

## Planar PS-Series RS232 protocol

(Applies to PS4200, PS4200TL, PS4250, PS4650, PS5550, PS5551, PS6500 models only)

### Table of contents

|     |                                       |    |
|-----|---------------------------------------|----|
| 1   | Introduction .....                    | 2  |
| 2   | Description.....                      | 2  |
| 2.1 | Hardware specification.....           | 2  |
| 2.2 | Communication Setting .....           | 2  |
| 2.3 | Command Message Reference .....       | 2  |
| 3   | Protocol 1 : with ID .....            | 3  |
| 3.1 | Command Description .....             | 3  |
| 3.2 | Set-Function Listing .....            | 3  |
| 3.3 | Get-Function Listing.....             | 8  |
| 4   | Protocol 2 : without ID .....         | 16 |
| 4.1 | Set function listing.....             | 16 |
| 4.2 | Remote Control Pass-through mode..... | 20 |

## 1 Introduction

This document describes the hardware interface spec and software protocols of RS232 interface communication between Commercial Display and PC or other control unit with RS232 protocol.

### 1. Protocol 1, with ID

This set protocol allow user to assign the ID in the command to control the specify ID monitor

### 2. Protocol 2, without ID

The set protocol is best for single display control

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.

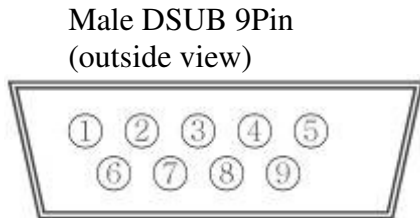
## 2 Description

### 2.1 Hardware specification

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 received correctly it will send “+” (0x2Bh) followed by “CR” (00Dh)
2. If the message is received incorrectly it will send “-” (0x2Dh) 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 Identify command type,  
 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 Identify command type,  
 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 | Value 1 | Value 2 | Value 3 | 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 | 1 Byte | 2  | 1 Byte       | 1  |

| Count       |   | Byte |   | 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     | Value 1     | Value 2     | Value 3     | CR                     |
|------|-------------|----------------------------|--------------|-------------|-------------|-------------|-------------|------------------------|
| Hex  | <u>0x38</u> | <u>0x30</u><br><u>0x32</u> | <u>0x73</u>  | <u>0x24</u> | <u>0x30</u> | <u>0x37</u> | <u>0x36</u> | <u>0x0</u><br><u>D</u> |

Reply (Hex Format)

| Name | Length      | ID                         | Command Type | CR                     |
|------|-------------|----------------------------|--------------|------------------------|
| Hex  | <u>0x34</u> | <u>0x30</u><br><u>0x32</u> | <u>0x2B</u>  | <u>0x0</u><br><u>D</u> |

Example2: Set Brightness as 176 for TV-02 and this command is NOT valid

Send (Hex Format)

| Name | Length      | ID                         | Command Type | Command     | Value 1     | Value 2     | Value 3     | CR                     |
|------|-------------|----------------------------|--------------|-------------|-------------|-------------|-------------|------------------------|
| Hex  | <u>0x38</u> | <u>0x30</u><br><u>0x32</u> | <u>0x73</u>  | <u>0x24</u> | <u>0x31</u> | <u>0x37</u> | <u>0x36</u> | <u>0x0</u><br><u>D</u> |

Reply (Hex Format)

| Name | Length      | ID                         | Command Type | CR                     |
|------|-------------|----------------------------|--------------|------------------------|
| Hex  | <u>0x34</u> | <u>0x30</u><br><u>0x32</u> | <u>0x2D</u>  | <u>0x0</u><br><u>D</u> |

Example3: Set Tint as 32 for TV-03 and this command is valid

Send (Hex Format)

| Name | Length      | ID                         | Command Type | Command     | Value 1     | Value 2     | Value 3     | CR                     |
|------|-------------|----------------------------|--------------|-------------|-------------|-------------|-------------|------------------------|
| Hex  | <u>0x38</u> | <u>0x30</u><br><u>0x33</u> | <u>0x73</u>  | <u>0x27</u> | <u>0x30</u> | <u>0x33</u> | <u>0x32</u> | <u>0x0</u><br><u>D</u> |

Reply (Hex Format)

| Name | Length      | ID                         | Command Type | CR                     |
|------|-------------|----------------------------|--------------|------------------------|
| Hex  | <u>0x34</u> | <u>0x30</u><br><u>0x33</u> | <u>0x2B</u>  | <u>0x0</u><br><u>D</u> |

