**Application Note**

**BDLxxxx**

**RS232 SERIAL INTERFACE**

**COMMUNICATION PROTOCOL**

**(SICP V1.85)**

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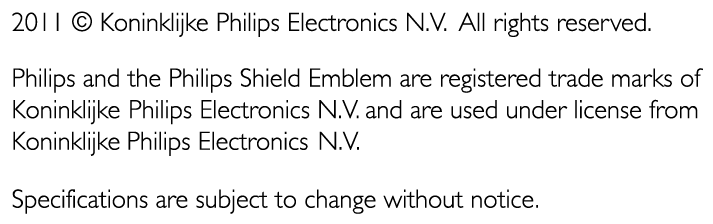
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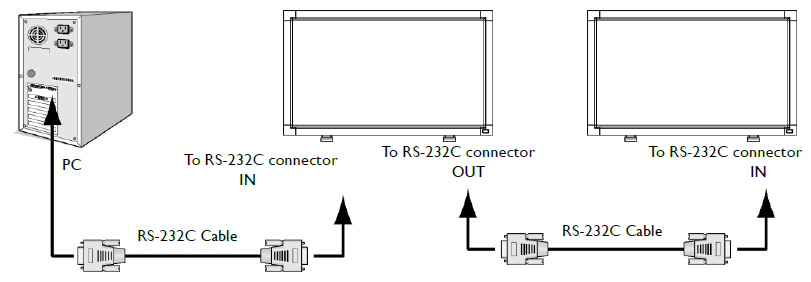
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# INTRODUCTION

## Purpose

The purpose of this document is to explain in detail the commands and steps that can be used to control a Philips display via RS232C.



## Definitions, Abbreviations and Acronyms

PBS Professional Business Solutions

RC Remote Control

ACK Acknowledge

NACK Not Acknowledge

NAV Not Available

ID Identification

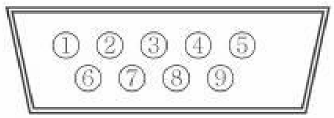
0xXX Hexadecimal notation

# COMMAND PACKET FORMAT

## Physical Specifications

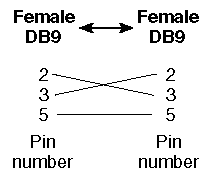
1. Baud Rate : 1200, 2400, 4800, 9600(default), 19200, 38400, 57600
2. Data bits: 8
3. Parity : None
4. Stop Bit : 1
5. Flow Control : None
6. The Pin Assignments for DB9 male connector:

Male D-Sub 9-Pin (outside view)



|  |  |  |
| --- | --- | --- |
| **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 |  |

Note: A crossover cable (null modem) is needed for connection to the host controller:



Philips Signage displays use RXD, TXD and GND pins for RS-232C control. For RS-232C cable, the reverse type cable should be used.

## Communication Procedure

Control commands can be sent from a host controller via the RS232 connection. A new command should not be sent until the previous command is acknowledged. However, if a response is not received within 500 milliseconds a retry may be triggered. Every valid command receives an ACK. A command that is valid but not supported in the current implementation will be responded to with a NAV (Not Available). If the command buffer is corrupt (transmission errors) the command will be responded to with a NACK. The display operates according to the received command. If the command is a valid “Get” command, the display responds with the requested info. If the command is a valid “Set” command allowed, the display performs the requested operation.

Figure1 and Figure2 explain the mechanism of the Get and Set commands.

Host controller

Monitor

Get command

NACK

NAV

Get

-

report command

Command code DATA[0] = x

Command code DATA[0] = x

Command data DATA[1..N]

Get command

cycle with

report from

Monitor

Internal

processing:

collect report

data

Get requested

parameter

from Monitor

**Note:**

No ACK, NACK

or NAV sent

to Monitor after

reception of

Get report command

-

**Note:**

No ACK sent

to Host controller

after reception of

Get command

Figure 1: Explanation of mechanism of Get Command.

Host controller

Monitor

Set command

ACK

NACK

NAV

Command code DATA[0] = y

Command data DATA[1..N]

Set command

cycle with

Acknowledge

from Monitor

Acknowledge

reception of

Set command

ACK= Ok

or

NACK= Not Ok

or

NAV= Not avail

Set parameter

in Monitor

Figure 2: Explanation of mechanism of Set Command.

## Command Format

The RS232 packet format:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **MsgSize** | **Control** | **Data[0]** | **Data[1]** | **...** | **Data[N]** | **Checksum** |

*Every field of packet format consists of one byte – MsgSize = 1 byte, etc.*

In detail:

|  |  |  |
| --- | --- | --- |
| **Number of Field** | **Name of Field** | **Description** |
| Byte 1: | MsgSize | Message Size has to be calculated in the fallowing way:  MsgSize + Control + Data(0) + … + Data(N) + Checksum  Range = 3 to 40 (0x3 to 0x28). |
| Byte 2: | Control | Message Control.  Bit 7..0: Monitor ID  Signal mode: Display Address range from 1 to 255  Broadcast mode: Display Address is 0 which indicates no ACK or Report is expected. |
| Byte 3 to Byte 39: | Data[0] to Data[N] | Data.  This field can be also empty.  If not empty then the range of Data Size, N = 0 to 36 (0x24). |
| Last Byte: | Checksum | Checksum.  Range = 0 to 255 (0xFF).  Algorithm: The EXCLUSIVE-OR (XOR) of all bytes in the message except the checksum itself.  Checksum = [MSG-SIZE] XOR [CONTROL] XOR DATA[0] … XOR DATA[N] |

# MESSAGES - SYSTEM

## Communication Control

This defines the feedback command from monitor to host controller when it receives the display command from the host controller, depending on the commands availability, the command reported back to host controller can be one of the ACK, NACK or NAV.

