



DLP™ Projector
UD8900U/UD8850U

Controlling the projector via RS-232C connection

Contents

1. Introduction	2
1.1 Connection.....	2
1.2 Interface	3
1.2.1 Pin assignment of SERIAL terminal (D-SUB 9-pin).....	3
1.2.2 Communications format	3
2. Control command configuration	4
3. Control sequence	4
4. Execution procedure of RS-232C commands via LAN.....	7
5. Command list	8
5.1 General control commands.....	8
5.2 Reading commands.....	8
5.2.1 Status read commands.....	8
5.2.2 Read commands for items in INFORMATION menu.....	9
5.2.3 Read commands for other information.....	9
5.3 Remote control key commands.....	10
5.4 Direct commands.....	11
5.5 Function commands	12
5.6 Menu setting commands	12
5.6.1 IMAGE menu.....	12
5.6.2 INSTALLATION 1 menu.....	13
5.6.3 INSTALLATION 2 menu.....	13
5.6.4 MULTI-SCREEN menu.....	14
5.6.5 FEATURE menu.....	15
5.6.6 SIGNAL menu	16
5.6.7 NETWORK menu	16
5.7 Password lock commands.....	19

2. Control command configuration

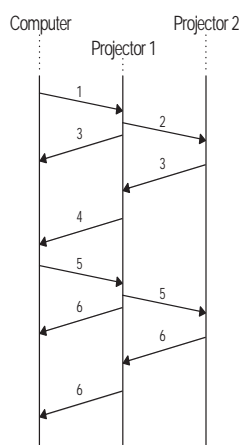
The command consists of the address code, ID code, function code, data code, ACK/NAK, and end code. The length of the command varies among the functions.

	Address code	ID code	Function code	Data code	ACK/NAK	End code
ASCII code	'30h' '30h'	'3Bh' ID '3Bh'	Function	Data	'3Ah' '4Eh'	'0Dh'
Character	00	:ID;	Function	Data	:N	␣

- [Address code] Fixed to 00. ('30h' '30h' in the ASCII code)
 ⌘%DPEF> \$PEFTQFDGZØHUIFQSPKFDUPSUPCFDPOUSPMMFEPS*%TQFDGZFWJIFSUIF130+803*%UP63) or GROUP ID (0A to 0Z). When the code is not specified, all the connected projectors are controlled.)
- [Function code] Code unique to each control operation.
- [Data code] Data (value) unique to each control operation (Not always indicated.)
- [ACK/NAK] Code indicating the NAK return as described below
 Fixed to :N ('3Ah' '4Eh' in the ASCII code. Not added to ACK.)
- [End code] Fixed to ␣ ('0Dh' in the ASCII code)

3. Control sequence

[Example] When the personal computer and two projectors are daisy-chained:



	Sequence	Note
1	Send the command from the personal computer to the projector.	
2	The command input from the SERIAL IN terminal is sent to the projector connected to the SERIAL OUT terminal.	
3	After receiving the end code, the projector sends the return command to the device connected to the SERIAL IN terminal.	If the projector does not receive commands normally, that is, if the projector is not connected physically or unable to receive commands, it does not send out a return command. In addition, when the ID code of the command is not corresponded to that of the projector, the projector doesn't send a return command. The projector sends out a return command within one second at the latest. When the received command cannot be executed, NAK is returned (as described below).
4	The return command input from the SERIAL OUT terminal is sent to the device connected to the SERIAL IN terminal.	The personal computer receives the commands as many as the number of the projectors that send the returned commands. However, the receiving order of the returned commands may vary depending on the projector status.
5	The personal computer checks the command and confirms if the sent command has been received or not.	
6	Use the check command to see if the projector has executed the command.	This projector sends various codes other than the return code. When having a control sequence by RS-232C, reject other codes from the personal computer.

t /",SFUVSO

In the following cases, the projector returns the command with ":N" added.

- (1) Though the command sent from the computer is received by the projector successfully, it cannot be executed because the projector is in the operation prohibition state.
- (2) The data length of the sent command is incorrect or the command is invalid.
- (3) The ID assigned to the command is out of the valid range (other than 00 to 63 or 0A to 0Z).
- (4) The signal length of the command is 48 bytes or longer.

t 8IFOBPNBØEJTFØUPVUEVSØHUIFGPMMPXØHPQFSBUØPOTWNBZØPUCFFYFDVUFE

- (1) During signal switching
- (2) In the process of the auto position
- (3) After the power is turned on.

