ViewSonic Commercial CDxxxx RS232 Protocol

Contents

Version control

Date	Reversion	Changes and additions	by
05/03/2010	V1.0	First release, combine two protocol sets in one document	

1 Introduction

This document describes the hardware interface spec and software protocols of RS232 interface communication between ViewSonic Commercial Display and PC or other control unit with RS232 protocol.
ViewSonic commercial CD displays contain 2 set of protocol command

1. Protocol 1, with ID

This set protocol allow user to assign the ID in the command to control the specify ID of multiple displays

2. Protocol 2, without ID

This set protocol is best for single display control and for ViewSonic Network Media Players.

Both sets protocol contain three sections command:

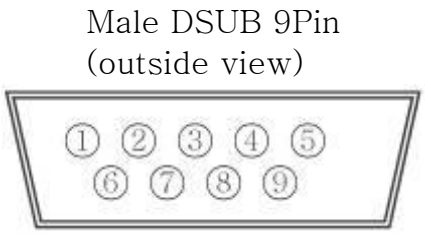
- Set-Function
- Get-Function
- Remote control pass-through mode

※In below document, "PC" will represents all the control units that can sent or receive the RS232 protocol command.

2 Description

2.1 Hardware specification

ViewSonic LCD communication port in the rear side
(1) Connector type: DSUB 9 Pin Male
(2) Pin Assignment



Pin #	Signal	Remark
1	NC	
2	RXD	Input to LCD Monitor
3	TXD	Output from LCD Monitor
4	NC	
5	GND	
6	NC	
7	NC	
8	NC	
9	NC	
frame	GND	

*Use of crossover (null modem) cable required for use with PC

2.2 Communication Setting

- Baud Rate Select: 9600bps (fixed)
- Data bits: 8bits (fixed)
- Parity: None (fixed)
- Stop Bits: 1(fixed)

2.3 Command Message Reference

PC sends to Monitor command packet followed by "CR". Every time PC sends control command to the Monitor, the Monitor shall response as follows:

1. If the message is receives correctly it will send "+" (02Bh) followed by "CR" (00Dh)
2. If the message is receives incorrectly it will send "-" (02Dh) followed by "CR" (00Dh)

3 Protocol 1: with ID

3.1 Command Description

Length:	Total Byte of Message excluding "CR"
TV ID	Identification for each of TV
Command Type	Identify command type, "s" (0x73h) : Set Command "g" (0x67h) : Get Command "r" (0x72h) : Reply Command "p" (0x70h) : RCU Pass-through "+" (0x2Bh) : Valid command Reply "-" (0x2Dh) : Invalid command Reply
Command:	Function command code: One byte ASCII code
Value[1~3]:	Three bytes ASCII that defines the value
CR	0x0D

3.2 Set-Function Listing

The PC can control the LCD Monitor for specific actions. The Set-Function command allows you to control the LCD monitor behavior in a remote sit through the RS232 port. The Set-Function packet format consists of 11 bytes.

Set-Function description:

Length:	Total Byte of Message excluding "CR"
TV ID	Identification for each of TV If we want to set all TV settings, TV ID can use "**99**" to achieve, and it will not have **Reply** command on this function.
Command Type	Identify command type, "s" (0x73h) : Set Command
Command:	Function command code: One byte ASCII code
Value[1~3]:	Three bytes ASCII that defines the value
CR	0x0D

Set-Function format
Send: (Command Type="s")

Name	Length	ID	Command Type	Command	Value1	Value2	Value3	CR
Byte Count	1 Byte	2 Byte	1 Byte	1 Byte	1 Byte	1 Byte	1 Byte	1 Byte
Bytes order	1	2~3	4	5	6	7	8	9

Reply: (Command Type="+" or "-")

Name	**Length**	**ID**	**Command Type**	**CR**
Byte Count	1 Byte	2 Byte	1 Byte	1 Byte
Bytes order	1	2~3	4	5

Example1: Set Brightness as 76 for TV-02 and this command is valid
Send (Hex Format)