Example4: Set Tint as 75 for TV-03 and this command is NOT valid

Send (Hex Format)

| Name | Length      | ID                         | Command Type | Command     | Value 1     | Value 2     | Value 3     | CR                     |
|------|-------------|----------------------------|--------------|-------------|-------------|-------------|-------------|------------------------|
| Hex  | <u>0x38</u> | <u>0x30</u><br><u>0x33</u> | <u>0x73</u>  | <u>0x27</u> | <u>0x30</u> | <u>0x37</u> | <u>0x35</u> | <u>0x0</u><br><u>D</u> |

Reply (Hex Format)

| Name | Length      | ID                         | Command Type | CR                     |
|------|-------------|----------------------------|--------------|------------------------|
| Hex  | <u>0x34</u> | <u>0x30</u><br><u>0x33</u> | <u>0x2D</u>  | <u>0x0</u><br><u>D</u> |

Example5: Set Brightness as 76 for all TV and this command is valid

Send (Hex Format)

| Name | Length      | ID                         | Command Type | Command     | Value 1     | Value 2     | Value 3     | CR                     |
|------|-------------|----------------------------|--------------|-------------|-------------|-------------|-------------|------------------------|
| Hex  | <u>0x38</u> | <u>0x39</u><br><u>0x39</u> | <u>0x73</u>  | <u>0x24</u> | <u>0x30</u> | <u>0x37</u> | <u>0x36</u> | <u>0x0</u><br><u>D</u> |

No Reply.

Set-function table

| Set Function     | Len | ID | Cmd Type | Command Code |       | Value Range (Three ASCII bytes)   | Comments                            |
|------------------|-----|----|----------|--------------|-------|---|-------------------------------------|
|                  |     |    |          | (ASCII)      | (Hex) |   |                                     |
| Picture mode     | 8   |    | s        |              | 81    | 000: STANDARD<br>001: VIVID<br>002: CINEMA<br>003: USER                       |                                     |
| Contrast         | 8   |    | s        | #            | 23    | 000 ~ 100   |                                     |
| Brightness       | 8   |    | s        | \$           | 24    | 000 ~ 100   |                                     |
| Color            | 8   |    | s        |              | 82    | 000 ~ 100   |                                     |
| Tint             | 8   |    | s        |              | 83    | 000 ~ 100   |                                     |
| Sharpness        | 8   |    | s        | %            | 25    | 000 ~ 010   |                                     |
| Backlight        | 8   |    | s        |              | 84    | 000 ~ 100   | Step : 20 for OSD display range 0~5 |
| DCR              | 8   |    | s        |              | 85    | 000: OFF<br>001: ON   |                                     |
| Color Temp       | 8   |    | S        |              | 86    | 000: 1200K<br>001: 9300K<br>002: 6500K<br>004: User                           |                                     |
| Input Resolution | 8   |    | s        |              | 87    | 000: AUTO<br>001: 1024x768<br>002: 1280x768<br>003: 1360x768<br>004: 1366x768 |                                     |
| Volume           | 8   |    | s        | 5            | 35    | 000 ~ 100   |                                     |

|                 |   |  |   |   |    |  |   |
|-----------------|---|--|---|---|----|--|---|
| Mute            | 8 |  | s | 6 | 36 | 000: OFF<br>001: ON  |   |
| Audio Source    | 8 |  | s |   | 88 | 000: Audio1<br>001: HDMI<br>002: Audio2<br>003: Audio3                               |   |
| Speaker         | 8 |  | s |   | 89 | 000: Internal<br>001: External<br>002: Lineout                                       | Only effected for models include internal speakers. |
| Aspect Ratio    | 8 |  | s | 1 | 31 | 000: Full<br>001: Original   |   |
| PIP Enable      | 8 |  | s |   | 8A | 000: OFF<br>001: ON  |   |
| PIP Main Input  | 8 |  | s |   | 8B | 000: VGA<br>001: YPbPr<br>002: DVI<br>003: HDMI                                      |   |
| PIP Sub Input   | 8 |  | s |   | 8C | 000: VGA<br>001: YPbPr<br>002: DVI<br>003: HDMI                                      |   |
| PIP Size        | 8 |  | s |   | 8D | 000: Small<br>001: Middle<br>002: Large  |   |
| PIP Position    | 8 |  | s |   | 8E | 000: Move Down<br>001: Move Up<br>002: Move Left<br>003: Move Right                  |   |
| Video Source    | 8 |  | s | " | 22 | 000 : VGA<br>001 : HDMI1<br>003 : CVBS1<br>004 : YPbPr<br>005 : S-Video<br>006 : DVI |   |
| Auto adjustment | 8 |  | s |   | 8F |  |   |

