

BASIC SERIAL COMMAND SPECIFICATIONS

PDG-DXL100

Ver. 1.01

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DS Company
Projector Division

- CONTENTS -

1	Overview	4
2	Serial Interface Specification.....	4
2.1	Transfer Specification	4
2.2	Connection	4
3	Notes for Communication	5
4	Functional Execution Command Table.....	6
5	Status Read Command Table.....	6
6	Functional Execution Command	7
6.1	Format	7
6.2	Functions which need command pipelining.....	7
6.3	Example Transferred	7
6.4	Operation Requirements.....	8
6.5	POWER ON Command	9
6.6	POWER OFF Command (Immediate POWER OFF).....	9
6.7	HDMI Command	9
6.8	Computer 1 Command	9
6.9	Computer 2 Command	9
6.10	Volume + Command	9
6.11	Volume - Command	10
6.12	Sound Mute ON Command	10
6.13	Sound Mute OFF Command	10
6.14	Video Mute ON Command.....	10
6.15	Video Mute OFF Command	11
6.16	Aspect Ratio 4:3 Command	11
6.17	Aspect Ratio 16:9 Command	11
6.18	Image mode Presentation Command	11
6.19	Image mode Movie Command	11
6.20	Image mode sRGB Command	12
6.21	Image mode Bright Command	12
6.22	Image mode User Command	12
6.23	Menu On Command	12
6.24	Menu Off Command.....	12
6.25	YPbPr 2 Command	12
6.26	Scart Command	13
6.27	IMAGE (Toggle) Command.....	13
6.28	D.zoom + Command	13
6.29	D.zoom – Command	13
6.30	Video Command.....	13
6.31	S-Video Command	13

6.32	YPbPr 1 Command	14
6.33	POINTER RIGHT Command	14
6.34	POINTER LEFT Command	14
6.35	POINTER UP Command	14
6.36	POINTER DOWN Command	14
6.37	ENTER Command	14
6.38	FREEZE ON Command	15
6.39	FREEZE OFF Command	15
6.40	AUTO ADJ. Command	15
6.41	KEYSTONE + Command	15
6.42	KEYSTONE – Command	15
7	Status Read Command	16
7.1	Format	16
7.2	Transfer Example	16
7.3	OSD	16
7.4	Status Read Command	17
7.5	Input Mode Read Command	18
7.6	Lamp Time Read Command	18
7.7	Setting Read Command	18
7.8	Temp Read Command	19
7.9	Lamp Mode Read Command	19
8	Modification	19

1 Overview

- 1.1. This specification defines projector control commands for the PDG-DXL100 series.
- 1.2. The projector control commands are designed to remote-control a projector through RS-232C and LAN from a computer.
- 1.3. Browser menus and commands for manufacture setting up are shown with red fonts /shaded texts.

Those menus and commands have to be embedded to the soft development.

(The items are not open to the public including sales companies.)

2 Serial Interface Specification

2.1 Transfer Specification

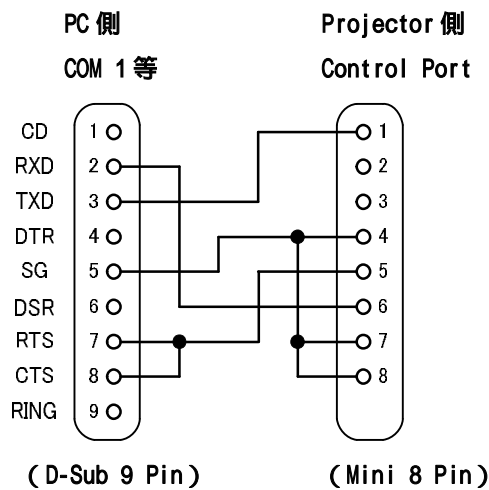
Items	Specification
Synchronous system	Asynchronous
Transmission Speed	9600/19200
Data Length	8 bits
Parity	None
Stop Bit	1
Flow Control	None

2.1.1. Transmission speed: The initial setting value is 9600.

2.1.2. Transmission speed can be changed in service mode.

2.2 Connection

Dedicated serial cable that meets to following specifications must be used for the connection to a computer and the projector.