Name	**Length**	**ID**	**Command Type**	**Command**	**Value1**	**Value2**	**Value3**	**CR**
Hex	0x38	0x30 0x32	0x73	0x24	0x30	0x37	0x36	0x0D

Reply (Hex Format)

Name	**Length**	**ID**	**Command Type**	**CR**
Hex	0x34	0x30 0x32	0x2B	0x0D

Example2: Set Brightness as 176 for TV-02 and this command is NOT valid
Send (Hex Format)

Name	**Length**	**ID**	**Command Type**	**Command**	**Value1**	**Value2**	**Value3**	**CR**
Hex	0x38	0x30 0x32	0x73	0x24	0x31	0x37	0x36	0x0D

Reply (Hex Format)

Name	**Length**	**ID**	**Command Type**	**CR**
Hex	0x34	0x30 0x32	0x2D	0x0D

Example3: Set Tint as 32 for TV-03 and this command is valid
Send (Hex Format)

Name	**Length**	**ID**	**Command Type**	**Command**	**Value1**	**Value2**	**Value3**	**CR**
Hex	0x38	0x30 0x33	0x73	0x27	0x30	0x33	0x32	0x0D

Reply (Hex Format)

Name	**Length**	**ID**	**Command Type**	**CR**
Hex	0x34	0x30 0x33	0x2B	0x0D

Example4: Set Tint as 75 for TV-03 and this command is NOT valid
Send (Hex Format)

Name	**Length**	**ID**	**Command Type**	**Command**	**Value1**	**Value2**	**Value3**	**CR**
Hex	0x38	0x30 0x33	0x73	0x27	0x30	0x37	0x35	0x0D

Reply (Hex Format)

Name	**Length**	**ID**	**Command Type**	**CR**
Hex	0x34	0x30 0x33	0x2B	0x0D

Example5: Set Brightness as 76 for all TV and this command is valid
Send (Hex Format)

Name	Length	ID	Command Type	Command	Value1	Value2	Value3	CR
Hex	0x38	0x39 0x39	0x73	0x24	0x30	0x37	0x36	0x0D

No Reply.

Commercial displays set-function table

Set Function	Length	ID	Command Type	Command		Value Range (Three ASCII bytes)	Comments
				Code (ASCII)	Code (Hex)		
Power	8		s	!	21	000: STBY 001: ON	Controlled power status: ON or Standby
Input Select	8		s	"	22	000 : VGA 001 : HDMI 002 : DVI-D 003 : AV 004 : YPbPr 005 : S-Video	
Contrast	8		s	#	23	000 ~ 100	
Brightness	8		s	$	24	000 ~ 100	
Sharpness	8		s	%	25	000 ~ 100	
Color	8		s	&	26	000 ~ 100	
Tint	8		s	`	27	000 ~ 100	
Bass	8		s	.	2E	000 ~ 100	Sets Bass value
Treble	8		s	/	2F	000 ~ 100	Sets Treble value
Balance	8		s	0	30	000 ~ 100	Sets Balance position
Picture Size	8		s	1	31	000 : FULL 001 : NORMAL 002 : CUSTOM 003 : DYNAMIC 004 : REAL	
OSD Language	8		s	2	32	000 : English 001 : French 002 : Spanish 003 : Germany 004 : Italian 005 : Simplified Chinese 006 : Russian 007 : Polish 008 : Turkish	
OSD timeout	8		s	3	33	005 ~120 Sec	Set OSD timeout
Volume	8		s	5	35	000 ~ 100	
Mute	8		s	6	36	000: OFF 001: ON (mute)	
Off Timer	8		s	7	37	000: OFF 001~024 (hour)	
PIP Mode	8		s	9	39	000 : OFF 001: PIP 002: POP 003 : PBP 004 : PBPA	