|                      |   |  |   |   |    |   |                                 |
|----------------------|---|--|---|---|----|---|---------------------------------|
| Clock frequency      | 8 |  | s |   | 90 | 000 ~ 32                                    |                                 |
| Phase                | 8 |  | s |   | 91 | 000 ~ 32                                    |                                 |
| H.Position           | 8 |  | s |   | 92 | 000 ~ 100                                   |                                 |
| V.Position           | 8 |  | s |   | 93 | 000 ~ 100                                   |                                 |
| Ambient Light Sensor | 8 |  | s |   | 94 | 000: OFF<br>001: ON                         |                                 |
| Blue Screen          | 8 |  | s |   | 95 | 000: OFF<br>001: ON                         |                                 |
| Auto Detect          | 8 |  | s |   | 96 | 000: OFF<br>001: ON                         |                                 |
| Touch Feature        | 8 |  | s |   | 9E | 000: OFF<br>001: On                         | Only effected for Touch models. |
|                      |   |  |   |   |    |   |                                 |
| Language             | 8 |  | s | 2 | 32 | 000: English<br>001: French<br>002: Spanish |                                 |
|                      |   |  |   |   |    | 003: Czech                                  | Optional by different models.   |
|                      |   |  |   |   |    | 004: Danish                                 | Optional by different models.   |
| Over Scan            | 8 |  | s |   | 97 | 000: OFF<br>001: ON                         |                                 |
| RTC Year             | 8 |  | s |   | 98 | 000 ~ 099                                   | From 2000~2099                  |
| RTC Month            | 8 |  | s |   | 99 | 000 ~ 012                                   |                                 |
| RTC Day              | 8 |  | s |   | 9A | 000 ~ 031                                   |                                 |
| RTC Hour             | 8 |  | s |   | 9B | 000 ~ 023                                   |                                 |
| RTC Minute           | 8 |  | s |   | 9C | 000 ~ 059                                   |                                 |
| Daylight saving time | 8 |  | s |   | 9D | 000: OFF<br>001: ON                         |                                 |
| H Monitor            | 8 |  | s |   | A4 | 001 ~ 010                                   |                                 |
| V Monitor            | 8 |  | s |   | A5 | 001 ~ 010                                   |                                 |
| H Position           | 8 |  | s |   | A6 | 001 ~ 010                                   |                                 |
| V Position           | 8 |  | s |   | A7 | 001 ~ 010                                   |                                 |
| Frame Comp.          | 8 |  | s |   | A8 | 000: OFF<br>001: ON                         |                                 |
| Power save           | 8 |  | s |   | A9 | 000: OFF<br>001: Eco                        |                                 |

|                    |   |  |   |   |    |  |
|--------------------|---|--|---|---|----|--|
|                    |   |  |   |   |    | 002: VGA Only<br>003: Standard   |
| Monitor ID         | 8 |  | s | = | 3D | 001 ~ 098  |
| Image retention    | 8 |  | s | G | 47 | 000: OFF<br>001: ON  |
| Auto adjustment    | 8 |  | s |   | AA | 000: OFF<br>001: ON  |
| DDC/CI             | 8 |  | s |   | AB | 000: OFF<br>001: ON  |
| Reset User Default | 8 |  | s |   | AC |  |
| OSD Info Box       | 8 |  | s | [ | 5B | 000: OFF<br>001: ON  |
| Store User Default | 8 |  | s |   | AD |  |
| Factory Reset      | 8 |  | s | ~ | 7E |  |
| Power              | 8 |  | s | ! | 21 | 000: STBY<br>001: ON   |
| Key Pad            | 8 |  | s | A | 41 | 000 : POWER<br>001 : SOURCE<br>002 : MENU<br>003 : UP<br>004 : DOWN<br>005 : LEFT<br>006 : RIGHT<br>007 : MUTE |
| Remote Control     | 8 |  | s | B | 42 | 000: Disable<br>001: Enable<br>002: Pass through   |
| Key Pad function   | 8 |  | s | C | 43 | 000: Disable<br>001: Enable  |
| Menu Key function  | 8 |  | s | E | 45 | 000: Disable<br>001: Enable  |
| Power Key function | 8 |  | s | F | 46 | 000: Disable<br>001: Enable  |

### 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 Identify command type,  
 Type “g” (0x67h) : Get Command  
 Command: Function command code: One byte ASCII code  
 Value[1~3]: Three bytes ASCII that defines the value  
 NOTE: to get backlight sensor, thermal sensor, and ambient sensor need four bytes ASCII that defines the value and the length is 9.  
 CR 0x0D

Get-Function format

Send: (Command Type=”g”)

| Name        | Length | ID     | Command Type | Command | Value 1 | Value 2 | Value 3 | 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 | Value 1 | Value 2 | Value 3 | 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 | Value 1 | Value 2 | Value 3 | CR   |
|------|--------|--------------|--------------|---------|---------|---------|---------|------|
| Hex  | 0x38   | 0x30<br>0x35 | 0x67         | 0x62    | 0x30    | 0x30    | 0x30    | 0x0D |