Connect COM port of the computer to SERIAL PORT IN of the projector.

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

3 Notes for Communication

3.1. The communication speed can be changed in menu. It starts to decode when the projector receives the carriage return (0x0D).

3.2. There are two types of command; the one is the Functional Execution Commands that execute almost the same function as the keys on the projector body, and the another one is the Status Read Commands that get basic status of the projector.

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

Example of the 0.Status Read Command: "CR0" [CR]

3.3. It clears the information of buffer in the following cases.

3.3.1. - When the projector receives LF (0x0A) or EOF (0x1A).

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

(Until receiving the carriage return after the reception of the first data.)

3.4. Allow interval time as below after the reception of response, pipelining the control commands.

3.4.1. [VOLUME +/-] [ZOOM UP/DOWN] [FOCUS UP/DOWN]

[LENS SHIF UP/DOWN/LEFT/RIGHT] commands...100ms

3.4.2. The other commands...500ms

3.5. Allow at least 500ms of interval time after the response, pipelining the status commands.

3.6. Do not issue any command before receiving the response except the case that there is no response for 5 seconds.

3.7. It takes about 7 seconds for internal initialization after plugging in AC. During this time, it cannot process command. Do not issue any commands.

3.8. When the projector receives the commands for internal initialization or lighting the lamps in 7seconds after starting POWER ON in the status of STANDBY, it does not carry out any command except the Status Read commands, although it returns "Acceptable" response. The Status Read commands are carried out after 500ms from when the "Acceptable" response is returned.

3.9. About the action during Count Down and Cooling Down operation:

When the projector receives commands in the period of the Count Down operation after Power ON or Cooling Down operation after Power OFF, it does not carry out any command but the Status Read commands although it returns "Acceptable" response.

3.10. About the action during switching inputs:

It takes 5 seconds to switch inputs after receiving the command. During the period, the projector does not carry out any command except Status Read commands although it returns "Acceptable" response. It carries out the Status Read commands in 500ms after "Acceptable" response is returns, which is for receiving the commands to switch inputs.

3.11. The text length of the returned value for the Status Read command in successful operation depends on the command.

3.12. The characters for commands must be in upper case (A - Z). Lower-case characters are not available.

4 Functional Execution Command Table

Command	Item	Command	Item
C00	POWER ON	C24	YPbPr 2
C01	POWER OFF (Immediate POWER OFF)	C25	---
C04	HDMI	C26	Scart
C05	Computer 1	C27	IMAGE(Toggle)
C06	Computer 2	C30	D.zoom +
C09	Volume +	C31	D.zoom -
C0A	Volume -	C33	Video
C0B	SOUND MUTE ON	C34	S-Video
C0C	SOUND MUTE OFF	C35	YPbPr 1
C0D	VIDEO MUTE ON	C3A	POINTER RIGHT
C0E	VIDEO MUTE OFF	C3B	POINTER LEFT
C0F	Aspect 4:3	C3C	POINITER UP
C10	Aspect 16:9	C3D	POINITER DOWN
C11	Image mode Presentation	C3F	ENTER
C12	Image mode Movie	C43	FREEZE ON
C13	Image mode sRGB	C44	FREEZE OFF
C14	Image mode Bright	C89	AUTO ADJ.
C15	Image mode User	C8E	KEYSTONE +
C1C	MENU ON	C8F	KEYSTONE -
C1D	MENU OFF	C92	---

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

6 Functional Execution Command

6.1 Format

- PC issues a command in the format below:

"C" Command [CR]

Command: 2 characters (Refer to the Functional Execution Command Table.)

- The projector decodes the received data and returns the result after getting ready to receive another command.

