

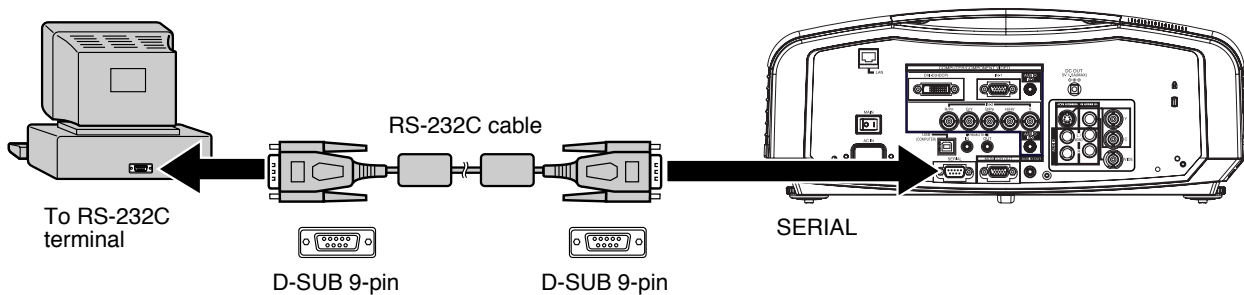
## Controlling the projector using a personal computer

This projector can be controlled by connecting a personal computer with RS-232C terminal.

### PC-controllable functions:

- Turning the power ON or OFF
- Changing input signals
- Inputting commands by pressing the buttons on the control panel and remote control
- Menu setting

### Connection



### Important:

- Make sure that your computer and projector are turned off before connection.
- Boot up the computer first, and then plug the power cord of the projector.  
(If you do not follow this instruction, the Com port may not function.)
- Adapters may be necessary depending on the PC connected to this projector. Contact your dealer for details.

### 1) Interface

|              |            |
|--------------|------------|
| PROTOCOL     | RS-232C    |
| BAUD RATE    | 9600 [bps] |
| DATA LENGTH  | 8 [bits]   |
| PARITY BIT   | NONE       |
| STOP BIT     | 1 [bit]    |
| FLOW CONTROL | NONE       |

This projector uses RXD, TXD and GND lines for RS-232C control.  
For RS-232C cable, the reverse type cable should be used.

### 2) Control command diagram

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

|       | Address code | Function code | Data code | End code |
|-------|--------------|---------------|-----------|----------|
| HEX   | 30h 30h      | Function      | Data      | 0Dh      |
| ASCII | '0' '0'      | Function      | Data      | ↵        |

- [Address code] 30h 30h (In ASCII code, '0' '0') fixed.  
 [Function code] A code of each fixed control move.  
 [Data code] A code of each fixed control data (number) and not always indicated.  
 [End code] 0Dh (In ASCII code, '↵') fixed.

### 3) Control sequence

- (1) Send the command from the personal computer to the projector.
  - (2) The projector will send a return command after it receives an end code. If the command is not received correctly, the projector will not send the return command.
  - (3) The personal computer checks the command and confirms if the sent command has been executed or not.
  - (4) 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.
- During signal switching, the command may not take effect even when the projector sends the return command. After signal switching completes, wait for the mode indication to disappear before sending the next command.
  - When sending commands successively, wait to receive the return command of the current command before sending a next command.
  - Keep intervals of at least 400 ms between receipt of a return command and sending of a next command.
  - Any commands will not be executed for 10 seconds after the power is turned on.

[Example] When turning the power ON (Figures and symbols enclosed in quotation marks are ASCII codes.):

| Sending commands from the PC, etc. | Status code from the projector | Description   |
|------------------------------------|--------------------------------|---|
| 30 30 21 0D<br>'0' '0' '!' '↵'     |                                | Command for POWER ON                                |
|                                    | 30 30 21 0D<br>'0' '0' '!' '↵' | Command receipt confirmation<br>(Command echo back) |

### 4) Operation commands (Not executable in stand-by mode. When the commands for input select are sent while the splash screen is being displayed, the splash screen is only canceled.)