After the power is turned on, no command is received until the image is displayed. (Usually, it takes about 20 seconds. However, when the lamp illumination takes time, more time will be required accordingly.) In this case, the projector returns the received command with NAK added.

t 5IFSUFVSØDPNNBØEJTFØUPVUXWIOØTFDPOEBUUIFMBUFTU

- **When sending commands successively, wait to receive the return command of the current command before sending a next command.**

- t 5IFQSPKFDUPSBNBZOPUSFDWFBDPNNBOEXIFOUIFTQMBTITDSFFOJCFØHEJQMBZFENNFEUFMFBZBGUFS turning on the power. Use command "00r10" to cancel the splash screen.
- t 8IMFVTØHUIF-"/UFSNØBMTUIF-"/GVODUØPOTUBLFQSFDFEFODF
- t PSUIF-"/UFSNØBMTUIFTBNFDPNNBOETBTUIPTFGPSDPOOFDUØHXWUIIF5\$1*1QPSUOVNCFBSBF available. Note, however, that the response becomes slightly slower than when using the RS-232C terminals. For the use of LAN terminals, refer to "4. Execution procedure of RS-232C commands via LAN".
- t 8IFOUIF/",JOUSFUVSOFEDIFDLUIF34\$DPNNBOETZTUFN\$0.."/%

[Example 1] Turning ON the power. (Values enclosed in quotation marks are ASCII codes.):

t 8IFO*%JOPUTQFDhFE

Command sent from the PC	Status code returned from the projector	Description
'30' '30' '21' '0D' 00! <input type="text"/>		Command for POWER ON (ID command is omitted.)
	'30' '30' '21' '0D' 00! <input type="text"/>	Command receipt confirmation (The statuses are echoed back as many as the number of the connected projectors.)

t 8IFO*%JTQFDhFEXIFOUIFDPNNBOEJTFOUUPUIFQSPKFDUPSXWUIIF*%PGiwPSi"--w

Command sent from the PC	Status code returned from the projector	Description
'30' '30' '3B' '30' '31' '3B' '21' '0D' 00;01;! <input type="text"/>		Command for POWER ON is sent to the projector with the ID of "01" or "ALL."
	'30' '30' '3B' '30' '31' '3B' '21' '0D' 00;01;! <input type="text"/>	The projector with the ID of "01" or "ALL" receives the command. (The status is echoed back from the projector with the ID of "01" or "ALL.")

[Example 2] Selecting VIDEO as the input signal during auto positioning (Values enclosed in quotation marks are ASCII codes.):