PIP Sound select	8		s	:	3A	000: Main 001: PIP	
PIP position	8		s	;	3B	000: Up 001: Down 002: Left 003: Right	
PIP Input	8		s	<	3C	000 : VGA 001 : HDMI 002 : DVI-D 003 : AV 004 : YPbPr 005 : S-Video	
Monitor ID	8		s	=	3D	001 ~ 026	
Key Pad	8		s	A	41	000 : POWER 001 : SOURCE 002 : MENU/EXIT 003 : UP 004 : DOWN 005 : LEFT 006 : RIGHT 007 : MUTE	
Remote Control	8		s	B	42	000: Disable 001: Enable 002: Pass through	**Disable**: RCU has no effect on HDTV. **Enabled**: RCU controls the HDTV. This is the power up default on the HDTV. **Pass through:** RCU has no effect on HDTV and all RCU command codes are transmitted to FC via the RS232 port. See page 15 for more details
Key Pad	8		s	C	43	000: Disable 001: Enable	**Disable**: Key Pad have no effect on HDTV. **Enabled**: Key Pad control the HDTV. This is the power up default on the HDTV.
Factory reset	8		s	~	7E	0	Rests HDTV to factory setting

3.3 Get-Function Listing

The PC can interrogate the LCD Monitor for specific information. The Get-Function packet format consists of 5 bytes which is similar to the Set-Function packet structure. Note that the "Value" byte is always = 00.

Get-Function description:

Length:	Total Byte of Message excluding "CR"
TV ID	Identification for each of TV
Command Type	Identify command type, "g" (0x67h) : Get Command
Command:	Function command code: One byte ASCII code
Value[1~3]:	Three bytes ASCII that defines the value
CR	0x0D

Get-Function format
Send: (Command Type="g")

Name	Length	ID	Command Type	Command	Value1	Value2	Value3	CR
Byte Count	1 Byte	2 Byte	1 Byte	1 Byte	1 Byte	1 Byte	1 Byte	1 Byte
Bytes order	1	2~3	4	5	6	7	8	9

Reply: (Command Type="r" or "-")
If the Command is valid, Command Type ="r"

Name	Length	ID	Command Type	Command	Value1	Value2	Value3	CR
Byte Count	1 Byte	2 Byte	1 Byte	1 Byte	1 Byte	1 Byte	1 Byte	1 Byte
Bytes order	1	2~3	4	5	6	7	8	9

If the Command is Not valid, Command Type="-"

Name	Length	ID	Command Type	CR
Byte Count	1 Byte	2 Byte	1 Byte	1 Byte
Bytes order	1	2~3	4	5

Example1: Get Brightness from TV-05 and this command is valid.
The Brightness value is 67.
Send (Hex Format)

Name	Length	ID	Command Type	Command	Value1	Value2	Value3	CR
Hex	0x38	0x30 0x35	0x67	0x62	0x30	0x30	0x30	0x0D

Reply(Hex Format)

Name	Length	ID	Command Type	Command	Value1	Value2	Value3	CR
Hex	0x38	0x30 0x35	0x72	0x62	0x30	0x36	0x37	0x0D

Example2: Get Brightness from TV-05, but the Brightness command ID is error and it is NOT in the command table.

Send (Hex Format)

Name	Length	ID	Command Type	Command	Value1	Value2	Value3	CR
Hex	0x38	0x30 0x35	0x67	0XD3	0x30	0x30	0x30	0x0D

Reply (Hex Format)

Name	Length	ID	Command Type	CR
Hex	0x34	0x30 0x35	0x2D	0x0D

Example3: Get Tint from TV-0007 and this command is valid.
The Tint value is 32.

Send (Hex Format)

Name	Length	ID	Command Type	Command	Value1	Value2	Value3	CR
Hex	0x38	0x30 0x37	0x67	0X65	0x30	0x30	0x30	0x0D

Reply (Hex Format)

Name	Length	ID	Command Type	Command	Value1	Value2	Value3	CR
Hex	0x38	0x30 0x37	0x72	0x65	0x30	0x33	0x32	0x0D

Example4: Get Tint from TV-07 , but the Brightness command ID is error and it is NOT in the command table.

Send (Hex Format)

Name	Length	ID	Command Type	Command	Value1	Value2	Value3	CR
Hex	0x38	0x30 0x37	0x67	0XD7	0x30	0x30	0x30	0x0D

Reply (Hex Format)

Name	Length	ID	Command Type	CR
Hex	0x34	0x30 0x37	0x2D	0x0D

Example5: Get SN from TV-01 , but the Brightness command ID is error and it is NOT in the command table.