Reply(Hex Format)

| Name | Length | ID | Command Type | Command | Value 1 | Value 2 | Value 3 | CR |
|------|--------|----|--------------|---------|---------|---------|---------|----|
|------|--------|----|--------------|---------|---------|---------|---------|----|

|     |             |                            |             |             |             |             |             |                        |
|-----|-------------|----------------------------|-------------|-------------|-------------|-------------|-------------|------------------------|
| Hex | <u>0x38</u> | <u>0x30</u><br><u>0x35</u> | <u>0x72</u> | <u>0x62</u> | <u>0x30</u> | <u>0x36</u> | <u>0x37</u> | <u>0x0</u><br><u>D</u> |
|-----|-------------|----------------------------|-------------|-------------|-------------|-------------|-------------|------------------------|

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     | Value 1     | Value 2     | Value 3     | CR                     |
|------|-------------|----------------------------|--------------|-------------|-------------|-------------|-------------|------------------------|
| Hex  | <u>0x38</u> | <u>0x30</u><br><u>0x35</u> | <u>0x67</u>  | <u>0XD3</u> | <u>0x30</u> | <u>0x30</u> | <u>0x30</u> | <u>0x0</u><br><u>D</u> |

Reply (Hex Format)

| Name | Length      | ID                         | Command Type | CR                     |
|------|-------------|----------------------------|--------------|------------------------|
| Hex  | <u>0x34</u> | <u>0x30</u><br><u>0x35</u> | <u>0x2D</u>  | <u>0x0</u><br><u>D</u> |

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     | Value 1     | Value 2     | Value 3     | CR                     |
|------|-------------|----------------------------|--------------|-------------|-------------|-------------|-------------|------------------------|
| Hex  | <u>0x38</u> | <u>0x30</u><br><u>0x37</u> | <u>0x67</u>  | <u>0X65</u> | <u>0x30</u> | <u>0x30</u> | <u>0x30</u> | <u>0x0</u><br><u>D</u> |

Reply (Hex Format)

| Name | Length      | ID                         | Command Type | Command     | Value 1     | Value 2     | Value 3     | CR                     |
|------|-------------|----------------------------|--------------|-------------|-------------|-------------|-------------|------------------------|
| Hex  | <u>0x38</u> | <u>0x30</u><br><u>0x37</u> | <u>0x72</u>  | <u>0x65</u> | <u>0x30</u> | <u>0x33</u> | <u>0x32</u> | <u>0x0</u><br><u>D</u> |

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     | Value 1     | Value 2     | Value 3     | CR                     |
|------|-------------|----------------------------|--------------|-------------|-------------|-------------|-------------|------------------------|
| Hex  | <u>0x38</u> | <u>0x30</u><br><u>0x37</u> | <u>0x67</u>  | <u>0XD7</u> | <u>0x30</u> | <u>0x30</u> | <u>0x30</u> | <u>0x0</u><br><u>D</u> |

Reply (Hex Format)

| Name | Length      | ID                         | Command Type | CR                     |
|------|-------------|----------------------------|--------------|------------------------|
| Hex  | <u>0x34</u> | <u>0x30</u><br><u>0x37</u> | <u>0x2D</u>  | <u>0x0</u><br><u>D</u> |

Example5 Get backlight sensor from TV-0007 and this command is valid.

The lux value is 1786 (ASCII code).

Send (Hex Format)

| Name | Length      | ID                         | Command Type | Command     | Value 1     | Value 2     | Value 3     | Value 4     | CR                     |
|------|-------------|----------------------------|--------------|-------------|-------------|-------------|-------------|-------------|------------------------|
| Hex  | <u>0x39</u> | <u>0x30</u><br><u>0x37</u> | <u>0x67</u>  | <u>0X6F</u> | <u>0x30</u> | <u>0x30</u> | <u>0x30</u> | <u>0x30</u> | <u>0x0</u><br><u>D</u> |

Reply (Hex Format)

| Name | Length      | ID                         | Command Type | Command     | Value 1     | Value 2     | Value 3     | Value 3     | CR                     |
|------|-------------|----------------------------|--------------|-------------|-------------|-------------|-------------|-------------|------------------------|
| Hex  | <u>0x39</u> | <u>0x30</u><br><u>0x37</u> | <u>0x72</u>  | <u>0X6F</u> | <u>0x31</u> | <u>0x37</u> | <u>0x38</u> | <u>0x36</u> | <u>0x0</u><br><u>D</u> |

Example6 Get ambient sensor from TV-0007 and this command is valid.