t 8IFO*%JOPUTQFDhFE

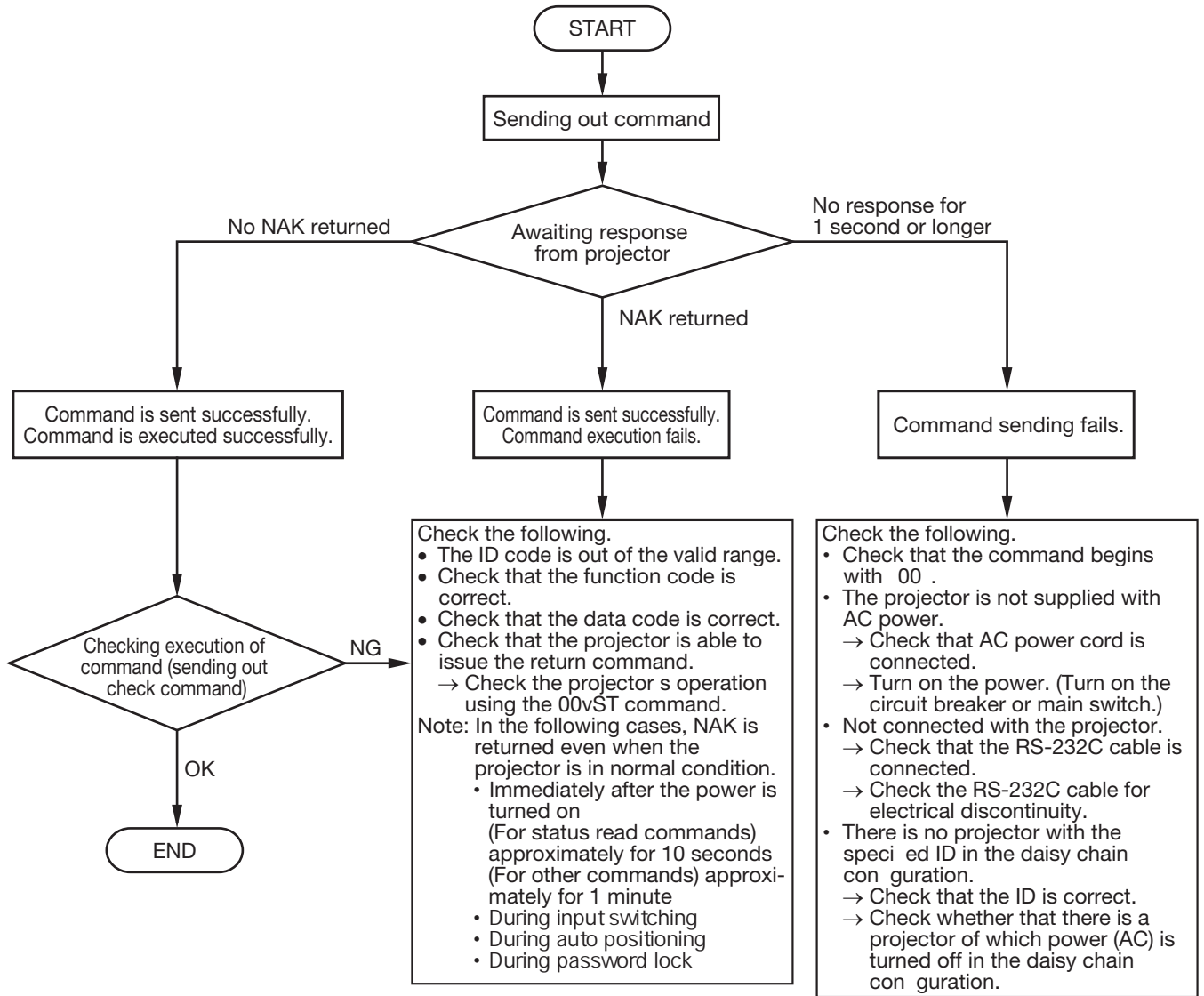
Command sent from the PC	Status code returned from the projector	Description
30' '30' '5F' '76' '31' '0D' 00_v1 <input type="text"/>		(During auto positioning) Command for selecting VIDEO as the input signal is sent out.
	'30' '30' '5F' '76' '31' '3A' '4E' '0D' 00_v1:N <input type="text"/>	The command is received by the projector but cannot be executed. (NAK return)

t 8IFO*%JTQFDhFEXIFOUIFDPNNBOEJTFOUUPUIFQSPKFDUPSXWUIIF*%PGiwPSi"--w

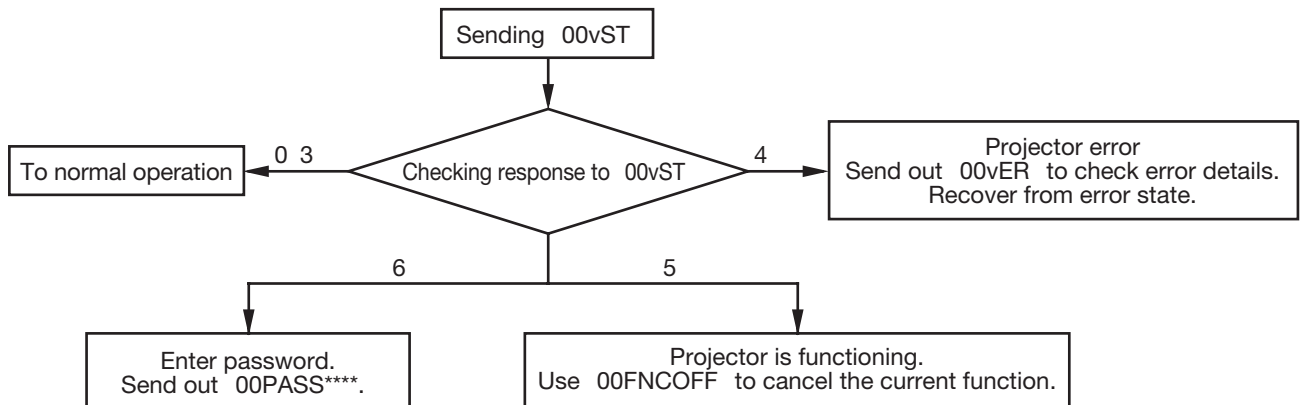
Command sent from the PC	Status code returned from the projector	Description
'30' '30' '3B' '30' '31' '3B' '5F' '76' '31' '0D' 00;01;_v1 <input type="text"/>		(During auto positioning) Command for selecting VIDEO as the input signal is sent to the projector with the ID of "01" or "ALL."
	'30' '30' '3B' '30' '31' '3B' '5F' '76' '31' '3A' '4E' '0D' 00;01;_v1:N <input type="text"/>	The projector with the ID of "01" or "ALL" receives the command, but cannot execute it. (NAK return)