The operation commands are used for the basic operation setting of this projector. They may not be executed while the signals are changed. The operation commands have no data codes.

| Operation        | ASCII | HEX         | Note   |
|------------------|-------|-------------|--|
| POWER ON         | !     | 21h         | This command is invalid for 1 minute after the power is turned off.              |
| POWER OFF        | "     | 22h         | This command is invalid for 1 minute after the power is turned on.               |
| INPUT COMPUTER 1 | _r1   | 5Fh 72h 31h | This command will not be executed in Stand-by mode or when the MUTE is executed. |
| INPUT COMPUTER 2 | _r2   | 5Fh 72h 32h | This command will not be executed in Stand-by mode or when the MUTE is executed. |
| INPUT DVI        | _d1   | 5Fh 64h 31h | This command will not be executed in Stand-by mode or when the MUTE is executed. |
| INPUT VIDEO      | _v1   | 5Fh 76h 31h | This command will not be executed in Stand-by mode or when the MUTE is executed. |
| INPUT S-VIDEO    | _v2   | 5Fh 76h 32h | This command will not be executed in Stand-by mode or when the MUTE is executed. |

[Example] When setting the input signal to COMPUTER 1 (Figures and symbols enclosed in quotation marks are ASCII codes.):

| Sending commands from the PC, etc.          | Status code from the projector              | Description   |
|---|---|---|
| 30 30 5F 72 31 0D<br>'0' '0' '_ 'r' '1' '↵' |   | Command for setting the input signal to COMPUTER 1  |
|   | 30 30 5F 72 31 0D<br>'0' '0' '_ 'r' '1' '↵' | Command receipt confirmation<br>(Command echo back) |

### 5) Volume commands (Not executable in stand-by mode. Possible only to read during muting.)

The volume commands are used for the volume setting of this projector with the value.

| ITEM   | ASCII | HEX     | VALUE   |
|--------|-------|---------|---------|
| VOLUME | VL    | 56h 4Ch | 00 - 21 |

#### How to set the grade

Use the ASCII codes to set the grade for setting data. Please refer to the table below for the HEX code.

| ASCII | '0' | '1' | '2' | '3' | '4' | '5' | '6' | '7' | '8' | '9' |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| HEX   | 30h | 31h | 32h | 33h | 34h | 35h | 36h | 37h | 38h | 39h |

[Example] When setting the volume to 15 (Figures and symbols enclosed in quotation marks are ASCII codes.):

| Sending commands from the PC, etc.                  | Status code from the projector                      | Description   |
|---|---|---|
| 30 30 56 4C 31 35 0D<br>'0' '0' 'V' 'L' '1' '5' '↵' |   | Command for setting the volume                      |
|   | 30 30 56 4C 31 35 0D<br>'0' '0' 'V' 'L' '1' '5' '↵' | Command receipt confirmation<br>(Command echo back) |

## 6) Keystone commands (Not executable in stand-by mode. Possible only to read during muting.)

The keystone commands are used for the keystone setting of this projector with the value. The value will vary depending on the installation conditions, etc.)

| ITEM                  | ASCII | HEX         | VALUE |
|-----------------------|-------|-------------|-------|
| KEystone (vertical)   | KS    | 4Bh 53h     | ±35   |
| KEystone (horizontal) | KSH   | 4Bh 53h 48h | ±25   |

### How to set the grade

Use the ASCII codes to set the grade for setting data. Please refer to the table below for the HEX code.

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

## 7) Mute commands (Not executable in stand-by mode. When the mute commands are sent while the splash screen is being displayed, the splash screen is not muted but only canceled.)

The mute commands are used for the mute setting of this projector with the 0 (30h) and 1 (31h).

| ITEM | ASCII | HEX             | VALUE           |
|------|-------|-----------------|-----------------|
| MUTE | MUTE  | 4Dh 55h 54h 45h | 0 (OFF), 1 (ON) |

## 8) Remote commands (Not executable in stand-by mode. When the remote commands are sent while the splash screen is being displayed, the splash screen is only canceled.)

Some remote control operations can be achieved by the remote command codes. The remote commands have no data codes.

| Button's name on remote | ASCII | HEX         |
|-------------------------|-------|-------------|
| + VOLUME                | r06   | 72h 30h 36h |
| - VOLUME                | r07   | 72h 30h 37h |
| KEystone                | r43   | 72h 34h 33h |
| MUTE                    | ra6   | 72h 61h 36h |
| ▲                       | r53   | 72h 35h 33h |
| ▼                       | r2b   | 72h 32h 62h |
| ◀                       | r4f   | 72h 34h 66h |
| ▶                       | r59   | 72h 35h 39h |
| MENU                    | r54   | 72h 35h 34h |
| ENTER                   | r10   | 72h 31h 30h |
| ZOOM/FOCUS              | r0f   | 72h 30h 66h |
| LENS SHIFT              | r47   | 72h 34h 37h |
| AUTO POSITION           | r09   | 72h 30h 39h |
| STILL                   | ra4   | 72h 61h 34h |
| ASPECT                  | re2   | 72h 65h 32h |
| CE                      | re7   | 72h 65h 37h |