**Note: there is no reply message when the wrong ID address is being used.**

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x00 = Communication Control - Report** |  | Generic report message after Get or Set message |
| DATA[1] | Communication Control |  | 0x06 = Acknowledge (ACK)  0x15 = Not Acknowledge (NACK)  0x18 = Not Available (NAV). Command not available, not relevant or cannot execute |

*Example ACK reply: (Display address 01)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum | Description |
| 0x05 | 0x01 | 0x00 | 0x06 | 0x02 | Command is well executed. |

*Example NACK reply: (Display address 01)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum | Description |
| 0x05 | 0x01 | 0x17 | 0x01 | 0x12 | No this command code-Data(0), the system will reply “NACK”. |

*Example NAV reply: (Display address 01)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum | Description |
| 0x05 | 0x01 | 0x18 | 0x01 | 0x1E | Checksum error, the system will reply “NAV”. |

*Example NAV reply: (Display address 01)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum | Description |
| 0x05 | 0x01 | 0x18 | 0x04 | 0x18 | No this parameter-Data(1), the system will reply “NAV”. |

*Example NAV reply: (Display address 01)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum | Description |
| 0x05 | 0x01 | 0x18 | 0x01 | 0x1D | Command is correct, while system is already in stand –by mode, so reply “NAV”. |

*Example No reply: (Display address 01- not active ID)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum | Description |
| 0x05 | 0x01 | 0x18 | 0x01 | 0x1D | Command is correct, while system would NOT reply any message due to it’s not active. |

*Example No reply: (Display address 00- Broadcast ID)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum | Description |
| 0x05 | 0x00 | 0x18 | 0x01 | 0x1C | Command is correct, all systems would NOT reply any message due to “Daisy Chain”’s limitation- Collision might occur. |

## Platform and Version Labels

This command provides the SICP protocol version and the display Software version to the host controller.

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0xA2 = Platform and Version Labels - Get** |  | Request the SICP version |
| DATA[1] | Which Label |  | 0x00 = Get SICP implementation version  0x01 = Get the software label and version information of the platform |

*Example: Get SICP version (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0xA2 | 0x00 | 0xA6 |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0xA2 = Platform and Version Label – Report** |  | Request the internal Hardware version. |
| DATA[1]  to DATA[N] | Character[0] to Character[N-1] |  | 36 (0x24) characters maximum.  No. of characters, N = 1 to 36 (0x24).  The actual size determines the value of the message size byte. |

# MESSAGES - GENERAL

## Power state

This command is used to set/get the power state as it is defined as below.

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x19 = Power state - Get** |  | Command requests the display to report its current power state |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x19 | 0x1C |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x19 = Power State - Report** |  | Command reports Power state |
| DATA[1] | Power State |  | 0x01 = Power Off  0x02 = On |

*Example: Power State On (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x19 | 0x02 | 0x1F |

### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x18 = Power state - Set** |  | Command to change the Power state of the display |
| DATA[1] | Power state |  | 0x01 = Power Off  0x02 = On |

*Example: Power State Deep Sleep (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x18 | 0x01 | 0x1D |

## User Input Control

The following commands are used to lock/unlock the Remote Control and the Local Keyboard functionality corresponding.

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x1D = User Input Control – Get** |  | Get the lock/unlock state |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x1D | 0x18 |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x1D = User Input Control – Report** |  | Report from display of lock/unlock state |
| DATA[1] | Bit meaning:  0 = locked  1 = unlocked | Bit 7..6 | Not used |
| Bit 1 | Local Keyboard |
| Bit 0 | Remote Control |

*Example: Lock Keyboard and unlocked Remote Control (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x1D | 0x01 | 0x18 |

### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x1C = User Input Control – Set** |  | Set the lock/unlock state |
| DATA[1] | Bit meaning:  0 = locked  1 = unlocked | Bit 7..6 | Not used. |
| Bit 1 | Local Keyboard |
| Bit 0 | Remote Control |

*Example: Unlock local Keyboard and unlock remote control (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x1C | 0x03 | 0x1B |



### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x1B = User Input Control State – Get** |  | Get the lock/unlock state for All/Voume/Power |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x1B | 0x1E |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x1B = User Input Control State – Report** |  | Report from display of lock/unlock state for Volume/~~Input/~~Power/~~Menu~~ |
| DATA[1] | User Input Control for Remote Control |  | 0x01 = Lock all  0x02 = Lock all but Volume  0x03 = Lock all but Power |
| DATA[2] | User Input Control for Local Keyboard |  | 0x01 = Lock all  0x02 = Lock all but Volume  0x03 = Lock all but Power |

*Example: Lock all except Volume key for both Remote Control and Local Keyboard (Display address 01)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Checksum |
| 0x06 | 0x01 | 0x1B | 0x02 | 0x02 | 0x1C |

### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x1A = User Input Control State– Set** |  | Set the lock/unlock state for Volume/~~Input~~/Power~~/Menu~~ |
| DATA[1] | User Input Control for Remote Control |  | 0x01 = Lock all  0x02 = Lock all but Volume  0x03 = Lock all but Power |
| DATA[2] | User Input Control for Local Keyboard |  | 0x01 = Lock all  0x02 = Lock all but Volume  0x03 = Lock all but Power |

*Example: Lock all except Volume key for both Remote Control and Local Keyboard (Display address 01)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Checksum |
| 0x06 | 0x01 | 0x1A | 0x02 | 0x02 | 0x1D |



## Power state at Cold Start

Command is used to set the cold start power state, the cold start power state are updated and stored by this command.

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0xA4 = Power at Cold Start - Get** |  | Get Power state at Cold Start state |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0xA4 | 0xA1 |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0xA4 = Power at Cold Start – Report** |  | Report from Power state at Cold Start state |
| DATA[1] | Power at Cold Start |  | 0x00 = Power Off  0x01 = Forced On  0x02 = Last Status |

*Example: Current Power state at Cold Start state: Last Status (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0xA4 | 0x02 | 0xA2 |



### Message-Set



|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0xA3 = Power at Cold Start - Set** |  | Set Power state at Cold Start |
| DATA[1] | Power at Cold Start |  | 0x00 = Power Off  0x01 = Forced On  0x02 = Last Status |

The value is stored and it is applied only when the display starts up from cold start power state the next time:

Power Off:

The monitor will be automatically switched to Power Off mode (even if the last status was on) whenever the mains power is turned on or resumed after the power interruption.