t 5IFnPXDI BSUPUIFOFYUQBHFTIPXTUIFSFDPNNFOEFEPQFSBUØHTFRVFODFGPSZPVSSFGFSFODFUPDSFBU program.

[RS-232C control flowchart]



[Method of checking state of projector]



4. Execution procedure of RS-232C commands via LAN

- t When you use the LAN function, set the STANDBY MODE to STANDARD or LAN.
- t 8IFOZPVFYFDVUF34\$DPNNBOETWB-"/DIFDLUIBUUIF\$0/530-4:450UIF/8803,NFOVJ set to STANDARD.
- t You can change the certification password using the NETWORK PASSWORD in the NETWORK menu. The default password is "admin."
- t PVDBOTLQUIFDFSUthDBUPOQSPDFTTQZ Setting the NETWORK CERTIFICATION in the NETWORK menu to OFF. When you skip the certification process, Steps 2 to 4 described below can be skipped and you can send RS-232C commands without adding a certification data.

Example:

Sending the PON command (00!) while the NETWORK CERTIFICATION is set to OFF
00!↵

For the procedure to set the menu, refer to the User Manual supplied with the projector.

To execute the RS-232C command via LAN while the NETWORK CERTIFICATION is set to ON, a 32-byte connection certification data must be added before the RS-232C command.

To create a 32-byte certification data, following information and procedure are required.

- t 3BOEPNDIBSBDUFSTUS0HGPSDSFBU0HUIFDFSUthDBUPOEBUBUIBUTBDRV\$FEGSPNUIFQSPKFDUPSDBSBD
- t /FUXPSLQBTTXPSEPGUIFQSPKFDUPSUPDIBSBDUFST
- t .%IBTIDBMDVMBUPO

- t BTFEPOUIFBCPWFUIFFYFDVUPOQSPDFEVSFTUPDPOOFDUUPUIFQSPKFDUPSBOETFOEUIF34\$DPNNBOET while the NETWORK CERTIFICATION is set to ON are described below.

1. Connect to Port 63007 of the projector from the PC as a TCP/IP client.
2. After completing the connection, send the acquisition request for the certification data (" \$AK↵") (ASCII code: 24 41 4B 0D) from the PC to the projector.
3. Acquire " \$AK*****↵" on the PC as the response of the request sent in Step 2. (*****: Random character string for creating the certification data)
4. Create the certification data on the PC.

- t \$SFBUIFIFLZPGUIFDFSUthDBUPOEBUBCZM0L0HUIFEBUBBDRV\$FE04UFQXWUIFUFUXPSLDIBSBD ter string.

For example, when the random character string is 12345678 and the password is ABCD, the key of the certification data is 12345678ABCD (character string in ASCII code).

- t 3VO.%IBTIPOUIFIFLZPGUIFDFSUthDBUPOEBUB
- t \$SFBUIFIFDFSUthDBUPOEBUBCZDPOWFUSU0HUIFIBTIDBMDVMBUFECZUFEBUB0UPUIF"4\$**DPEFDIB acter string.

Example:

Calculation result: [4f][3c][5d][a1][7b][4f][b5][ed][2c][99][4e][bb][f6][57][67][54] (hexadecimal numeral)

Certification data: 4f 3c 5d a1 7b 4f b5 ed 2c 99 4e bb f6 57 67 54 (character string in ASCII code)

5. Send the RS-232C command with the certification data from the PC to the projector.

Example:

To send the PON command (00!↵) using the certification data created in Step 4:

