received the first data.)

8.1.7 Wait the interval up to 60 ms for the response.

8.2   Functional Execution Command with address

8.2.1   Format

1) PC issues a command in format as below:

"A" Address "C" Command [CR]

or

"C" Address "CF□" Command "□" Parameter [CR]

Address: 3-digit number ("001"-"999")

Commands with "FFF" as the address are available for all projectors.

Command: Character line (Refer to Basic Commands or Expand Commands)

2) The only projector with the appropriate address decodes the received command, and when it is ready to receive next commands, it returns the response.

[ACK] [CR]: When receiving Functional Execution Command (0x06, 0x0D)

"?" [CR]: When the received data cannot be decoded

However, when address is "FFF", it executes the function but does not return the response.

8.2.2   When the command pipelining is needed

When it needs the command pipelining, the operation is the same as the remote control.

1) System: PC issues commands every 100ms

2) When receiving the appropriate command, the projector executes it continuously for 120ms.

3) When receiving the same command within 120ms, the projector executes it continuously for another 120ms from the moment.

4) When there is no command after 120ms, the execution of pipelining is stopped.

5) When receiving other incoming commands in 120ms, the execution of pipelining is stopped.

8.3   Status Read Command with Address

8.3.1   Format

1) PC issues a command in format as below:

"A" ‖Address‖ "CR" ‖Command‖ [CR]

or

"A" ‖Address‖ "CR□" ‖Command‖ [CR]

Address: 3-digit number ("001"-"999")

Command: Character line (Refer to Basic and Expand Serial Commands)

2) When the only projector with the appropriate address decodes the received command, and returns the character line as the required data.

‖Required Data‖ [CR]

Required Data: Character Line (Refer to Basic Status Read Command Table)

3) When the received data cannot to be decoded, it returns "?" [CR].