The lux value is 1568 (ASCII code).

Send (Hex Format)

| Name | Length      | ID                         | Command Type | Command     | Value 1     | Value 2     | Value 3     | Value 4     | CR                     |
|------|-------------|----------------------------|--------------|-------------|-------------|-------------|-------------|-------------|------------------------|
| Hex  | <u>0x39</u> | <u>0x30</u><br><u>0x37</u> | <u>0x67</u>  | <u>0X70</u> | <u>0x30</u> | <u>0x30</u> | <u>0x30</u> | <u>0x30</u> | <u>0x0</u><br><u>D</u> |

Reply (Hex Format)

| Name | Length      | ID                         | Command Type | Command     | Value 1     | Value 2     | Value 3     | Value 4     | CR                     |
|------|-------------|----------------------------|--------------|-------------|-------------|-------------|-------------|-------------|------------------------|
| Hex  | <u>0x39</u> | <u>0x30</u><br><u>0x37</u> | <u>0x72</u>  | <u>0X70</u> | <u>0x31</u> | <u>0x35</u> | <u>0x36</u> | <u>0x38</u> | <u>0x0</u><br><u>D</u> |

Example7 Get thermal sensor from TV-0007 and this command is valid.

The value is +075 degree (ASCII code). NOTE: positive degree is “+”ASCII code and negative degree is “-”ASCII code.

Send (Hex Format)

| Name | Length      | ID                         | Command Type | Command     | Value 1     | Value 2     | Value 3     | Value 4     | CR                     |
|------|-------------|----------------------------|--------------|-------------|-------------|-------------|-------------|-------------|------------------------|
| Hex  | <u>0x39</u> | <u>0x30</u><br><u>0x37</u> | <u>0x67</u>  | <u>0X71</u> | <u>0x30</u> | <u>0x30</u> | <u>0x30</u> | <u>0x30</u> | <u>0x0</u><br><u>D</u> |

Reply (Hex Format)

| Name | Length      | ID                         | Command Type | Command     | Value 1     | Value 2     | Value 3     | Value 4     | CR                     |
|------|-------------|----------------------------|--------------|-------------|-------------|-------------|-------------|-------------|------------------------|
| Hex  | <u>0x39</u> | <u>0x30</u><br><u>0x37</u> | <u>0x72</u>  | <u>0X71</u> | <u>0x2B</u> | <u>0x30</u> | <u>0x37</u> | <u>0x35</u> | <u>0x0</u><br><u>D</u> |

Example8 Get Running Hours from TV-0007 and this command is valid.

The value is 21,356 hours (ASCII code).

Send (Hex Format)

| Name | Length | ID | Command | Command | Value | Value | Value | Value | Value | CR |
|------|--------|----|---------|---------|-------|-------|-------|-------|-------|----|
|      |        |    |         |         |       |       |       |       |       |    |

|     |             |                            |             |             |             |             |             |             |             |                        |
|-----|-------------|----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------------------|
|     | h           |                            | Type        | d           | 1           | 2           | 3           | 4           | 5           |                        |
| Hex | <u>0x3A</u> | <u>0x30</u><br><u>0x37</u> | <u>0x67</u> | <u>0X76</u> | <u>0x30</u> | <u>0x30</u> | <u>0x30</u> | <u>0x30</u> | <u>0x30</u> | <u>0x0</u><br><u>D</u> |

Reply (Hex Format)

| Name | Length      | ID                         | Command Type | Command     | Value 1     | Value 2     | Value 3     | Value 4     | Value 5     | CR                     |
|------|-------------|----------------------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|------------------------|
| Hex  | <u>0x3A</u> | <u>0x30</u><br><u>0x37</u> | <u>0x72</u>  | <u>0X76</u> | <u>0x32</u> | <u>0x31</u> | <u>0x33</u> | <u>0x35</u> | <u>0x36</u> | <u>0x0</u><br><u>D</u> |