Forced On:

The monitor will be automatically switched to ON mode whenever the mains power is turned on or resumed after the power interruption.

Last Status:

The monitor will be automatically switched to the last status (either Power Off or On) whenever the mains power is turned on or resumed after the power interruption.

*Example: Set Power state at cold start to last status (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0xA3 | 0x02 | 0xA5 |

# MESSAGES - INPUT SOURCES

## Input Source

This command is used to change the current input source.

### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0xAC = Input Source – Set** |  | Command requests the display to set the current input source |
| DATA[1] | Input Source Type |  | 0x01 = VIDEO  0x01 = S-VIDEO  0x03 = COMPONENT  0x03 = CVI 2 (not applicable)  0x05 = VGA  0x05 = HDMI 2  0x06 = Display Port 2  0x06 = USB 2  0x07 = Card DVI-D  0x07 = Display Port or Display Port 1  0x08 = Card OPS  0x08 = USB or USB 1  0x09 = HDMI or HDMI 1  0x09 = DVI-D |
| DATA[2] | Input Source Number |  | 0x00 = VIDEO  0x01 = S-VIDEO  0x00 = COMPONENT  0x01 = CVI 2 (not applicable)  0x00 = VGA  0x01 = HDMI 2  0x00 = HDMI or HDMI 1  0x01 = DVI-D  0x00 = Card DVI-D  0x01 = Display Port or Display Port 1  0x00 = Card OPS  0x01 = USB or USB 1  0x00 = USB 2  0x01 = Display Port 2 |
| DATA[3] | OSD Style | Bit7 | Not used. |
| Bit6 | Do not switch.  Source is made current. set is updated with the details of this source; however, source change is performed.  1 = Do not switch. 0 = Switch |
| Bit2.0 | Source info. Display Style  0 = Reserved  1 = Source label |
| DATA[4] | Mute Style | Bit 7 | (Reserved, value is 0) |
| Bit 6 | (Reserved, value is 0) |
| Bit 5 | (Reserved, value is 0) |
| Bit 4 | (Reserved, value is 0) |
| Bit 3 | (Reserved, value is 0) |
| Bit 2 | (Reserved, value is 0) |
| Bit 1 | (Reserved, value is 0) |
| Bit 0 | (Reserved, value is 0) |

*Example: Set on DVI-D with Source label displaying on OSD (Display address 01)*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Data (3) | Data (4) | Checksum |
| 0x08 | 0x01 | 0xAC | 0x09 | 0x01 | 0x01 | 0x00 | 0xAC |

## Current Source

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0xAD = Current Source – Get** |  | Command requests the display to report the current input source in use. |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0xAD | 0xA8 |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0xAD = Current Source – Report** |  | Command reports to the host controller the current input source in use by the display. |
| DATA[1] | Input Source Type |  | 0x00 = Reserved for smartcard  0x01 = Reserved for smartcard  0x02 = Reserved for smartcard  0x03 = Reserved for smartcard  0xFD = Input Source (normal state)  0xFE = Reserved for smartcard |
| DATA[2] | Input Source Number |  | For Input Source Type: 0x00, 0x01, 0x02, 0x03  0x01…0x63 = Channel Number (only for smartcard)  For Input Source Type: 0xFD  0x01 = VIDEO  0x02 = S-VIDEO  0x06 = COMPONENT  0x07 = CVI 2 (not applicable)  0x08 = VGA  0x09 = HDMI 2  0x0A = HDMI or HDMI 1  0x0B = DVI-D  0x0C = Card DVI-D  0x0D = Display Port or Display Port 1  0x0E = Card OPS  0x0F = USB or USB 1  0x10 = USB 2  0x11 = Display Port 2 |

*Example: Current Input Source:* VIDEO *(Display address 01)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Checksum |
| 0x06 | 0x01 | 0xAD | 0xFD | 0x01 | 0x56 |

## Auto Signal Detecting

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0xAF = Auto Signal Detecting – Get** |  | Command requests the display to report its current Auto Signal Detecting status |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0xAF | 0xAA |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0xAF = Auto Signal Detecting – Report** |  | Command reports Auto Signal Detecting Setting |
| DATA[1] | On / Off |  | 0x00 = Off  0x01 = On |

*Example: Current Display settings: Off and On (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0xAF | 0x00 | 0xAB |
| 0x05 | 0x01 | 0xAF | 0x01 | 0xAA |

### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0xAE = Auto Signal Detecting – Set** |  | Command to change the Auto Signal Detecting setting of the display |
| DATA[1] | On / Off |  | 0x00 = Off  0x01 = On |

*Example: Set the Display to the fallowing: Auto Signal Detecting Off (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0xAE | 0x00 | 0xAA |

# MESSAGES ‑ VIDEO

## Video Parameters

The following commands are used to get/set video parameters as it is defined below.

