MITSUBISHI ELECTRIC

DLP™ Projector

HC3100

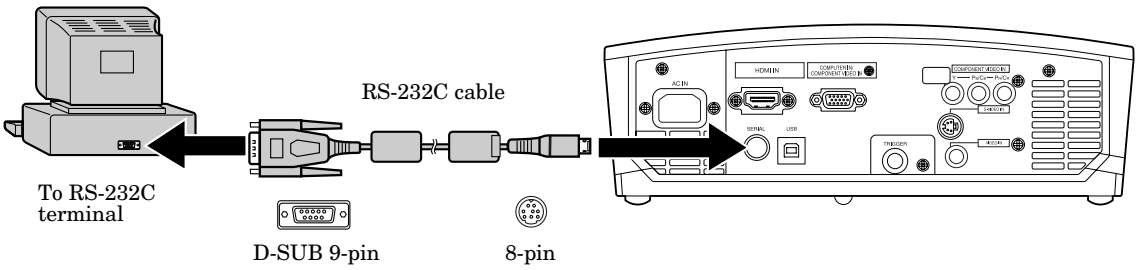
Controlling the projector using a personal computer

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 '0' '0' '!' '↵'		Command for POWER ON
	30 30 21 0D '0' '0' '!' '↵'	Command receipt confirmation (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	_r1	5Fh 72h 31h	This command will not be executed in Stand-by mode.
INPUT COMPONENT	_c1	5Fh 63h 31h	This command will not be executed in Stand-by mode.
INPUT HDMI	_d1	5Fh 64h 31h	This command will not be executed in Stand-by mode.
INPUT VIDEO	_v1	5Fh 76h 31h	This command will not be executed in Stand-by mode.
INPUT S-VIDEO	_v2	5Fh 76h 32h	This command will not be executed in Stand-by mode.

[Example] When setting the input signal to COMPUTER (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 '0' '0' '_' 'r' '1' '↵'		Command for setting the input signal to COMPUTER
	30 30 5F 72 31 0D '0' '0' '_' 'r' '1' '↵'	Command receipt confirmation (Command echo back)

5) 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	±40
KEYSTONE (horizontal)	KSH	4Bh 53h 48h	±25

How to set the value

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

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

6) 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			Button's name on remote	ASCII	HEX		
▲	r53	72h	35h	33h	AV MEMORY 1	re4	72h	65h	34h
▼	r2b	72h	32h	62h	AV MEMORY 2	re5	72h	65h	35h
◀	r4f	72h	34h	66h	AV MEMORY 3	re6	72h	65h	36h
▶	r59	72h	35h	39h	CONTRAST	rd0	72h	64h	30h
MENU	r54	72h	35h	34h	BRIGHTNESS	rd1	72h	64h	31h
ENTER	r10	72h	31h	30h	COLOR TEMP.	rd4	72h	64h	34h
AUTO POSITION	r09	72h	30h	39h	GAMMA	rd5	72h	64h	35h
ASPECT	re2	72h	65h	32h	SHARPNESS	rd6	72h	64h	36h
IRIS	r55	72h	35h	35h	KEYSTONE	r43	72h	34h	33h
BrilliantColor™	rc7	72h	63h	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 '0' '0' 'r' '5' '4' '↵'		Command operating the same as the MENU button
	30 30 72 35 34 0D '0' '0' 'r' '5' '4' '↵'	Command receipt confirmation (Command echo back)

7) 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.

ITEM	ASCII	HEX						VALUE
Password lock enabling/disabling	PSLOCK	50h	53h	4Ch	4Fh	43h	4Bh	0**** (Disabling), 1**** (DISPLAY INPUT) 2**** (MENU ACCESS)

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

8) Reading command diagram

The projectors operating status, such as POWER-ON/OFF and the currently selected input terminal, 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	vI	r1	76h	49h		72h	31h
INPUT COMPONENT	vI	c1	76h	49h		63h	31h
INPUT HDMI	vI	d1	76h	49h		64h	31h
INPUT VIDEO	vI	v1	76h	49h		76h	31h
INPUT S-VIDEO	vI	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	

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.