PC Get-function command to LCD Monitor

| Get Function     | Len | ID | Cmd Type | Command Code |       | Value Range (Three ASCII bytes)   | Comments  |
|------------------|-----|----|----------|--------------|-------|---|---|
|                  |     |    |          | (ASCII)      | (Hex) |   |   |
| Picture mode     | 8   |    | g        |              | B1    | 000: STANDARD<br>001: VIVID<br>002: CINEMA<br>003: USER                       |   |
| Contrast         | 8   |    | g        |              | 61    | 000 ~ 100   |   |
| Brightness       | 8   |    | g        |              | 62    | 000 ~ 100   |   |
| Color            | 8   |    | g        |              | B2    | 000 ~ 100   |   |
| Tint             | 8   |    | g        |              | B3    | 000 ~ 100   |   |
| Sharpness        | 8   |    | g        |              | 63    | 000 ~ 010   |   |
| Backlight        | 8   |    | g        |              | B4    | 000 ~ 100   | Step : 20 for OSD display range 0~5                 |
| DCR              | 8   |    | g        |              | B5    | 000: OFF<br>001: ON   |   |
| Color Temp       | 8   |    | g        |              | B6    | 000: 12000K<br>001: 9300K<br>002: 6500K<br>004: User                          |   |
| Input Resolution | 8   |    | g        |              | B7    | 000: AUTO<br>001: 1024x768<br>002: 1280x768<br>003: 1360x768<br>004: 1366x768 |   |
| Volume           | 8   |    | g        |              | 66    | 000 ~ 100   |   |
| Mute             | 8   |    | g        |              | 67    | 000: OFF<br>001: ON   |   |
| Audio Source     | 8   |    | g        |              | B8    | 000: Audio1<br>001: HDMI<br>002: Audio2<br>003: Audio3                        |   |
| Speaker          | 8   |    | g        |              | B9    | 000: Internal<br>001: External<br>002: Lineout                                | Only effected for models include internal speakers. |

|                      |   |  |   |  |    |  |                                 |
|----------------------|---|--|---|--|----|--|---------------------------------|
| Aspect Ratio         | 8 |  | g |  | 77 | 000: Full<br>001: Original   |                                 |
| PIP Enable           | 8 |  | g |  | BA | 000: OFF<br>001: ON  |                                 |
| PIP Main Input       | 8 |  | g |  | BB | 000: VGA<br>001: YPbPr<br>002: DVI<br>003: HDMI                                      |                                 |
| PIP Sub Input        | 8 |  | g |  | BC | 000: VGA<br>001: YPbPr<br>002: DVI<br>003: HDMI                                      |                                 |
| PIP Size             | 8 |  | g |  | BD | 000: Small<br>001: Middle<br>002: Large  |                                 |
| Video Source         | 8 |  | g |  | 6A | 000 : VGA<br>001 : HDMI1<br>003 : CVBS1<br>004 : YPbPr<br>005 : S-Video<br>006 : DVI |                                 |
| Clock frequency      | 8 |  | g |  | C0 | 000 ~ 32   |                                 |
| Phase                | 8 |  | g |  | C1 | 000 ~ 32   |                                 |
| H.Position           | 8 |  | g |  | C2 | 000 ~ 100  |                                 |
| V.Position           | 8 |  | g |  | C3 | 000 ~ 100  |                                 |
| Ambient Light Sensor | 8 |  | g |  | C4 | 000: OFF<br>001: ON  |                                 |
| Blue Screen          | 8 |  | g |  | C5 | 000: OFF<br>001: ON  |                                 |
| Auto Detect          | 8 |  | g |  | C6 | 000: OFF<br>001: ON  |                                 |
| Touch Feature        | 8 |  | g |  | CE | 000: OFF   | Only effected for Touch models. |
|                      |   |  |   |  |    | 001: ON  |                                 |
| Language             | 8 |  | g |  | 78 | 000: English<br>001: French<br>002: Spanish  |                                 |

|                      |    |  |   |    |  |   |
|----------------------|----|--|---|----|--|---|
|                      |    |  |   |    | 003: Czech,  | Optional by different models.                                   |
|                      |    |  |   |    | 004: Danish  | Optional by different models.                                   |
| Over Scan            | 8  |  | g | C7 | 000: OFF<br>001: ON                                    |   |
| RTC Year             | 8  |  | g | C8 | 000 ~ 099  | From 2000~2099  |
| RTC Month            | 8  |  | g | C9 | 000 ~ 012  |   |
| RTC Day              | 8  |  | g | CA | 000 ~ 031  |   |
| RTC Hour             | 8  |  | g | CB | 000 ~ 023  |   |
| RTC Minute           | 8  |  | g | CC | 000 ~ 059  |   |
| Daylight saving time | 8  |  | g | CD | 000: OFF<br>001: ON                                    |   |
| H Monitor            | 8  |  | g | D4 | 001 ~ 010  |   |
| V Monitor            | 8  |  | g | D5 | 001 ~ 010  |   |
| H Position           | 8  |  | g | D6 | 001 ~ 010  |   |
| V Position           | 8  |  | g | D7 | 001 ~ 010  |   |
| Frame Comp.          | 8  |  | g | D8 | 000: OFF<br>001: ON                                    |   |
| Power save           | 8  |  | g | D9 | 000: OFF<br>001: Eco<br>002: VGA Only<br>003: Standard |   |
| Monitor ID           | 8  |  | g | 75 | 001 ~ 098  |   |
| Image retention      | 8  |  | g | 72 | 000: OFF<br>001: ON                                    |   |
| Auto adjustment      | 8  |  | g | DA | 000: OFF<br>001: ON                                    |   |
| DDC/CI               | 8  |  | g | DB | 000: OFF<br>001: ON                                    |   |
| FW Version           | 16 |  | g | DC | PS5550 p.xx  | (ASCII), the return value will be different for different model |
| OSD Info Box         | 8  |  | g | 5D | 000: OFF<br>001: ON                                    |   |
| Power                | 8  |  | g | 6C | 000: STBY<br>001: ON                                   |   |