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x33 = Video Parameters – Get** |  | Command requests the display to report its current video parameters. |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x33 | 0x36 |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x33 = Video Parameters – Report** |  | Command reports to the host controller the current video parameters of the display. |
| DATA[1] | Brightness. |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[2] | Colour. |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[3] | Contrast. |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[4] | Sharpness. |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[5] | Tint (Hue) |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[6] | Black Level |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[7] | Gamma Selection |  | 0x01= Native, 0x02 = S gamma, 0x03 = 2.2, 0x04 = 2.4 |

*Example: All video parameters are set to 55 % (0x37) (Display address 01)*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Data (3) | Data (4) | Data (5) | Data (6) | Data (7) | Checksum |
| 0x0B | 0x01 | 0x33 | 0x37 | 0x37 | 0x37 | 0x37 | 0x37 | 0x37 | 0x03 | 0x0C |

### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x32 = Video Parameters – Set** |  | Command to change the current video parameters |
| DATA[1] | Brightness. |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[2] | Colour. |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[3] | Contrast. |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[4] | Sharpness. |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[5] | Tint (Hue) |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[6] | Black Level |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[7] | Gamma Selection |  | 0x01= Native, 0x02 = S gamma, 0x03 = 2.2, 0x04 = 2.4 |

*Example: Set all video parameters to 0x37 (55 %) (Display address 01)*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Data (3) | Data (4) | Data (5) | Data (6) | Data (7) | Checksum |
| 0x0B | 0x01 | 0x32 | 0x37 | 0x37 | 0x37 | 0x37 | 0x37 | 0x37 | 0x03 | 0x0D |

The following commands are used to get/set the color temperature.



### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x35 = Color Temperature – Get** |  | Command requests the display to report its current color temperature. |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x35 | 0x30 |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x35 = Color Temperature – Report** |  | Command reports to the host controller the current color temperature of the display. |
| DATA[1] | **Color temperature** |  | 0x00 = User  0x01 = Nature  0x02 = 11000K(Not applicable)  0x03 = 10000K  0x04 = 9300K  0x05 = 7500K  0x06 = 6500K  0x07 = 5770K (Not applicable)  0x08 = 5500K(Not applicable)  0x09 = 5000K  0x0A = 4000K  0x0B = 3400K (Not applicable)  0x0C = 3350K (Not applicable)  0x0D = 3000K  0x0E = 2800K (Not applicable)  0x0F = 2600K (Not applicable)  0x10 = 1850K (Not applicable) |

*Example: The current color temperature is set to Nature (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x35 | 0x01 | 0x30 |

### Message-Set

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | | | **Description** | |
| DATA[0] | **0x34 = Color Temperature – Set** |  | | | Command to change the current color parameters | |
| DATA[1] | Color temperature | |  | 0x00 = User  0x01 = Nature  0x02 = 11000K(Not applicable)  0x03 = 10000K  0x04 = 9300K  0x05 = 7500K  0x06 = 6500K  0x07 = 5770K (Not applicable)  0x08 = 5500K(Not applicable)  0x09 = 5000K  0x0A = 4000K  0x0B = 3400K (Not applicable)  0x0C = 3350K (Not applicable)  0x0D = 3000K  0x0E = 2800K (Not applicable)  0x0F = 2600K (Not applicable)  0x10 = 1850K (Not applicable) | |

*Example: The current color temperature is set to Nature (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x34 | 0x01 | 0x31 |

The following commands are used to get/set the color parameters for specific color temperature.

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x37 = Color Parameters – Get** |  | Command requests the display to report its current color parameters. |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x37 | 0x32 |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x37 = Color Parameters – Report** |  | Command reports to the host controller the current color parameters of the display. |
| DATA[1] | Red color gain value |  | 0 to 255 of the user selectable range of the display. |
| DATA[2] | Green color gain value |  | 0 to 255 of the user selectable range of the display. |
| DATA[3] | Blue color gain value |  | 0 to 255 of the user selectable range of the display. |
| DATA[4] | Red color offset value |  | 0 to 255 of the user selectable range of the display. |
| DATA[5] | Green color offset value |  | 0 to 255 of the user selectable range of the display. |
| DATA[6] | Blue color offset value |  | 0 to 255 of the user selectable range of the display. |

*Example: All color parameters are set to 255 (0xFF) (Display address 01)*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Data (3) | Data (4) | Data (5) | Data (6) | Checksum |
| 0x0A | 0x01 | 0x37 | 0xFF | 0xFF | 0xFF | 0xFF | 0xFF | 0xFF | 0x3C |

### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x36 = Color Parameters – Set** |  | Command to change the current color parameters |
| DATA[1] | Red color gain value |  | 0 to 255 of the user selectable range of the display. |
| DATA[2] | Green color gain value |  | 0 to 255 of the user selectable range of the display. |
| DATA[3] | Blue color gain value |  | 0 to 255 of the user selectable range of the display. |
| DATA[4] | Red color offset value |  | 0 to 255 of the user selectable range of the display. |
| DATA[5] | Green color offset value |  | 0 to 255 of the user selectable range of the display. |
| DATA[6] | Blue color offset value |  | 0 to 255 of the user selectable range of the display. |

*Example: All color parameters are set to 255 (0xFF) (Display address 01)*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Data (3) | Data (4) | Data (5) | Data (6) | Checksum |
| 0x0A | 0x01 | 0x36 | 0xFF | 0xFF | 0xFF | 0xFF | 0xFF | 0xFF | 0x3D |

## Picture Format

This command is used to control the display screen format.

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x3B = Picture Format – Get** |  | Command requests the display to report its current picture format |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x3B | 0x3E |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x3B = Picture Format – Report** |  | Command report to the host controller the current picture format of the display. |
| DATA[1] | Picture Format\* | Bit 7..4 | Not used. |
| Bit 3..0 | Picture Format.  0x00 = Normal  0x01 = Custom  0x02 = Real  0x03 = Full  0x04 = 21:9  0x05 = Dynamic |

\* For further explanations, please see section 6.2.3 – Message-Set.

*Example: Current Picture Format is Widescreen on Full Display (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (0) | Checksum |
| 0x05 | 0x01 | 0x3B | 0x03 | 0x3C |

### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x3A = Picture Format – Set** |  | Command requests the display to set the specified picture format |
| DATA[1] | Picture Format | Bit 7..4 | Not used. |
| Bit 3..0 | Picture Format.  0x00 = Normal  0x01 = Custom  0x02 = Real  0x03 = Full  0x04 = 21:9  0x05 = Dynamic |

The display shall respond with NAV if it receives a Picture Format that is not relevant to its Display Aspect Ratio.

