RS-232C External Serial Control Specifications
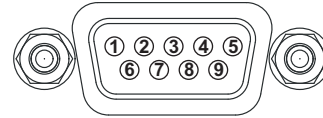
Applicable models: HD-P70R1U/61R1U for North America

1. Connection
1.1. Terminal
D-SUB 9Pin Male terminal

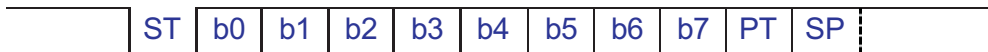| Pin No.	Name	Pin No.	Name
1	NC	6	NC
2	RXD	7	NC
3	TXD	8	NC
4	NC	9	NC
5	GND		

1.2. Communication Line
This control system uses RXD(receive data), TXD(transmit data) and GND line.
You can use a D-SUB 9 pin cross cable that connects to the external controller like as PC.

2.   Protocol
2.1. Communication Specifications

Communication System	Asynchronous
Interface	RS-232C
Baud rate	19200bps
Data length	8 bits
Parity	Odd parity
Stop bit	1 bit
Flow Control	None
Communication Code	ASCII character code

ST	b0	b1	b2	b3	b4	b5	b6	b7	PT	SP

2.2 Data format   *The length of the control command varies according to function

1 byte	2 bytes		2 bytes		n+1 bytes			1 byte
Header	Unit ID		Command		Data[0]	...	data[n]	Termination

2.3 Header table

HEX	ASCII	TYPE
0x21	'!'	Operation command
0x06	ACK	ACK
0x15	NAK	NAK

2.4 Unit ID table
Unit ID consists of Machine code and Individual code.
The applicable models are using 0x8280

Machine code: 0x82   Individual code: 0x80

2.5 Command table

HEX		ASCII		Function	Operation	
[illegible]						
0x00,	0x00	NUL,	NUL	NULL command	○	
0x50,	0x57	'P',	'W'	Power source [PoWer]	○	
0x49,	0x50	'I',	'P'	Input [InPut]	○	
0x56,	0x4C	'V',	'L'	Sound volume [VoLume]	○	
0x41,	0x4D	'A',	'M'	Audio muting [Audio Muting]	○	
0x43,	0x48	'C',	'H'	Channel [CHannel]	○	
0x56,	0x53	'V',	'S'	Video status [Video Status]	○	
0x41,	0x53	'A',	'S'	Aspect [ASpect]	○	
Remote control command						
0x52,	0x43	'R',	'C'	Remote control code through [Remote Code]	○	
Setup						
0x53,	0x55	'S',	'U'	Initial setup [SetUp]	○	

2.6 Parameters

HEX	ASCII	Meaning	HEX	ASCII	Meaning
General Perspective			Independent Perspective		
0x2B	'+'	'+'	0x2B	'+'	UP
0x2D	'-'	'-'	0x2D	'-'	DOWN
0x30-39	'0'-'9'	'0'-'9'	0x30	'0'	OFF/NO/Disable
0x41-5A	'A'-'Z'	'A'-'Z'	0x31	'1'	ON/YES/Enable

2.7 Termination code

0x0A (LineFeed) Fixed

3.   Command control

3.1 NULL command

Command code

HEX		ASCII		Function	Operation	
0x00	0x00	NULL	NULL	NULL command	○	

Parameters: None

3.2 Power source [PoWer]

Command code

HEX		ASCII		Function	Operation	
0x50	0x57	'P'	'W'	Power source [POWER]	○	

Parameters

HEX	ASCII	Operation
0x30	'0'	Power OFF
0x31	'1'	Power ON
0x2B	'+'	Power ON/OFF toggle switch
0x2D	'-'	Power ON/OFF toggle switch

3.3 Input [InPut]

Command code

HEX		ASCII		Function	Operation	
0x49	0x50	'I'	'P'	Input switching [INPUT]	○	

Parameters: Data length 1 or 2
[Data 0]

HEX	ASCII	Operation
0x30	'0'	TV input
0x31	'1'	VIDEO1 input
0x32	'2'	VIDEO2 input
0x33	'3'	VIDEO3 input
0x34	'4'	VIDEO4 input
0x35	'5'	DIGITAL-1
0x36	'6'	DIGITAL-2
0x37	'7'	i.Link
0x2B	'+'	input + toggle switching
0x2D	'-'	input - toggle switching