Send (Hex Format)

Name	Length	ID	Command Type	Command	Value1	Value2	Value3	CR
Hex	0x38	0x30 0x31	0x67	0X6B	0x30	0x30	0x30	0x0D

Reply (Hex Format)

Name				
Hex	0x34	0x30 0x37	0x2D	0x0D

PC Get-function command to Commercial Displays

Get Function	Length	ID	Command Type	Command		Response Range (Three ASCII bytes)	Comments
				Code (ASCII)	Code (Hex)		
Get-Contrast	8		g	a	61	000 ~ 100	Gets Contrast value
Get-Brightness	8		g	b	62	000 ~ 100	Gets Brightness value
Get-Sharpness	8		g	c	63	000 ~ 100	Gets Sharpness value
Get-Color	8		g	d	64	000 ~ 100	Gets Color value
Get-Tint	8		g	e	65	000 ~ 100	Gets Tint value
Get-Volume	8		g	f	66	000 ~ 100	Gets Volume value
Get-Mute	8		g	g	67	000: OFF (unmuted) 001: ON (muted)	Gets Mute ON/OFF status
Get-RCU	8		g	h	68	000: Disable 001: Enable 002: Pass through	Gets RCU mode status
Get-Key Pad	8		g	i	69	000: Disable 001: Enable	Gets Buttons ON/OFF status
Get-Input select	8		g	j	6A	000: VGA 001: HDMI 002: DVI-D 003: AV 004: YPbPr 005: S-Video	Gets Input select status
Get-Power status	8		g	l	6C	000: STBY 001: ON	Gets the status of the HDTV power. HDTV response: 000 = HDTV is in standby 001 = HDTV is ON
Get-ACK	8		g	z	7A	0	This command is used to test the communication link.

4 Protocol 2: without ID

4.1 Set function listing

The PC can control the LCD Monitor for specific actions. The Set-Function command allows you to control the LCD monitor behavior in a remote sit through the RS232 port. The Set-Function packet format consists of 5 bytes. Note that the "Value" byte is always = 00.

Set-Function description:

Length: Total bytes of message = 5 ASCII (35H) excluding "CR"

Command: Function command code: One byte ASCII code

Value[1~3]: Three bytes ASCII that defines the value

Set-Function format:

Name	Length	Command	Value1	Value2	Value3	CR
Byte Count	1 Byte	1 Byte	1 Byte	1 Byte	1 Byte	1 Byte
Bytes order	1	2	3	4	5	6

All Set-Function from PC to Monitor (ASCII)

Name	Length	Command	Value1	Value2	Value3	CR
Byte Count	**5**	**1 Byte**	**1 Byte**	**1 Byte**	**1 Byte**	**00D**
Bytes order	1	2	3	4	5	6

Example: Set Mute-ON command (ASCII)

Name	Length	Command	Value1	Value2	Value3	CR
Byte Count	**5**	**6**	**0**	**0**	**0**	**00D**
Bytes order	1	2	3	4	5	6

Example: Set Mute-OFF command (ASCII)

Name	Length	Command	Value1	Value2	Value3	CR
Byte Count	**5**	**6**	**0**	**0**	**1**	**00D**
Bytes order	1	2	3	4	5	6

Example: Set Tint to 50 command (ASCII)

Name	Length	Command	Value1	Value2	Value3	CR
Byte Count	**5**	**`**	**0**	**5**	**0**	**00D**
Bytes order	1	2	3	4	5	6

LCD Monitor will send "+" (02Bh) and "CR" bytes to PC after receiving a valid command.
LCD Monitor will send "-" (02Dh) and "CR" bytes to PC if the command is not valid.