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

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

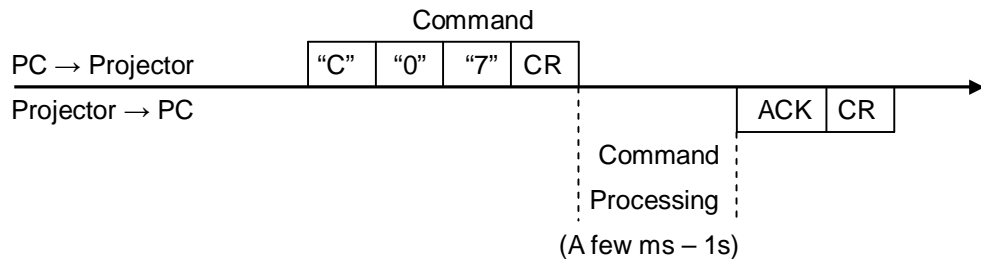
6.2 Functions which need command pipelining

Functions which need command pipelining follow the same rule as the one for the Remote Control Reception, as indicated below;

- Sender system issues any command every 100ms.
- Receiving the applicable command, the function is executed consecutively for 120ms from the moment.
- Receiving the same command in succession within 120ms, the function is executed consecutively for another 120ms from the moment.
- When there is no incoming command within 120ms, the consecutive execution is stopped.
- When the projector receives another command within 120ms, the consecutive execution is stopped.

6.3 Example Transferred

The projector changes the input to INPUT3 with Basic Command.



6.4 Operation Requirements

The Functional Execution Commands are limited, when the projector is in the status below.

(The Status Read Commands are available in following status.)

Projector Status	Available Functional Execution Commands
In Standby mode	C00: POWER ON
Cooling Down in process	NONE (No Execution)
Cooling Down in process due to abnormal temperature	NONE (No Execution)
In Abnormal Temperature	NONE (No Execution)

Note) In the above status, the projector returns **[ACK] [CR]** even if it projector receives other commands.

6.5 POWER ON Command

COMMAND	"C00" [CR]	
Detail	Set Power On. (Same as the "Power On" key on the projector body / remote controller.) No operation is started when the projector has been turned on already. "Count Down" is terminated by receiving this command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.6 POWER OFF Command (Immediate POWER OFF)

COMMAND	"C01" [CR]	
Detail	Turn off the projector and set into standby. Although "Power OFF" display appears when Power is turned off with ON-OFF button of the projector and remote control, this command executes Power OFF immediately without displaying OSD.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.7 HDMI Command

COMMAND	"C04" [CR]	
Detail	Select "HDMI". The projector shows the OSD "HDMI" at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.8 Computer 1 Command

COMMAND	"C05" [CR]	
Detail	Select "Computer1". The projector shows the OSD "Computer1" at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.9 Computer 2 Command

COMMAND	"C06" [CR]	
Detail	Select "Computer2". The projector shows the OSD "Computer2" at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.10 Volume + Command

COMMAND	"C09" [CR]	
Detail	This command turns up the Volume. This command works the same as "VOLUME +" button of the projector and remote control. The projector shows the OSD "Volume" at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.11 Volume - Command

COMMAND	"C0A" [CR]	
Detail	This command turns down the Volume. This command works the same as "VOLUME -" button of the projector and remote control. The projector shows the OSD "Volume" at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.12 Sound Mute ON Command

COMMAND	"C0B" [CR]	
Detail	This command sets "Sound Mute" ON. It mutes the sound but does not turn off the projecting image, unlike the operation of the key "AV-Mute" on the remote control. It works immediately after the command is transmitted. The projector shows the OSD "Mute" at receiving the command. This command works only for "Sound-Mute ON" and does not operate "Sound-Mute OFF" with command pipelining.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.13 Sound Mute OFF Command