4f3c5da17b4fb5ed2c994ebbf657675400!↵

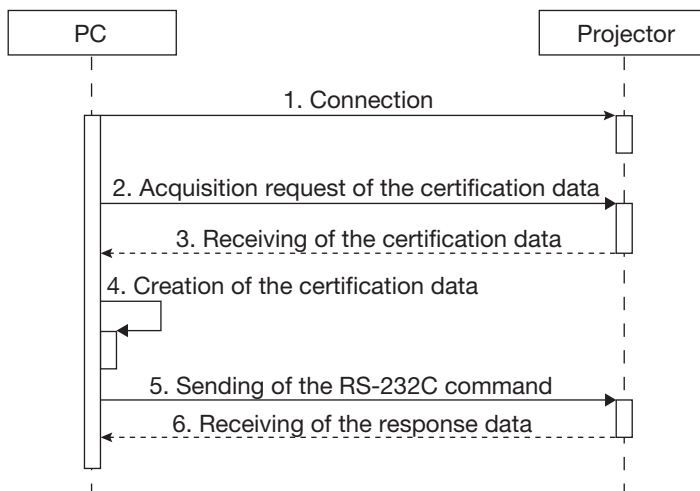
6. Receive the response from the projector on the PC.

Response data has the following patterns.

Normal: 00!↵ (Parameter is added depending on the command.)

Error in the certification data: PRV=ERRA↵

Command error: 00!N↵



ITEM	Function		Data
	Character	ASCII code	
COLOR MATCHING-MANUAL (RESET)	MNRST	4Dh 4Eh 52h 53h 54h	
COLOR MATCHING-MEASURE-MEASURED DATA (Y(Relative value))	MSML	4Dh 53h 4Dh 4Ch	x00050 to 20000 x: Color selection R (RED), G (GREEN), B (BLUE), W (WHITE)
COLOR MATCHING-MEASURE-MEASURED DATA (x)	MSMX	4Dh 53h 4Dh 58h	x*.*** to *.*** x: Color selection R (RED), G (GREEN), B (BLUE), W (WHITE) *.***: The range varies depending on x.
COLOR MATCHING-MEASURE-MEASURED DATA (y)	MSMY	4Dh 53h 4Dh 59h	x*.*** to *.*** x: Color selection R (RED), G (GREEN), B (BLUE), W (WHITE) *.***: The range varies depending on x.
COLOR MATCHING-MEASURE-TARGET DATA (GAIN)	MSTG	4Dh 53h 54h 47h	x010 to 100 x: Color selection R (RED), Y (YELLOW), G (GREEN), C (CYAN) B (BLUE), M (MAGENTA), W (WHITE)
COLOR MATCHING-MEASURE-TARGET DATA (x)	MSTX	4Dh 53h 54h 58h	x*.*** to *.*** x: Color selection R (RED), Y (YELLOW), G (GREEN), C (CYAN) B (BLUE), M (MAGENTA), W (WHITE) *.***: The range varies depending on x.
COLOR MATCHING-MEASURE-TARGET DATA (y)	MSTY	4Dh 53h 54h 59h	x*.*** to *.*** x: Color selection R (RED), Y (YELLOW), G (GREEN), C (CYAN) B (BLUE), M (MAGENTA), W(WHITE) *.***: The range varies depending on x.
COLOR MATCHING-MEASURE (RESET)	MSRST	4Dh 53h 52h 53h 54h	