Value Range: Three bytes ASCII value range
Command Code: Function command code in ASCII

Commercial displays set command table

Set Function	Length	Command Code (ASCII)	Command Code (Hex)	Value Range (Three ASCII bytes)	Comments
Power	5	!	21	000: STBY 001: ON	Controlled power status: ON or Standby
Input Select	5	"	22	000 : VGA 001 : HDMI 002 : DVI-D 003 : AV 004 : YPbPr 005 : S-Video	
Contrast	5	#	23	000 ~ 100	
Brightness	5	$	24	000 ~ 100	
Sharpness	5	%	25	000 ~ 100	
Color	5	&	26	000 ~ 100	
Tint	5	`	27	000 ~ 100	
Bass	5	.	2E	000 ~ 100	Sets Bass value
Treble	5	/	2F	000 ~ 100	Sets Treble value
Balance	5	0	30	000 ~ 100	Sets Balance position
Picture Size	5	1	31	000 : FULL 001 : NORMAL 002 : CUSTOM 003 : DYNAMIC 004 : REAL	
OSD Language	55	2	32	000 : English 001 : French 002 : Spanish 003 : Germany 004 : Italian 005 : Simplified Chinese 006 : Russian 007 : Polish 008 : Turkish	
OSD timeout	5	3	33	005 ~120 Sec	Set OSD timeout
Volume	5	5	35	000 ~ 100	
Mute	5	6	36	000: OFF 001: ON (mute)	
Off Timer	5	7	37	000: OFF 001~024 (hour)	
PIP Mode	5	9	39	000 : OFF 001: PIP 002: POP 003 : PBP 004 : PBPA	
PIP Sound select	5	:	3A	000: Main 001: PIP	
PIP position	5	;	3B	000: Up 001: Down 002: Left 003: Right	
PIP Input	5	<	3C	000 : VGA 001 : HDMI 002 : DVI-D 003 : AV	

				004 : YPbPr 005 : S-Video	
Monitor ID	5	=	3D	001 ~ 026	
~~Number~~	~~5~~	~~@~~	~~40~~	~~000 ~ 009~~	
Key Pad	5	A	41	000 : POWER 001 : SOURCE 002 : MENU/EXIT 003 : UP 004 : DOWN 005 : LEFT 006 : RIGHT 007 : MUTE	
Remote Control	5	B	42	000: Disable 001: Enable 002: Pass through	**Disable**: RCU has no effect on HDTV. **Enabled**: RCU controls the HDTV. This is the power up default on the HDTV. **Pass through:** RCU has no effect on HDTV and all RCU command codes are transmitted to FC via the RS232 port. See page 15 for more details
Key Pad	5	C	43	000: Disable 001: Enable	**Disable**: Key Pad have no effect on HDTV. **Enabled**: Key Pad control the HDTV. This is the power up default on the HDTV.
Factory reset	5	~	7E	0	Rests HDTV to factory setting

4.2 Get-Function Listing

The PC can interrogate the LCD Monitor for specific information. The Get-Function packet format consists of 5 bytes which is similar to the Set-Function packet structure. Note that the "Value" byte is always = 00.

Get-Function description:

Length: Total bytes of message = 5 ASCII (35H), excluding "CR"

Command: Get-Function command code: One byte ASCII code

Value[1~3]: Always = 000

Get-Function format from PC to LCD (ASCII)

Name	Length	Command	Value1	Value2	Value3	CR
Byte Count	**5**	**1 Byte**	**0**	**0**	**0**	**00D**
Bytes order	1	2	3	4	5	6

Monitor shall response to Get-Function with the following packet format:

LCD Monitor response packet format:

Name	Length	Value1	Value2	Value3	Value4	CR

Byte Count	5	1 Byte	1 Byte	1 Byte	1 Byte	00D
Bytes order	1	2	3	4	5	6

Response packet (to Get-Function):

Length: Total bytes of packet = 5 ASCII excluding "CR"

Exception: Total bytes for On-Hours = 6

Value[1-4]: Four ASCII codes: Value range is from 0000 ~ 9999

Exception: Value[1-5] for On-Hours

LCD Monitor will send "+" (02Bh), "CR" bytes to PC after receiving a valid command
LCD Monitor will send "-" (02Dh), "CR" bytes to PC if the command is not valid

- **The following is an example of PC requesting the volume value from the LCD Monitor:**

PC send Get-Volume-value packet to Monitor (In ASCII)

Name	Length	Command	Value1	Value2	Value3	CR
Byte Count	5	f	0	0	0	00D
Bytes order	1	2	3	4	5	6