COMMAND	"C0C" [CR]	
Detail	This command sets "Sound Mute" OFF. It releases the "Sound Mute", but does not release "Video Mute", unlike the operation of the key "AV-Mute" on the remote control. It works immediately after the command is transmitted. The projector shows the OSD "Mute" at receiving the command. This command works only for "Sound-Mute OFF" and does not operate "Sound-Mute ON" with command pipelining.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.14 Video Mute ON Command

COMMAND	"C0D" [CR]	
Detail	This command sets AV MUTE ON. It turns off the projecting image but does not mute the sound. It works immediately after the command is transmitted. The projector shows the OSD "AV Mute" at receiving the command. This command works only for "AV-Mute ON" and does not operate "AV-Mute OFF" with command pipelining.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.15 Video Mute OFF Command

COMMAND	"C0E" [CR]	
Detail	This command sets AV Mute OFF. It releases the "Video Mute", but does not release "Sound Mute". It works immediately after the command is transmitted. The projector shows the OSD "AV-Mute" at receiving command. This command works only for "AV-Mute OFF" and does not operate "AV-Mute ON" with command pipelining.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.16 Aspect Ratio 4:3 Command

COMMAND	"C0F" [CR]	
Detail	Set screen size to Normal (4:3). This command changes its aspect immediately into Normal. The projector shows the OSD "4:3" on the screen at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.17 Aspect Ratio 16:9 Command

COMMAND	"C10" [CR]	
Detail	Set screen size to Wide. This command changes its aspect immediately into Wide. The projector shows the OSD "16:9" on the screen at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.18 Image mode Presentation Command

COMMAND	"C11" [CR]	
Detail	Set Image mode to Presentation. This command changes Image mode immediately into Presentation The projector shows the OSD "Presentation" on the screen at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.19 Image mode Movie Command

COMMAND	"C12" [CR]	
Detail	Set Image mode to Movie. This command changes Image mode immediately into Movie. The projector shows the OSD "Movie" on the screen at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.20 Image mode sRGB Command

COMMAND	"C13" [CR]	
Detail	Set Image mode to sRGB. This command changes Image mode immediately into sRGB. The projector shows the OSD "sRGB" on the screen at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.21 Image mode Bright Command

COMMAND	"C14" [CR]	
Detail	Set Image mode to Bright. This command changes Image mode immediately into Bright. The projector shows the OSD "Bright" on the screen at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.22 Image mode User Command

COMMAND	"C15" [CR]	
Detail	Set Image mode to User. This command changes Image mode immediately into User. The projector shows the OSD "User" on the screen at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.23 Menu On Command

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

6.24 Menu Off Command

COMMAND	"C1D" [CR]	
Detail	Clear Menu of ALL On Screen Display. This command clears ALL On Screen Display in any circumstances.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.25 YPbPr 2 Command

COMMAND	"C24" [CR]	
Detail	Select "YPbPr 2" The projector shows the OSD "YPbPr 2" at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.26 Scart Command

COMMAND	"C26" [CR]	
Detail	Select "Scart" The projector shows the OSD "Scart" at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.27 IMAGE (Toggle) Command

COMMAND	"C27" [CR]	
Detail	Switch Images setting along the order below. Presentation → Bright → Movie → RGB User The behavior is the same as the "IMAGE" key on the remote control. The projector shows Image OSD at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.28 D.zoom + Command

COMMAND	"C30" [CR]	
Detail	Enter Digital Zoom mode and expand image size. The behavior is the same as the key "D.zoom +" on the remote control. The projector shows the OSD "D.zoom" at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.29 D.zoom – Command

COMMAND	"C31" [CR]	
Detail	Enter Digital Zoom mode and compress image size. The behavior is the same as the key "D.zoom -" on the remote control. The projector shows the OSD "D.zoom" at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.30 Video Command

COMMAND	"C33" [CR]	
Detail	Select Video. The projector shows the OSD "Video" at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.31 S-Video Command