|                    |   |  |   |   |    |  |      |
|--------------------|---|--|---|---|----|--|------|
| Remote Control     | 8 |  | g |   | 68 | 000: Disable<br>001: Enable<br>002: Pass through | Lock |
| Key Pad function   | 8 |  | g |   | 69 | 000: Disable<br>001: Enable                      | Lock |
| Menu Key function  | 8 |  | g |   | 73 | 000: Disable<br>001: Enable                      | Lock |
| Power Key function | 8 |  | g |   | 74 | 000: Disable<br>001: Enable                      | Lock |
| 5V                 | 8 |  | g | m | 6D | 000~50   |      |
| 12V                | 8 |  | g | n | 6E | 000~120  |      |
| Ambient Sensor     | 9 |  | g | p | 70 | 0000 ~ 2000                                      |      |
| Thermal Sensor     | 9 |  | g | q | 71 | -055 ~ +125                                      |      |
| Operating Time     | A |  | g | v | 76 | 0 ~ 65535  | Hour |

#### 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   |

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 Function command code in ASCII  
 Code:

set command table

| Set Function     | Len | Value Range |   | Comments                            |
|------------------|-----|-------------|---|-------------------------------------|
|                  |     | Code (Hex)  | (Three ASCII bytes)   |                                     |
| Picture mode     | 5   | 81          | 000: STANDARD<br>001: VIVID<br>002: CINEMA<br>003: USER                       |                                     |
| Contrast         | 5   | 23          | 000 ~ 100   |                                     |
| Brightness       | 5   | 24          | 000 ~ 100   |                                     |
| Color            | 5   | 82          | 000 ~ 100   |                                     |
| Tint             | 5   | 83          | 000 ~ 100   |                                     |
| Sharpness        | 5   | 25          | 000 ~ 010   |                                     |
| Backlight        | 5   | 84          | 000 ~ 100   | Step : 20 for OSD display range 0~5 |
| DCR              | 5   | 85          | 000: OFF<br>001: ON   |                                     |
| Color Temp       | 5   | 86          | 000: 12000K<br>001: 9300K<br>002: 6500K<br>004: User                          |                                     |
| Input Resolution | 5   | 87          | 000: AUTO<br>001: 1024x768<br>002: 1280x768<br>003: 1360x768<br>004: 1366x768 | VGA only                            |
| Volume           | 5   | 35          | 000 ~ 100   |                                     |

|                 |   |    |  |   |
|-----------------|---|----|--|---|
| Mute            | 5 | 36 | 000: OFF<br>001: ON  |   |
| Audio Source    | 5 | 88 | 000: Audio1<br>001: HDMI<br>002: Audio2<br>003: Audio3                               |   |
| Speaker         | 5 | 89 | 000: Internal<br>001: External<br>002: Lineout                                       | Only effected for models include internal speakers. |
| Aspect Ratio    | 5 | 31 | 000: Full<br>001: Original   |   |
| PIP Enable      | 5 | 8A | 000: OFF<br>001: ON  |   |
| PIP Main Input  | 5 | 8B | 000: VGA<br>001: YPbPr<br>002: DVI<br>003: HDMI                                      |   |
| PIP Sub Input   | 5 | 8C | 000: VGA<br>001: YPbPr<br>002: DVI<br>003: HDMI                                      |   |
| PIP Size        | 5 | 8D | 000: Small<br>001: Middle<br>002: Large  |   |
| PIP Position    | 5 | 8E | 000: Move Down<br>001: Move Up<br>002: Move Left<br>003: Move Right                  |   |
| Video Source    | 5 | 22 | 000 : VGA<br>001 : HDMI1<br>003 : CVBS1<br>004 : YPbPr<br>005 : S-Video<br>006 : DVI |   |
| Auto adjustment | 5 | 8F |  |   |