[Example] When displaying the MENU selection bar (Figures and symbols enclosed in quotation marks are ASCII codes.):

| Sending commands from the PC, etc.           | Status code from the projector               | Description                                      |
|--|--|--|
| 30 30 72 35 34 0D<br>'0' '0' 'r' '5' '4' '↵' |  | Command operating the same as the MENU button    |
|  | 30 30 72 35 34 0D<br>'0' '0' 'r' '5' '4' '↵' | Command receipt confirmation (Command echo back) |

## 9) Password lock commands

The password lock commands control the password lock. The password lock enabling or disabling command is sent with a 4-digit figure (password) 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-digit figure (password) at the end.

| ITEM                             | ASCII  | HEX                     | VALUE   |
|----------------------------------|--------|-------------------------|---|
| Password lock enabling/disabling | PSLOCK | 50h 53h 4Ch 4Fh 43h 4Bh | 0**** (Disabling), 1**** (DISPLAY INPUT)<br>2**** (MENU ACCESS) |
| Password input                   | PASS   | 50h 41h 53h 53h         | ****  |

\*\*\*\* is a 4-digit figure (password).

## 10) Reading command diagram

The projectors operating status, such as POWER-ON/OFF, the currently selected input terminal and lamp operating time, etc. can be monitored.

|  | ASCII    |                | HEX      |         |                |
|--|----------|----------------|----------|---------|----------------|
|  | Function | Data (Receive) | Function |         | Data (Receive) |
| POWER ON                                     | vP       | 1              | 76h      | 50h     | 31h            |
| POWER OFF                                    | vP       | 0              | 76h      | 50h     | 30h            |
| INPUT COMPUTER 1                             | vl       | r1             | 76h      | 49h     | 72h 31h        |
| INPUT COMPUTER 2                             | vl       | r2             | 76h      | 49h     | 72h 32h        |
| INPUT DVI                                    | vl       | d1             | 76h      | 49h     | 64h 31h        |
| INPUT VIDEO                                  | vl       | v1             | 76h      | 49h     | 76h 31h        |
| INPUT S-VIDEO                                | vl       | v2             | 76h      | 49h     | 76h 32h        |
| POWER ON/OFF INPOSSIBLE                      | vPK      | 0              | 76h      | 50h 4Bh | 30h            |
| POWER ON/OFF POSSIBLE                        | vPK      | 1              | 76h      | 50h 4Bh | 31h            |
| NO SIGNAL SUPPLIED                           | vSM      | 0              | 76h      | 53h 4Dh | 30h            |
| SIGNAL SUPPLIED                              | vSM      | 1              | 76h      | 53h 4Dh | 31h            |
| LAMP OPERATING TIME<br>(on a LOW mode basis) | vLE      | hhhhmm         | 76h      | 4Ch 45h | hhhhmm         |

The PC sends the command without attaching the data code to it. On the other hand, the projector attaches to the received command its current operating status as the data code and send it back to the PC. (LAMP OPERATING TIME: "h" and "m" represent hour and minute respectively. )

[Example] When checking the currently selected input terminal (when the INPUT VIDEO is being selected):

| Sending commands from the PC, etc.    | Status code from the projector                      | Description                             |
|---------------------------------------|---|---|
| 30 30 76 49 0D<br>'0' '0' 'v' 'l' '↵' |   | Command for checking the input terminal |
|                                       | 30 30 76 49 76 31 0D<br>'0' '0' 'v' 'l' 'v' '1' '↵' | Check result (VIDEO)                    |

## 11) Menu setting commands (Not executable in stand-by mode. Possible only to read during muting.)

The menu setting commands are used for the menu setting of this projector. If the personal computer sends the command without attaching the data code, the projector attaches to the received command its current setting value as the data code and send it back to the PC.