The display shall ignore the [Picture Format - Set] if it receives a Picture Format that it cannot execute.

*Example: Set Picture Format to Widescreen on Full Display (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (0) | Checksum |
| 0x05 | 0x01 | 0x3A | 0x03 | 0x3D |

|  |  |
| --- | --- |
| **Picture Format** | **Description** |
| 0x00 | Normal |
| 0x01 | Custom |
| 0x02 | Real |
| 0x03 | Full |
| 0x04 | 21:9 |
| 0x05 | Dynamic |

This command is used to control the VGA video parameters.

Value in(**0,10,20,30,40,50,60,70,80,90,100**)

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x39 = VGA Video Parameters – Get** |  | Command requests the display to report its VGA current video parameters. |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x39 | 0x36 |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x39 = VGA Video Parameters – Report** |  | Command reports to the host controller the VGA current video parameters of the display. |
| DATA[1] | Clock |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[2] | Clock Phase |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[3] | H. position |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[4] | V. Position |  | 0 to 100 (%) of the user selectable range of the display. |

*Example: All VGA video parameters are set to 55 % (0x37) (Display address 01)*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Data (3) | Data (4) | Checksum |
| 0x08 | 0x01 | 0x39 | 0x37 | 0x37 | 0x37 | 0x37 | 0x0C |

### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x38 = VGA Video Parameters – Set** |  | Command to change the VGA current video parameters |
| DATA[1] | Clock(Invalid) |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[2] | Clock Phase(Invalid) |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[3] | H. position |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[4] | V. Position |  | 0 to 100 (%) of the user selectable range of the display. |

*Example: Set all VGA video parameters to 0x37 (55 %) (Display address 01)*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Data (3) | Data (4) | Checksum |
| 0x08 | 0x01 | 0x38 | 0x37 | 0x37 | 0x37 | 0x37 | 0x0D |

## Picture-in-Picture (PIP)

This command is used to control PIP on/off with different locations.

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x3D = Picture-in-Picture –  Get** |  | Command requests the display to get the specified PIP settings. |

*Example: Get PIP setting (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x3D | 0x38 |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | 0x3D = Picture-in-Picture –  Report |  | Command reports to the host controller the current PIP settings. |
| DATA[1] | Picture-in-Picture | Bit 7..1 | ( reserved, default 0 ) |
|  |  | Bit 0 | PIP on/off  0 = off  1 = on  Note: The size of the PIP window is platform-dependent. If the size is other than half-screen (i.e. Picture-by-Picture), DATA[2].Bit1.0 may be used to specify the window position. |
| DATA[2] | Additional PIP parameters | Bit 7..3 | ( reserved, default 0 ) |
|  |  | Bit 2..0 | Position of the PIP window:  0x00 = 00 = position 0 (typically bottom-left)  0x01 = 01 = position 1 (typically top-left)  0x02 = 10 = position 2 (typically top-right)  0x03 = 11 = position 3 (typically bottom-right)  0x04 = Others. |
| DATA[3] |  |  | ( reserved, default 0 ) |
| DATA[4] |  |  | ( reserved, default 0 ) |

*Example: Current PIP setting is enabling and located at position 2 (Display address 01)*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Data (3) | Data (4) | Checksum |
| 0x08 | 0x01 | 0x3D | 0x01 | 0x02 | 0x00 | 0x00 | 0x37 |

### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x3C = Picture-in-Picture – Set** |  | Command requests the display to set the specified PIP settings. |
| DATA[1] | Picture-in-Picture | Bit 7..1 | ( reserved, default 0 ) |
| Bit 0 | PIP on/off  0 = off  1 = on  Note: The size of the PIP window is platform-dependent. If the size is other than half-screen (i.e. Picture-by-Picture), DATA[2].Bit1.0 may be used to specify the window position. |
| DATA[2] | Additional PIP parameters | Bit 7..2 | ( reserved, default 0 ) |
| Bit 1..0 | Position of the PIP window:  0x00 = 00 = position 0 (typically bottom-left)  0x01 = 01 = position 1 (typically top-left)  0x02 = 10 = position 2 (typically top-right)  0x03 = 11 = position 3 (typically bottom-right) |
| DATA[3] |  |  | ( reserved, default 0 ) |
| DATA[4] |  |  | ( reserved, default 0 ) |

*Example: Set PIP ON, top-right (Display address 01)*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Data (3) | Data (4) | Checksum |
| 0x08 | 0x01 | 0x3C | 0x01 | 0x02 | 0x00 | 0x00 | 0x36 |

## 

## PIP Source

This command is used to control the PIP source setting.

### 6.4.1 Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x85 = PIP Source – Get** |  | Command requests the display to report its current PIP source setting. |

This command is used to get the source for the PIP window when PIP feature is activated.

*Example: Get PIP source setting (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x85 | 0x80 |

### 6.4.2 Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x85 = PIP Source – Get** |  | Command requests the display to report its current PIP source setting. |
| DATA[1] | Source Type |  | 0xFD = Input Source (normal state)  0xFE = Reserved for smartcard |
| DATA[2] | Source Number |  | 0x01 = VIDEO  0x03 = S-VIDEO  0x06 = COMPONENT  0x08 = VGA  0x09 = HDMI 2  0x0A = HDMI or HDMI 1  0x0B = DVI-D  0x0C = Card DVI-D (not applicable)  0x0D = Display Port or Display Port 1  0x0E = Card OPS  0x0F = USB or USB 1  0x10 = USB 2  0x11 = Display Port 2 |

*Example: Get PIP source report (Display address 01)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Checksum |
| 0x06 | 0x01 | 0x85 | 0xFD | 0x08 | 0x77 |

### 6.4.3 Message-Set

This is the PIP source selection command

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x84 = PIP Source – Set** |  | Command requests the display to set the specified PIP source. |
| DATA[1] | Source Type |  | 0xFD = Input Source (normal state)  0xFE = Reserved for smartcard |
| DATA[2] | Source Number |  | 0x01 = VIDEO  0x03 = S-VIDEO  0x06 = COMPONENT  0x08 = VGA  0x09 = HDMI 2  0x0A = HDMI or HDMI 1  0x0B = DVI-D  0x0C = Card DVI-D  0x0D = Display Port or Display Port 1  0x0E = Card OPS  0x0F = USB or USB 1  0x10 = USB 2  0x11 = Display Port 2 |

This command is used to select the source for the PIP window before the PIP feature is activated.