COMMAND	"C34" [CR]	
Detail	Select S-Video. The projector shows the OSD "S-Video" at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.32 YPbPr 1 Command

COMMAND	"C35" [CR]	
Detail	Select "YPbPr 1" The projector shows the OSD "YPbPr 1" at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.33 POINTER RIGHT Command

COMMAND	"C3A" [CR]	
Detail	Move Pointer of OSD Menu to right. The behavior is the same as "▶" button of the projector and the remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.34 POINTER LEFT Command

COMMAND	"C3B" [CR]	
Detail	Move Pointer of OSD Menu to left. The behavior is the same as "◀" button of the projector and the remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.35 POINTER UP Command

COMMAND	"C3C" [CR]	
Detail	Move up Pointer of OSD Menu. The behavior is the same as "▲" button of the projector and remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.36 POINTER DOWN Command

COMMAND	"C3D" [CR]	
Detail	Move down Pointer of OSD Menu. The behavior is the same as the "▼"key on the projector and the remote control.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.37 ENTER Command

COMMAND	"C3F" [CR]	
Detail	The behavior is the same as the "SELECT" key on the projector and the remote control. The projector does not show any OSD when it accepts this command and there is no OSD shown.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.38 FREEZE ON Command

COMMAND	"C43" [CR]	
Detail	Freeze the projecting image. The behavior is the same as "FREEZE" button of the remote control except the command only freezes the image and does not cancel it. The projector shows the OSD "Freeze" at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.39 FREEZE OFF Command

COMMAND	"C44" [CR]	
Detail	Cancel Freeze function The behavior is the same as "FREEZE" button of the remote control except the command only cancels the freeze and does not freezes the image. The projector shows the OSD "Freeze" at receiving command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.40 AUTO ADJ. Command

COMMAND	"C89" [CR]	
Detail	AUTO ADJ. Command The behavior is the same as the key "AUTO PC" button of the remote control. The projector does not show any OSD at receiving the command.	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.41 KEYSTONE + Command

COMMAND	"C8E" [CR]	
Detail	Correct keystone distortion by resizing upper part of image. The behavior is the same as the "Keystone +" button of the remote control A scale OSD is shown by adjusting Keystone and the scale reflects adjusting value	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

6.42 KEYSTONE - Command

COMMAND	"C8F" [CR]	
Detail	Correct keystone distortion by resizing lower part of image. The behavior is the same as the "Keystone -" button of the remote control A scale OSD is shown by adjusting Keystone and the scale reflects adjusting value	
Response	Acceptable	[ACK] [CR]
	Unacceptable	"?" [CR]

7 Status Read Command

7.1 Format

- 1) PC issues a command in the format below:

"CR" Command [CR]

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

- 2) When a projector receives the appropriate command, it returns the required information as a data string.

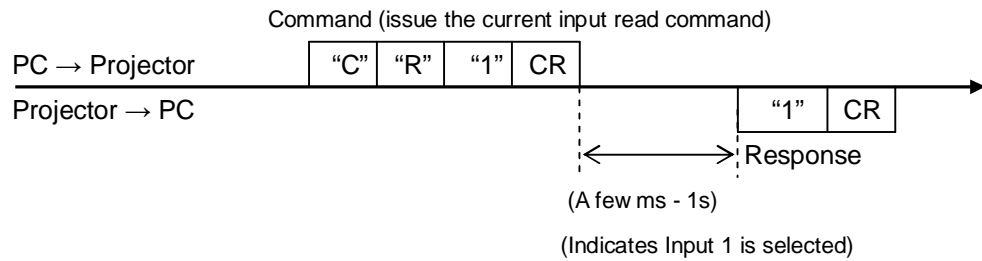
Required Data [CR]

Required Data: String (Refer to Status Read Command Table)

- 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.



7.3 OSD

The projector does not show any OSD when it receives a status read command.