5.6.5 FEATURE menu

ITEM	Function		Data
	Character	ASCII code	
130+&503*%	PID	50h 49h 44h	00 (ALL), 01 to 63
GROUP ID	GID	47h 49h 44h	A to Z
PASSWORD FUNCTION	PSLOCK	50h 53h 4Ch 4Fh 43h 4Bh	0**** (UNLOCK), 1**** (DISPLAY INPUT), 2**** (MENU ACCESS), 3**** (SPLASH ID SCREEN) **** is a 4 to 8-digit password comprised of any figures 1 to 4.
MENU POSITION	MP	4Dh 50h	0 (Upper left), 1 (Lower right), 4 (Center)
CINEMA MODE	CINE	43h 49h 4Eh 45h	0 (VIDEO), 1 (AUTO), 2 (FILM)
LANGUAGE	LG	4Ch 47h	00 (日本語), 01 (English), 02 (Español), 03 (Deutsch), 04 (Français), 05 (Italiano), 06 (中文), 07 (한국어), 08 (РУССКИЙ), 09 (PORTUGU ° S), 11 (SVENSKA), 12 (POLSKI), 16 (Nederlands), 17 (Norsk), 18 (اللغة العربية), 19 (Türkçe), 20 (ภาษาไทย), 21 (Bahasa Indonesia), 22 (Melayu), 23 (Tiếng Việt)
VIDEO SIGNAL (VIDEO only)	VS	56h 53h	0 (AUTO), 1 (NTSC), 2 (PAL), 3 (SECAM), 4 (4.43NTSC), 5 (PAL-M), 6 (PAL-N), 7 (PAL-60)
SET UP	STU	53h 54h 55h	0 (AUTO), 1 (OFF), 2 (3.75%), 3 (7.5%)
SCART INPUT	SRT	53h 52h 54h	0 (OFF), 1 (ON)
LAMP WARNING	LW	4Ch 57h	0 (STANDARD), 1 (SHORT TERM)
HIDE OSD	HOSD	48h 4Fh 53h 44h	0 (OFF), 1 (ON)
LAMP 1 TIME RESET	TRST1L	54h 52h 53h 54h 31h 4Ch	
LAMP 2 TIME RESET	TRST2L	54h 52h 53h 54h 32h 4Ch	
FILTER TIME RESET	TRSTFL	54h 52h 53h 54h 46h 4Ch	
RESET ALL	RSTALL	52h 53h 54h 41h 4Ch 4Ch	

How to set the value

Use the character or ASCII code as shown below to set the value.

Character	+	-	0	1	2	3	4	5	6	7	8	9
ASCII code	'2Bh'	'2Dh'	'30h'	'31h'	'32h'	'33h'	'34h'	'35h'	'36h'	'37h'	'38h'	'39h'

[Example 1] When setting the AUTO POWER ON to ON. (Values enclosed in quotation marks are ASCII codes.):

t 8IFO*%JOPUTQFDhFE

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '41' '50' '4F' '4E' '31' '0D' 00APON1		Command for setting the AUTO POWER ON to ON (ID command is omitted.)
	'30' '30' '41' '50' '4F' '4E' '31' '0D' 00APON1	Command receipt confirmation (The statuses are echoed back as many as the number of the connected projectors.)

t 8IFO*%JTQFDhFEXIFOUIFDPNNBOEJTFOUUPUIFQSPKFDUPSXWIIUIF*%PGiwPSi"--w

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '3B' '30' '31' '3B' '41' '50' '4F' '4E' '31' '0D' 00;01;APON1		Command for setting the AUTO POWER ON is sent to the projector with the ID of "01" or "ALL."
	'30' '30' '3B' '30' '31' '3B' '41' '50' '4F' '4E' '31' '0D' 00;01;APON1	Command receipt confirmation (The status is echoed back from the projector with the ID of "01" or "ALL.")

[Example 2] When setting the CONTRAST R of the COLOR TEMP.-USER to +10, the CONTRAST G to 0, and the CONTRAST B to -5. (Values enclosed in quotation marks are ASCII codes.):

t 8IFO*%JOPUTQFDhFE

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '50' '2B' '31' '30' '2B' '30' '30' '2D' '30' '35' '0D' 00P+10+00-05		Command for setting the picture control (ID command is omitted.)
	'30' '30' '50' '2B' '31' '30' '2B' '30' '30' '2D' '30' '35' '0D' 00P+10+00-05	Command receipt confirmation (The statuses are echoed back as many as the number of the connected projectors.)

t 8IFO*%JTQFDhFEXIFOUIFDPNNBOEJTFOUUPUIFQSPKFDUPSXWIIUIF*%PGiwPSi"--w

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '3B' '30' '31' '3B' '50' '2B' '31' '30' '2B' '30' '30' '2D' '30' '35' '0D' 00;01;P+10+00-05		Command for setting the CONTRAST is sent to the projector with the ID of "01" or "ALL."
	'30' '30' '3B' '30' '31' '3B' '50' '2B' '31' '30' '2B' '30' '30' '2D' '30' '35' '0D' 00;01;P+10+00-05	Command receipt confirmation (The status is echoed back from the projector with the ID of "01" or "ALL.")