*Example: Set source PIP to* VIDEO *(Display address 01)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Checksum |
| 0x06 | 0x01 | 0x84 | 0xFD | 0x01 | 0x7F |

# MESSAGES - AUDIO

## Volume

This command is used to set/get the Volume as it is defined as below.

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| Bytes | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x45 = Volume – Get** |  | Command requests the display to report its current Volume level |

The interface to set Software must be such that they also modify the variables representing these current parameters.

To mute the display, send Volume = 0. This command does not overwrite the system mute status of the display.

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x45 | 0x40 |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x45 = Volume – Report** |  | Command reports current Volume level |
| DATA[1] | Volume. |  | 0 to 100 (%) of the user selectable range of the display. |

*Example: Current Display settings: Volume:77% (0x4D) (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x45 | 0x4D | 0x0C |

### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x44 = Volume – Set** |  |  |
| DATA[1] | Volume. |  | 0 to 100 (%) of the user selectable range of the display. |

*Example: Set the Display Volume to 77% (0x4D) (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x44 | 0x4D | 0x0D |

## Volume Limits

This command is used to set the volume limit (minimum, maximum and switch on volume).

### Message-Set

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | | **Bits** | | **Description** | | | |
| DATA[0] | **0xB8 = Volume Limits– Set** | |  | | The 3 values must conform to the rule :  Min <= Switch On <= Max | | | |
| DATA[1] | Minimum Volume | |  | | 0 to 100 (%) of the user selectable range of the display. | | | |
| DATA[2] | Maximum Volume | |  | | 0 to 100 (%) of the user selectable range of the display. | | | |
| DATA[3] | Switch On Volume | |  | | 0 to 100 (%) of the user selectable range of the display. | | | |
|  |  |  |  |  | |  |  |

*Example: Set the Display to the following: 10% (0x0A), 77% (0x4D), 50% (0x32) (Display address 01)*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Data (3) | Checksum |
| 0x07 | 0x01 | 0xB8 | 0x0A | 0x4D | 0x32 | 0xCB |

## Audio Parameters

This command is used to set/get the audio parameters as it is defined as below.

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x43 = Audio Parameters – Get** |  | Command requests the display to report its current audio parameters |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x43 | 0x46 |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x43 = Audio Parameters – Report** |  | Command reports Audio Parameters |
| DATA[1] | Treble. |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[2] | Bass. |  | 0 to 100 (%) of the user selectable range of the display. |

*Example: Current Display settings: Treble:80% (0x50) , Bass:93% (0x5D) (Display address 01)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Checksum |
| 0x06 | 0x01 | 0x43 | 0x50 | 0x5D | 0x49 |

### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x42 = Audio Parameters – Set** |  | Command to change the Audio Parameters of the display |
| DATA[1] | Treble. |  | 0 to 100 (%) of the user selectable range of the display. |
| DATA[2] | Bass. |  | 0 to 100 (%) of the user selectable range of the display. |

The interface to set Software must be such that they modify the variables representing these current parameters

*Example: Set the Display to the fallowing: Treble:77% (0x4D) , Bass:77% (0x4D) (Display address 01)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Checksum |
| 0x06 | 0x01 | 0x42 | 0x4D | 0x4D | 0x45 |

# MISCELLANEOUS

## Operating Hours

The command is used to record the working hours of the display.

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| Bytes | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x0F = Misc Info - Get** |  | Command requests the display to report from miscellaneous information parameters |
| DATA[1] | Item |  | 0x02 = Operating Hours  (All other values are reserved) |

*Example: (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x0F | 0x02 | 0x09 |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x0F = Misc Info – Report** |  | Command reports current Operating Hours |
| DATA[1] to  DATA[2] | Operating Hours |  | DATA[1] and DATA[2] form the MSByte and LSByte, respectively, of the 16-bit-wide Operational Hours value. |

*Example: Current Display Operation Hours counter value (Display address 01)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Checksum |
| 0x06 | 0x01 | 0x0F | 0x4D | 0x00 | 0x45 |

## Power Saving Mode

This command is used for dimming back light power consumption control. Different levels of power consumptions can be achieved by using this command.

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0xDE = Smart Power – Get** |  | Command requests the display to get the specified Power Saving Mode. |

*Example: Get the Smart Power Level (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0xDE | 0xDB |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0xDE = Smart Power – Report** |  | Command reports Power Saving Mode Setting |
| DATA[1] | Level of Smart Power control |  | 0x00 = OFF  0x01 = Low (defined to be same as OFF)  0x02 = Medium  0x03 = High |

*Example: Current Display settings: Power Saving Mode setting is Low (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0xDE | 0x01 | 0xDB |

### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0xDD = SmartPower – Set** |  | Command requests the display to set the specified Power Saving Mode. |
| DATA[1] | Level of SmartPower control |  | For the currently-defined Type = 0:  0x00 = OFF (no special action, default mode)  0x01 = Low (defined to be same as OFF)  0x02 = Medium  0x03 = High (highest power-saving mode) |

*Example: Set the Display to Medium SmartPower Level (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0xDD | 0x02 | 0xDB |

Note1: This command controls the level of power-saving when the display is active-on.

Note2: Exactly how this feature is implemented, or whether it can be done at all, depends on the platform. It is possible that the picture‑quality might be compromised as a trade-off.