LCD Monitor will send "-" (02Dh), "CR" to PC if command is not recognized.
Otherwise the LCD Monitor will respond with the volume value as outlined below:

LCD-Monitor response packet to Get-volume-value (in this example the volume value is 50):

Name	Length	Value1	Value2	Value3	Value4	CR
Byte Count	5	0	0	5	0	00D
Bytes order	1	2	3	4	5	6

A special command "Get-ACK" is used to test the communication link between PC and the LCD Monitor. The LCD Monitor shall response to "Get-ACK" command with a "+" or "-".

Get-ACK from PC to LCD (ASCII)

Name	Length	Command	Value1	Value2	Value3	CR
Byte Count	5	z	0	0	0	00D
Bytes order	1	2	3	4	5	6

LCD Monitor will send "+" (02Bh); "CR" bytes to PC after receiving the command indicating that the communication link is OK

Get Function	Length	Command Code (ASCII)	Command Code (Hex)	Response Range (Three ASCII bytes)	Comments
Get-Contrast		a	61	000 ~ 100	Gets Contrast value
Get-Brightness		b	62	000 ~ 100	Gets Brightness value
Get-Sharpness		c	63	000 ~ 100	Gets Sharpness value
Get-Color		d	64	000 ~ 100	Gets Color value
Get-Tint		e	65	000 ~ 100	Gets Tint value
Get-Volume		f	66	000 ~ 100	Gets Volume value
Get-Mute		g	67	000: OFF (unmuted) 001: ON (muted)	Gets Mute ON/OFF status
Get-RCU		h	68	000: Disable 001: Enable 002: Pass through	Gets RCU mode status
Get-Key Pad		i	69	000: Disable 001: Enable	Gets Buttons ON/OFF status
Get-Input select		j	6A	000: VGA 001: HDMI 002: DVI-D 003: AV 004: YPbPr 005: S-Video	Gets Input select status
Get-Power status		l	6C	000: STBY 001: ON	Gets the status of the HDTV power. HDTV response: 000 = HDTV is in standby 001 = HDTV is ON
Get-ACK		z	7A	0	This command is used to test the communication link.

4.3 Remote Control Pass-through mode

When PC sets the LCD monitor to Remote Control Pass through mode, the LCD shall send a three bytes packet (followed by "CR") in response to RCU button activation. Note, that in this mode the RCU shall have no effect on the monitor function. For example: "+Volume" will not change the volume in the LCD but only sends "+Volume" code to PC over the RS232 port.

Remote Control pass-through packet format from LCD monitor to PC(ASCII)

Name	**Length**	**RCU-Code1**	**RCU-Code2**	**CR**
Byte Count	**3**	**MSB**	**LSB**	**00D**
Bytes order	1	2	3	4

Example: Remote Control pass-through when "Menu" key is pressed (1A)

Name	**Length**	**RCU-Code1**	**RCU-Code2**	**CR**
Byte Count	**3**	**1**	**A**	**00D**
Bytes order	1	2	3	4

Example: Remote Control pass-through when key "1" is pressed (01)

Name	**Length**	**RCU-Code1**	**RCU-Code2**	**CR**
Byte Count	**3**	**0**	**1**	**00D**
Bytes order	1	2	3	4

Example: Remote Control pass-through when "OK" key is pressed (1F)

Name	**Length**	**RCU-Code1**	**RCU-Code2**	**CR**
Byte Count	**3**	**1**	**F**	**00D**
Bytes order	1	2	3	4

Key	**Code (HEX)**
Size	0F
Volume Up (**+**)	10
Volume Down (**-**)	11
Mute	12
POWER	15
INPUT	16
PIP ON/OFF	17
MENU	1A
Up	1B
Down	1C
Left(-)	1D
Right(+)	1E
SET	1F

PIP INPUT	20
PIP CHANGE	21
PICTURE MODE	22
AUDIO INPUT	23
SCREEN SAVER MOTION	24
SCREEN SAVER BRIGHTNESS	25
DISPLAY	26
AUTO SETUP	27
EXIT	28