| ITEM                           | ASCII  | HEX                        | VALUE   |
|--------------------------------|--------|----------------------------|---|
| COLOR ENHANCER                 | CE     | 43h 45h                    | 0 (AUTO), 1 (PRESENTATION), 2 (STANDARD), 3 (THEATER), 4 (sRGB), 5 (USER)                         |
| COLOR ENHANCER-USER            | CEU1   | 43h 45h 55h 31h            | +0 (DYNAMIC), +1 (NATURAL), +2 (DETAIL)<br>+00 - 02 (BrilliantColor™)                             |
| CONTRAST                       | PP     | 50h 50h                    | ±30   |
| BRIGHTNESS                     | QQ     | 51h 51h                    | ±30   |
| COLOR TEMP.                    | A      | 41h                        | 1 (STANDARD), 2 (HIGH), 3 (LOW), 4 (USER)   |
| COLOR TEMP.-USER(CONTRAST)     | P      | 50h                        | ±30±30±30 (R,G,B)   |
| COLOR TEMP.-USER(BRIGHTNESS)   | Q      | 51h                        | ±30±30±30 (R,G,B)   |
| COLOR                          | T      | 54h                        | ±10   |
| TINT                           | S      | 53h                        | ±10   |
| SHARPNESS                      | R      | 52h                        | ±05   |
| LAMP MODE                      | LM     | 4Ch 4Dh                    | 0 (STANDARD), 1 (LOW)   |
| AUTO POWER ON                  | APON   | 41h 50h 4Fh 4Eh            | 0 (OFF), 1 (ON)   |
| AUTO POWER OFF                 | APOF   | 41h 50h 4Fh 46h            | 00 (OFF), 05, 10, 15, 30, 60  |
| SPLASH SCREEN                  | SS     | 53h 53h                    | 0 (OFF), 1 (ON)   |
| BACK COLOR                     | BB     | 42h 42h                    | 0 (BLACK), 1 (BLUE)   |
| IMAGE REVERSE                  | IR     | 49h 52h                    | 0 (OFF), 1 (MIRROR), 2 (INVERT), 3 (MIRROR INVERT)  |
| TEST PATTERN                   | TP     | 54h 50h                    | 0 (OFF), 1 (CROSS HATCH)  |
| ZOOM/FOCUS LOCK                | FZL    | 46h 5Ah 4Ch                | 0 (OFF), 1 (ON)   |
| LENS SHIFT LOCK                | LSL    | 4Ch 53h 4Ch                | 0 (OFF), 1 (ON)   |
| LENS SHIFT RESET               | LSRST  | 4Ch 53h 52h 53h 54h        |   |
| ASPECT                         | SC     | 53h 43h                    | 0 (AUTO), 1 (16:9), 2 (REAL), 3 (FULL)  |
| ASPECT(Position of 16:9 image) | SCP    | 53h 43h 50h                | 0 (CENTER), 1 (UPPER), 2 (LOWER)  |
| PASSWORD FUNCTION              | PSLOCK | 50h 53h 4Ch 4Fh<br>43h 4Bh | 0**** (UNLOCK), 1**** (DISPLAY INPUT),<br>2**** (MENU ACCESS) **** is a 4-digit figure (password) |
| MENU POSITION                  | MP     | 4Dh 50h                    | 0 (Upper left), 1 (Lower right)   |
| CINEMA MODE                    | CINE   | 43h 49h 4Eh 45h            | 0 (OFF), 1 (AUTO)   |
| VIDEO SIGNAL                   | VS     | 56h 53h                    | 0 (AUTO), 1 (NTSC), 2 (PAL), 3 (SECAM),<br>4 (4.43NTSC), 5 (PAL-M), 6 (PAL-N), 7 (PAL-60)         |
| WXGA                           | WXGA   | 57h 58h 47h 41h            | 0 (OFF), 1 (AUTO), 2 (1280x768), 3 (1360x768), 4 (1366x768)                                       |
| SETUP                          | STU    | 53h 54h 55h                | 0 (AUTO), 1 (OFF), 2 (3.75%), 3 (7.5%)  |
| SCART INPUT                    | SRT    | 53h 52h 54h                | 0 (OFF), 1 (ON)   |