[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 '0' '0' 'v' 'I' '↵'		Command for checking the input terminal
	30 30 76 49 76 31 0D '0' '0' 'v' 'I' 'v' '1' '↵'	Check result (VIDEO)

9) 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
GAMMA MODE	GS	47h 53h	**0** (SPORTS), **1** (VIDEO), **2** (CINEMA), **3** (USER1), **4** (USER2), **5** (AUTO)
GAMMA MODE-USER1	GSU1	47h 53h 55h 31h	**+0** (SPORTS), **+1** (VIDEO), **+2** (CINEMA), **±05 ±05 ±05** (HIGH, MID, LOW)
GAMMA MODE-USER2	GSU2	47h 53h 55h 32h	**+0** (SPORTS), **+1** (VIDEO), **+2** (CINEMA), **±05 ±05 ±05** (HIGH, MID, LOW)
CONTRAST	PP	50h 50h	**±30**
BRIGHTNESS	QQ	51h 51h	**±30**
COLOR TEMP.	A	41h	**1** (9300K), **2** (6500K), **3** (5900K), **4** (USER), **5** (HIGH BRIGHTNESS)
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**
BrilliantColor™	WEH	57h 45h 48h	**0 - 2**
SCREEN SIZE	SCR	53h 43h 52h	**0** (WXGA 15:9), **1** (720P 16:9), **2** (XGA 4:3), **4** (CINEMA SCOPE 2.35:1)
VERTICAL LOCATION	IMP	49h 4Dh 50h	**±26**
LAMP MODE	LM	4Ch 4Dh	**0** (STANDARD), **1** (LOW)
CW SPEED	CWS	43h 57h 53h	**0** (4x), **1** (5x)
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)
TRIGGER OUT	SCT	53h 43h 54h	**0** (OFF), **1** (ON)
TEST PATTERN	TP	54h 50h	**0** (OFF), **1** (CROSS HATCH), **2** (WHITE), **3** (BLACK)
ASPECT	SC	53h 43h	**0** (AUTO), **1** (4:3), **2** (16:9), **3** (ZOOM1), **4** (ZOOM2), **5** (STRETCH), **6** (REAL)
PASSWORD FUNCTION	PSLOCK	50h 53h 4Ch 4Fh 43h 4Bh	**0****** (UNLOCK), **1****** (DISPLAY INPUT), **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 (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)
WXGA	WXGA	57h 58h 47h 41h	**0** (OFF), **1** (AUTO), **2** (1280 x 768), **3** (1360 x 768), **4** (1366 x 768)
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)
LANGUAGE	LG	4Dh 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** (YC_BC_R/YP_BP_R), **2** (AUTO)
OVER SCAN	VOS	56h 4Fh 53h	**00** (90%) **- 10** (100%)
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)
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	**00-95**
SHUTTER(RS)	SHRS	53h 48h 52h 53h	**00-95**

*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 value

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

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 '0' '0' 'A' 'P' 'O' 'N' '1' '↵'		Command for setting the AUTO POWER ON to ON
	30 30 41 50 4F 4E 31 0D '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 '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 '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 '0' '0' 'S' '↵'		Command for checking the TINT setting
	30 30 53 2B 31 30 0D '0' '0' 'S' '+' '1' '0' '↵'	Check result (+10)

- To set TINT at 0, enter +00. (-00 is invalid.)

[Example 4] When setting the REFERENCE of GAMMA MODE-USER1 to CINEMA (+2), HIGH to -2, MID to +3 and LOW to 0. (Figures and symbols enclosed in quotation marks are ASCII codes.):

Sending commands from the PC, etc.	Status code from the projector	Description
30 30 47 53 55 31 2B 32 2D 30 32 2B 30 33 2B 30 30 OD '0' '0' 'G' 'S' 'U' '1' '+' '2' '-' '0' '2' '+"0' '3' '+' '0' '0' '↵'		Command for setting GAMMA MODE-USER1
	30 30 47 53 55 31 2B 32 2D 30 32 2B 30 33 2B 30 30 OD '0' '0' 'G' 'S' 'U' '1' '+' '2' '-' '0' '2' '+"0' '3' '+' '0' '0' '↵'	Command receipt confirmation (Command echo back)