[Example 3] When checking the TINT setting (when the TINT is set to +10). (Values enclosed in quotation marks are ASCII codes.):

t 8IFO*%JOPUTQFDhFE

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '53' '0D' 00S		Command for checking the TINT setting (ID command is omitted.)
	'30' '30' '53' '2B' '31' '30' '0D' 00S+10	Check result (+10) (The statuses are echoed back as many as the number of the connected projectors.)

t 8IFO*%JTQFDhFEXIFOUIFDPNNBOEJTFOUUPUIFQSPKFDUPSXWUIUIF*%PGiwPSi"--w

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '3B' '30' '31' '3B' '53' '0D' 00;01;S		Command for checking the TINT setting is sent to the projector with the ID of "01" or "ALL."
	'30' '30' '3B' '30' '31' '3B' '53' '2B' '31' '30' '0D' 00;01;S+10	Check result (+10) (The status is echoed back from the projector with the ID of "01" or "ALL.")

[Example 4] When setting the GAMMA MODE of the COLOR ENHANCER-USER to DETAIL. (Values enclosed in quotation marks are ASCII codes.):

t 8IFO*%JOPUTQFDhFE

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '43' '45' '55' '31' '47' '53' '32' '0D' 00CEU1GS2		Command for setting the picture control (ID command is omitted.)
	'30' '30' '43' '45' '55' '31' '47' '53' '32' '0D' 00CEU1GS2	Command receipt confirmation (The statuses are echoed back as many as the number of the connected projectors.)

t 8IFO*%JTQFDhFEXIFOUIFDPNNBOEJTFOUUPUIFQSPKFDUPSXWUIUIF*%PGiwPSi"--w

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '3B' '30' '31' '3B' '43' '45' '55' '31' '47' '53' '32' '0D' 00;01;CEU1GS2		Command for setting the GAMMA MODE of the COLOR ENHANCER-USER is sent to the projector with the ID of "01" or "ALL."
	'30' '30' '3B' '30' '31' '3B' '43' '45' '55' '31' '47' '53' '32' '0D' 00;01;CEU1GS2	Command receipt confirmation (The status is echoed back from the projector with the ID of "01" or "ALL.")

5.7 Password lock commands

The password lock commands control the password lock. The password lock enabling or disabling command is sent with a 4 to 8-digit password comprised of any figures 1 to 4 added to the end of the data code. When the password lock is enabled or disabled successfully, the projector sends a return command comprising the data code, password, and "1" at the end. When enabling or disabling the password lock fails, it sends a return command with "0" at the end. There is no reconfirmation of the password. The password input command is for enabling projection of image when password lock has been set to DISPLAY INPUT. The password input command is sent with a 4 to 8-digit password comprised of any figures 1 to 4 at the end.

ITEM	Function		Data
	Character	ASCII code	
Password lock enabling/ disabling	PSLOCK	50h 53h 4Ch 4Fh 43h 4Bh	0**** (Disabling), 1**** (DISPLAY INPUT), 2**** (MENU ACCESS), 3**** (SPLASH ID SCREEN)
Password input	PASS	50h 41h 53h 53h	****

**** is a 4 to 8-digit password comprised of any figures 1 to 4.

[Example] When enabling the password lock of DISPLAY INPUT (in the case that the password is 123412).
(Values enclosed in quotation marks are ASCII codes.):

t 8IFO*%JOPUTQFDhFE

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '50' '53' '4C' '4F' '43' '4B' '31' '31' '32' '33' '34' '31' '32' '0D' 00PSLOCK1123412		Command for enabling the password lock of DISPLAY INPUT (ID command is omitted.)
	'30' '30' '50' '53' '4C' '4F' '43' '4B' '31' '31' '32' '33' '34' '31' '32' '31' '0D' 00PSLOCK11234121	Response informing that the projector succeeded in enabling the password lock of DISPLAY INPUT (The statuses are echoed back as many as the number of the connected projectors.)

t 8IFO*%JTQFDhFEXIFOUIFDPNNBOEJTFOUUPUIFQSPKFDUPSXWIIUIF*%PGiwPSi"--w

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '3B' '30' '31' '3B' '50' '53' '4C' '4F' '43' '4B' '31' '31' '32' '33' '34' '31' '32' '0D' 00;01;PSLOCK1123412		Command for turning on the password lock of DISPLAY INPUT is sent to the projector with the ID of "01" or "ALL."
	'30' '30' '3B' '30' '31' '3B' '50' '53' '4C' '4F' '43' '4B' '31' '31' '32' '33' '34' '31' '32' '31' '0D' 00;01;PSLOCK11234121	Response informing that the projector succeeded in enabling the password lock of DISPLAY INPUT (The status is echoed back from the projector with the ID of "01" or "ALL.")