| ITEM           | ASCII  | HEX                     | VALUE   |
|----------------|--------|-------------------------|---|
| LANGUAGE       | LG     | 4Ch 47h                 | 0 (日本語), 1 (English), 2 (Español), 3 (Deutsch), 4 (Français), 5 (Italiano), 6 (中文), 7 (한국어), 8 (РУССКИЙ), 9 (PORTUGUÊS) |
| RESET ALL      | RSTALL | 52h 53h 54h 41h 4Ch 4Ch |   |
| HORIZ.POSITION | HP     | 48h 50h                 | + (increment), - (decrement)*1  |
| VERT. POSITION | VP     | 56h 50h                 | + (increment), - (decrement)*1  |
| FINE SYNC.     | FN     | 46h 4Eh                 | 00 - 31   |
| TRACKING       | TRK    | 54h 52h 4Bh             | + (increment), - (decrement)*1  |
| COMPUTER INPUT | CIN    | 43h 49h 4Eh             | 0 (RGB), 1 (YCbCr/YPr), 2 (AUTO)  |
| HOLD           | HLD    | 48h 4Ch 44h             | 0 (OFF), 1 (ON)   |
| HOLD BEGIN     | HLB    | 48h 4Ch 42h             | 00 - 99   |
| HOLD END       | HLE    | 48h 4Ch 45h             | 00 - 99   |
| CLAMP POSITION | CLP    | 43h 4Ch 50h             | 001 - 255   |
| CLAMP WIDTH    | CLW    | 43h 4Ch 57h             | 01 - 63   |
| VERT. SYNC     | VSC    | 56h 53h 43h             | 0 (AUTO), 1 (OFF)   |
| OVER SCAN      | VOS    | 56h 4Fh 53h             | 00 (90%) - 10 (100%)  |
| LPF            | LPF    | 4Ch 50h 46h             | 0 (OFF), 1 (ON)   |
| SHUTTER(U)     | SHU    | 53h 48h 55h             | 00 - 38   |
| SHUTTER(L)     | SHL    | 53h 48h 4Ch             | 00 - 38   |
| SHUTTER(LS)    | SHLS   | 53h 48h 4Ch 53h         | 00 - 63   |
| SHUTTER(RS)    | SHRS   | 53h 48h 52h 53h         | 00 - 63   |

\*1) Setting range differs depending on the input signals.

- Some commands are not executed depending on the input signal. The operational restrictions same as those on the menu setting are applied. Refer to "Menu operation" in the User Manual for more details.

### How to set the grade

Use the ASCII codes to set the grade for setting data. Please refer to the table below for the HEX code.

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

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

| Sending commands from the PC, etc.                         | Status code from the projector                             | Description                                      |
|--|--|--|
| 30 30 41 50 4F 4E 31 0D<br>'0' '0' 'A' 'P' 'O' 'N' '1' '↵' |  | Command for setting the AUTO POWER ON to ON      |
|  | 30 30 41 50 4F 4E 31 0D<br>'0' '0' 'A' 'P' 'O' 'N' '1' '↵' | Command receipt confirmation (Command echo back) |

[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. (Figures and symbols enclosed in quotation marks are ASCII codes.):

| Sending commands from the PC, etc.  | Status code from the projector  | Description                                      |
|---|---|--|
| 30 30 50 2B 31 30 2B 30 30 2D 30 35 0D<br>'0' '0' 'P' '+' '1' '0' '+' '0' '0' '-' '0' '5' '↵' |   | Command for setting the picture control          |
|   | 30 30 50 2B 31 30 2B 30 30 2D 30 35 0D<br>'0' '0' 'P' '+' '1' '0' '+' '0' '0' '-' '0' '5' '↵' | Command receipt confirmation (Command echo back) |

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

| Sending commands from the PC, etc. | Status code from the projector                      | Description                           |
|------------------------------------|---|---------------------------------------|
| 30 30 53 0D<br>'0' '0' 'S' '↵'     |   | Command for checking the TINT setting |
|                                    | 30 30 53 2B 31 30 0D<br>'0' '0' 'S' '+' '1' '0' '↵' | Check result (+10)                    |

[Example 4] When setting the GAMMA MODE of the COLOR ENHANCER-USER to DETAIL, the BrilliantColor™ to 2. (Figures and symbols enclosed in quotation marks are ASCII codes.):

| Sending commands<br>from the PC, etc.  | Status code from<br>the projector  | Description   |
|--|--|---|
| 30 30 43 45 55 31 2B 32 2B 30 32 0D<br>'0' '0' 'C' 'E' 'U' '1' '+' '2' '+' '0' '2' '↵' |  | Command for setting the<br>picture control          |
|  | 30 30 43 45 55 31 2B 32 2B 30 32 0D<br>'0' '0' 'C' 'E' 'U' '1' '+' '2' '+' '0' '2' '↵' | Command receipt confirmation<br>(Command echo back) |