## Auto Adjust

This command works for VGA (host controller) video auto adjust.

### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x70 = Video Alignment – Set** |  | Command requests the display to make auto adjustment on VGA Input source. |
| DATA[1] | Item |  | 0x40 = Auto Adjust  (\* All other values are reserved \*) |
| DATA[2] |  |  | ( reserved, default 0 ) |

*Example: (Display address 01)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Data (2) | Checksum |
| 0x06 | 0x01 | 0x70 | 0x40 | 0x00 | 0x37 |

## Temperature Sensors

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x2F = Temperature Sensor – Get** |  | Command requests the display to report its value of the temperature sensors (±3°C). |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x2F | 0x2A |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x2F = Temperature Sensor – Report** |  | Command reports Temperature sensor value |
| DATA[1] | Temperature Sensor 1 |  | 0-100 in Celsius degrees represented in hex. |

*Example: Current Temp Sensor read out: Sensor 1 = 28°C (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x2F | 0x1C | 0x37 |

## Serial Code

### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x15 = Serial Code Get** |  | Command requests the display to report its Serial Code Number (Production code) 14 digits |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x15 | 0x10 |

### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x15 = Serial Code – Report** |  | Command reports Serial Code |
| DATA[1] | 1st Character |  | Character acc. ASCII character map (HEX) |
| DATA[2] | 2nd Character |  |  |
| DATA[3] | 3rd Character |  |  |
|  |  |  |  |
| DATA[14] | 14th Character |  | Character acc. ASCII character map (HEX) |

*Example: Current Display settings: Serial Code = HA1A0917123456 (Display address 01)*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | MsgSize | Control | Data (0) | Data (1) | Data (2) | Data (3) | Data (4) | Data (5) | Data (6) | Data (7) |
|  | 0x12 | 0x01 | 0x15 | 0x48 | 0x41 | 0x31 | 0x41 | 0x30 | 0x39 | 0x31 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Data (8) | Data (9) | Data (10) | Data (11) | Data (12) | Data (13) | Data (14) | Checksum |
| 0x37 | 0x31 | 0x32 | 0x33 | 0x34 | 0x35 | 0x36 | 0x77 |

## Tiling

The command is used to set/get the tiling status as it is defined as below.



### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x23 = Tiling – Get** |  | Command requests the display to report Tiling status. |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x23 | 0x26 |



### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| Bytes | Bytes Description | Bits | Description |
| DATA[0] | **0x23 = Tiling – Report** |  | Command reports Tiling Setting |
| DATA[1] | Enable |  | 0x00 = No  0x01 = Yes |
| DATA[2] | Frame comp. |  | 0x00 = No  0x01 = Yes |
| DATA[3] | Position |  | 0x01 = position 1  0x02 = position 2  ...  See Note 1 |
| DATA[4] | V Monitors, H Monitors |  | 0x00 = don’t care  0x01 = V Monitors =1, H Monitors =1  0x02 = V Monitors =1, H Monitors =2  …  See Note 2 |

Note 1:

(1) For Zero Bezel models, the maximum Position value is 150 (hexadecimal value is 0x96).

(2) For other models, the maximum Position value is 25 (hexadecimal value is 0x19).

(3) The Position is counted from left to right, then up to down in the Tiling Wall.

Example: See Figure 3 for the hexadecimal Position value in a 4x3 (H Monitors x V Monitors) Tiling Wall.

Example: See Figure 4 for the hexadecimal Position value in a 5x5 (H Monitors x V Monitors) Tiling Wall.

Example: See Figure 5 for the hexadecimal Position value in a 15x10 (H Monitors x V Monitors) Tiling Wall.

Note 2:

(1) For Zero Bezel models, the maximum H Monitors are 15 and the maximum V Monitors are 10. The formulas for DATA[4], V Monitors, and H Monitors are as follows:

H Monotirs = MOD(Data[4], 15) (Data[4] ÷ 15, take the remainder)

V Monitors = INT(Data[4], 15) + 1 (Data[4] ÷ 15, take the quotient and plus one)

Data[4]= (V Monitors – 1) x 15 + H Monitors

Example: If H Monitors = 12 and V Monitors = 6, the Data[4] value will be (6–1) x 15 + 12 = 87

(2) For other models, the maximum H Monitors and V Monitors are 5, and the formulas for DATA[4], V Monitors, and H Monitors are as follows:

H Monotors = MOD(Data[4], 5) (Data[4] ÷ 5, take the remainder)

V Monitors = INT(Data[4], 5) + 1 (Data[4] ÷ 5, take the quotient and plus one)

Data[4]= (V Monitors – 1) x 5 + H Monitors

Example: If H Monitors = 4 and V Monitors = 3, the Data[4] value will be (3–1) x 5 + 4 = 14.

*Example for BDL4675XU, Display address 01,*

*Set the display as follows:*

*Tiling enabled: Yes*

*Frame comp.: No*

*Position: 2*

*H Monitors: 3*

*V monitors: 2*

Data[4] value will be: (2–1) x 15 + 3 = 18 (hex value: 0x12)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data[0] | Data (1) | Data (2) | Data (3) | Data (4) | Checksum |
| 0x08 | 0x01 | 0x23 | 0x01 | 0x00 | 0x02 | 0x12 | 0x3B |

*Example for BDL4230E, Display address 01*

*Set the display as follows:*

*Tiling enabled: Yes*

*Frame comp.: No*

*Position: 2*

*H Monitors: 3*

*V monitors: 2*

Data[4] value will be: (2–1) x 5 + 3 = 8

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data[0] | Data (1) | Data (2) | Data (3) | Data (4) | Checksum |
| 0x08 | 0x01 | 0x23 | 0x01 | 0x00 | 0x02 | 0x08 | 0x21 |

Figure 3. The hexadecimal Position value in a 4x3 (H Monitors x V Monitors) Tiling Wall.