|                      |   |    |   |                                 |
|----------------------|---|----|---|---------------------------------|
| Clock frequency      | 5 | 90 | 000 ~ 32                                    |                                 |
| Phase                | 5 | 91 | 000 ~ 32                                    |                                 |
| H.Position           | 5 | 92 | 000 ~ 100                                   |                                 |
| V.Position           | 5 | 93 | 000 ~ 100                                   |                                 |
| Ambient Light Sensor | 5 | 94 | 000: OFF<br>001: ON                         |                                 |
| Blue Screen          | 5 | 95 | 000: OFF<br>001: ON                         |                                 |
| Auto Detect          | 5 | 96 | 000: OFF<br>001: ON                         |                                 |
| Touch Feature        | 5 | 9E | 000: OFF                                    | Only effected for Touch models. |
|                      |   |    | 001: ON                                     |                                 |
| Language             | 5 | 32 | 000: English<br>001: Franch<br>002: Spanish |                                 |
|                      |   |    | 003: Czech,                                 | Optional by different models.   |
|                      |   |    | 004: Danish                                 | Optional by different models.   |
| Over Scan            | 5 | 97 | 000: OFF<br>001: ON                         |                                 |
| RTC Year             | 5 | 98 | 000 ~ 099                                   | From 2000~2099                  |
| RTC Month            | 5 | 99 | 000 ~ 012                                   |                                 |
| RTC Day              | 5 | 9A | 000 ~ 031                                   |                                 |
| RTC Hour             | 5 | 9B | 000 ~ 023                                   |                                 |
| RTC Minute           | 5 | 9C | 000 ~ 059                                   |                                 |
| Daylight saving time | 5 | 9D | 000: OFF<br>001: ON                         |                                 |
| H Monitor            | 5 | A4 | 001 ~ 010                                   |                                 |
| V Monitor            | 5 | A5 | 001 ~ 010                                   |                                 |
| H Position           | 5 | A6 | 001 ~ 010                                   |                                 |
| V Position           | 5 | A7 | 001 ~ 010                                   |                                 |
| Frame Comp.          | 5 | A8 | 000: OFF<br>001: ON                         |                                 |
| Power save           | 5 | A9 | 000: OFF<br>001: ECO<br>002: VGA Only       |                                 |

|                    |   |    |  |  |
|--------------------|---|----|--|--|
|                    |   |    | 003: Standard  |  |
| Monitor ID         | 5 | 3D | 001 ~ 098  |  |
| Image retention    | 5 | 47 | 000: OFF<br>001: ON  |  |
| Auto adjustment    | 5 | AA | 000: OFF<br>001: ON  |  |
| DDC/CI             | 5 | AB | 000: OFF<br>001: ON  |  |
| Reset User Default | 5 | AC |  |  |
| OSD Info Box       | 5 | 5B | 000: OFF<br>001: ON  |  |
| Store User Default | 5 | AD |  |  |
| Factory Reset      | 5 | 7E |  |  |
| Power              | 5 | 21 | 000: STBY<br>001: ON   |  |
| Key Pad            | 5 | 41 | 000 : POWER<br>001 : SOURCE<br>002 : MENU<br>003 : UP<br>004 : DOWN<br>005 : LEFT<br>006 : RIGHT<br>007 : MUTE |  |
| Remote Control     | 5 | 42 | 000: Disable<br>001: Enable<br>002: Pass through   |  |
| Key Pad function   | 5 | 43 | 000: Disable<br>001: Enable  |  |
| Menu Key function  | 5 | 45 | 000: Disable<br>001: Enable  |  |
| Power Key function | 5 | 46 | 000: Disable<br>001: Enable  |  |

#### 4.2 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 (2E)

| Name       | Length | RCU-Code1 | RCU-Code2 | CR  |
|------------|--------|-----------|-----------|-----|
| Byte Count | 3      | 2         | E         | 00D |

|             |   |   |   |   |
|-------------|---|---|---|---|
| Bytes order | 1 | 2 | 3 | 4 |
|-------------|---|---|---|---|

Example: Remote Control pass-through when key “DOWN” is pressed (21)

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

Example: Remote Control pass-through when “Power” key is pressed (0C)

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

| RCU Key     | Support | CODE (HEX) | Notes        |
|-------------|---------|------------|--------------|
| PWR         | Y       | 0C         |              |
| Exit        | Y       | 0F         | = MENU key   |
| Vol +       | Y       | 10         |              |
| Vol -       | Y       | 11         |              |
| UP          | Y       | 20         |              |
| DOWN        | Y       | 21         |              |
| Mute        | Y       | 0D         |              |
| Enter       | Y       | 0A         | = SOURCE key |
| Menu        | Y       | 2E         |              |
| Information | Y       | 12         |              |
| Input       | Y       | 28         | = SOURCE key |
| DVI         | Y       | 4B         |              |
| VGA         | Y       | 39         |              |
| HDMI        | Y       | 38         |              |
| AV          | Y       | 37         |              |
| YPbPr       | Y       | 70         |              |



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