7.4 Status Read Command

COMMAND	"CR0" [CR]	
Detail	Get the projector status	
Response	Acceptable	"%1" [CR]
	%1	"00" = Power ON "80" = Standby "20" = Cooling Down in process "10" = Power Failure "28" = Cooling Down due to Abnormal Temperature in process "21" = Cooling Down in process after Off due to lamp failure
	Unacceptable	"?" [CR]

【 Details for Response 】

- **"00" [CR]**

Status: Power ON

Normal image is on screen.

- **"80" [CR]**

Status: Standby

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

- **"20" [CR]**

Status: Cooling Down in process

Execution of POWER OFF Command ("C01" [CR]) in power on status brings into Cooling Down status.

This status automatically moves to Standby when the lamp is turned off and the fan spin finishes after about 90 seconds (the time of spinning fan depends on models).

During this time, Functional Execution Commands are not accepted.

- **"10" [CR]**

Status: Power Failure

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

The projector returns "10" [CR], which indicates the status moves to Power OFF due to power failure. Fan also stops.

This status continues for the same period (90 seconds approx.) of the Cooling Down operation when Power OFF executed, and then moved to Standby.

- **"28" [CR]**

Status: Cooling Down due to Abnormal Temperature in process

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

Even if the temperature comes down during this process, the given Cooling Down process is executed and it moves to Standby mode.

- **“21” [CR]**

Status: Cooling Down in process after turned off due to lamp failure

When a projector is turned off because of lamp failure, it automatically starts Cooling Down operation, in which the projector returns “21” [CR].

7.5 Input Mode Read Command

COMMAND	“CR1” [CR]	
Detail	Get currently selected Input	
Response	Acceptable	“%1” [CR]
	%1	“1” = Selected. HDMI “2” = Selected. Computer 1 “3” = Selected. YPbPr 1 “4” = Selected. Scart “5” = Selected. Computer 2 “6” = Selected. YPbPr 2 “7” = Selected. Video “8” = Selected. S-video
	Unacceptable	“?” [CR]

7.6 Lamp Time Read Command

COMMAND	“CR3” [CR]	
Detail	Get total lamp running hours	
Response	Acceptable	“%1” [CR]
	%1, %2	Each lamp data follows in sequence with one space between each of them. %1 = lamp No.1 e.g.; “00410” [CR] **** → Lamp No.1 = 410 Hours
	Unacceptable	“?” [CR]

7.7 Setting Read Command

COMMAND	“CR4” [CR]	
Detail	Get screen setting status of Ceiling/Rear.	
Response	Acceptable	“%1” [CR]
	%1	“11” [CR] = Normal Screen Setting (Status: Desktop Front) “10” [CR] = Picture is top/bottom reversed (Status: Ceiling Rear) “01” [CR] = Picture is left/right reversed (Status: Desktop Rear) “00” [CR] = Picture is top/bottom and left/right reversed (Status: Ceiling Front)
	Unacceptable	“?” [CR]

7.8 Temp Read Command

COMMAND	"CR6" [CR]	
Detail	Get the temperature information inside projector With more than one temperature sensors installed in the projector, it is possible to get all temperatures at once.	
Response	Acceptable	"%1" [CR]
	%1 %2	%1 = temperature at Sensor 1 Temperature data is expressed as "00.0". When the temperature goes under 0, 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 more than one temperature sensors installed, the projector returns the values in series. "_31.5" [CR] Each sensor data follows in sequence with one space between each of them.
	Unacceptable	"?" [CR]

7.9 Lamp Mode Read Command

COMMAND	"CR7" [CR]	
Detail	Get lamp mode status. For 1 lamp projector, get if it is lighting or not.	
Response	Acceptable	"%1" [CR]
	%1	"00" [CR]=Light is out. "01" [CR]=Light is on.
	Unacceptable	"?" [CR]

8 Modification

Version	Date	Modification
1.01	2009.7.31	Delete below "81" = Standby after Cooling Down due to lamp failure