3.4 Sound volume [VoLume]

Command code

HEX		ASCII		Function	Operation	
0x56	0x4C	'V'	'L'	Sound volume [VOLUME]	○	

Parameters Data length 1 or 2

HEX	ASCII	Operation
0x30~0x39	'0'~'9'	Direct setting of the numerical value of the sound volume
0x2B	'+'	Sound volume UP
0x2D	'-'	Sound volume DOWN

3.5 Audio muting [Audio Muting]

Command code

HEX		ASCII		Function	Operation	
0x41	0x4D	'A'	'M'	Audio muting [Audio Muting]	○	

Parameters Data length 1

HEX	ASCII	Operation
0x30	'0'	Sound volume MUTE OFF
0x31	'1'	Sound volume MUTE ON
0x2B	'+'	ON/OFF toggle switching of audio MUTE
0x2D	'-'	ON/OFF toggle switching of audio MUTE

3.6 Channel [CHannel]

Command code

HEX		ASCII		Function	Operation	
0x43	0x48	'C'	'H'	Channel [CHANNEL]	○	

Parameters Data length 1-7

HEX	ASCII	Operation
0x30~0x39	'0'~'9'	Direct channel selection
0x2B	'+'	Channel UP
0x2D	'-'	Channel DOWN/sub channel

- Direct channel specification is done with decimal numbers.

3.7 Video status [Video Status]

Command code

HEX		ASCII		Function	Operation	
0x56	0x53	'V'	'S'	Video status [Video Status]	○	

Parameters Data length 1

HEX	ASCII	Operation
0x30	'0'	Standard setting
0x31	'1'	Dynamic setting
0x32	'2'	Theater setting
0x33	'3'	Game setting
0x2B	'+'	Video status toggle switching
0x2D	'-'	Video status toggle switching

3.8 Aspect [ASpect]

Command code

HEX		ASCII		Function	Operation	
0x41	0x53	'A'	'S'	Aspect [ASPECT]	○	

Parameters Data length 1

HEX	ASCII	Operation
0x30	'0'	PANORAMA/ P. ZOOM setting
0x31	'1'	CINEMA/ C. ZOOM setting
0x32	'2'	FULL setting
0x33	'3'	REGULAR/SLIM setting
0x2B	'+'	Aspect toggle switching
0x2D	'-'	Aspect toggle switching

3.9 Remote control pass through

Command code

HEX		ASCII		Function	Operation
0x52	0x43	'R'	'C'	Remote control code pass through [Remote Code]	○

Parameters: Data length 4

HEX	ASCII	Operation
0x30~0x39	'0'~'9'	Remote control code setting
0x41~0x46	'A'~'F'	Remote control code setting

3.10Setup

Command code

HEX		ASCII		Function	Operation	
0x53	0x55	'S'	'U'	Initial setting [SetUp]	○	

Parameters: Data length unspecified
Subcommand table (mandatory commands only)

HEX		ASCII		Operation	Last memory
Mandatory command					
0x49	0x43	'I'	'C'	Individual code [Individual Code]	yes
0x52	0x4D	'R'	'M'	Remote control operation [ReMote]	no
0x46	0x4B	'F'	'K'	Front key operation [FrontKey]	no

- Consists of "subcommand" + "setting", where the subcommand is two bytes of ASCII characters.
- There are no explicit rules for commands other than mandatory commands.

The parameters of the various subcommands are as follows.

Parameters when the subcommand is [0x49, 0x43]   Data length 1

HEX	ASCII	Operation
0x80~0xFF	-	Individual code setting (Default: 0x80)

Parameters when the subcommand is [0x52, 0x4D]   Data length 1

HEX	ASCII	Operation
0x30	'0'	Disable (invalid)
0x31	'1'	Enable (valid)

Parameters when the subcommand is [0x46, 0x48]   Data length 1

HEX	ASCII	Operation
0x30	'0'	Disable (invalid)
0x31	'1'	Enable (valid)