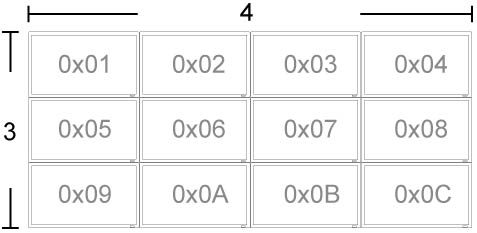


Figure 4. The hexadecimal Position value in a 5x5 (H Monitors x V Monitors) Tiling Wall.

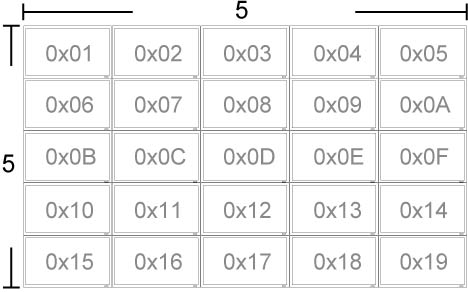
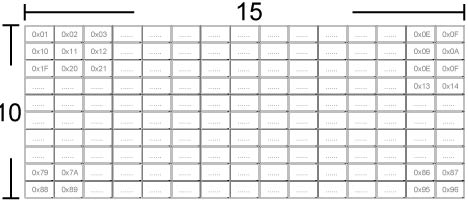


Figure 5. The hexadecimal Position value in a 15x10 (H Monitors x V Monitors) Tiling Wall.





### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| Bytes | Bytes Description | Bits | Description |
| DATA[0] | **0x22 = Tiling – Set** |  | Command reports Tiling Setting |
| DATA[1] | Enable |  | 0x00 = No  0x01 = Yes |
| DATA[2] | Frame comp. |  | 0x00 = No  0x01 = Yes  0x02 = don’t overwrite (keep previous value) |
| DATA[3] | Position |  | 0x00 = don’t overwrite (keep previous value)  0x01 = position 1  0x02 = position 2  …  See Note 1 at 8.6.2 |
| DATA[4] | V Monitors, H Monitors |  | 0x00 = don’t overwrite (keep previous value)  0x01 = V Monitors =1, H Monitors =1  0x02 = V Monitors =1, H Monitors =2  …  See Note 2 at 8.6.2 |

*Example for BDL4675XU, Display address: 01*

*Set the display as follows:*

*Tiling enabled: Yes*

*Frame comp.: No*

*Position: 2*

*H Monitors: 3*

*V monitors: 2*

Data[4] value will be (2–1) x 15 + 3 = 18 (hex value: 0x12)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data[0] | Data (1) | Data (2) | Data (3) | Data (4) | Checksum |
| 0x08 | 0x01 | 0x22 | 0x01 | 0x00 | 0x02 | 0x12 | 0x3A |

*Example for BDL4675XU, Display address 01*

*Set the display as follows:*

*Tiling enabled: Yes*

*Frame comp., Position, H Monitors, V Monitors: Keep as before*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data[0] | Data (1) | Data (2) | Data (3) | Data (4) | Checksum |
| 0x08 | 0x01 | 0x22 | 0x01 | 0x02 | 0x00 | 0x00 | 0x28 |

*Example for BDL4230E, Display address 01*

*Set the display as follows:*

*Tiling enabled: Yes*

*Frame comp.: No*

*Position: 2*

*H Monitors: 3*

*V monitors: 2*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data[0] | Data (1) | Data (2) | Data (3) | Data (4) | Checksum |
| 0x08 | 0x01 | 0x22 | 0x01 | 0x00 | 0x02 | 0x08 | 0x20 |

*Example for BDL4230E, Display address 01*

*Set the display as follows:*

*Tiling enabled: Yes*

*Frame comp., Position, H Monitors, V Monitors: Keep as before*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| MsgSize | Control | Data[0] | Data (1) | Data (2) | Data (3) | Data (4) | Checksum |
| 0x08 | 0x01 | 0x22 | 0x01 | 0x02 | 0x00 | 0x00 | 0x28 |

## Light Sensor

The command is used to set/get the light sensor status as it is defined as below.



### Message-Get



|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x25 = Light Sensor – Get** |  | Command requests the display to report its current light sensor status |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x25 | 0x20 |



### Message-Report



|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x25 = Light Sensor – Report** |  | Command reports Light Sensor Setting |
| DATA[1] | On / Off |  | 0x00 = Off  0x01 = On |

*Example: Current Display settings: Off and On (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x25 | 0x00 | 0x21 |
| 0x05 | 0x01 | 0x25 | 0x01 | 0x20 |



### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x24 = Light Sensor – Set** |  | Command to change the Light Sensor setting of the display |
| DATA[1] | On / Off |  | 0x00 = Off  0x01 = On |

*Example: Set the Display to the fallowing: Light Sensor Off (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x24 | 0x00 | 0x20 |

## OSD Rotating

The command is used to set/get the OSD menu direction as it is defined as below.



### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x27 = OSD Rotating – Get** |  | Command requests the display to report its current OSD rotating status |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x27 | 0x22 |



### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x27 = OSD Rotating – Report** |  | Command reports OSD Rotating Setting |
| DATA[1] | On / Off |  | 0x00 = Off  0x01 = On |

*Example: Current Display settings: Off and On (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x27 | 0x00 | 0x23 |
| 0x05 | 0x01 | 0x27 | 0x01 | 0x22 |



### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x26 = OSD Rotating – Set** |  | Command to change the OSD Rotating setting of the display |
| DATA[1] | On / Off |  | 0x00 = Off  0x01 = On |

*Example: Set the Display to the fallowing: OSD Rotating Off (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x26 | 0x00 | 0x22 |

## Information OSD

The command is used to set/get the Information OSD Feature as it is defined as below.



### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x2D = Information OSD Feature – Get** |  | Command requests the display to report its current Information OSD Feature status |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x2D | 0x1A |



### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x2D = Information OSD Feature – Report** |  | Command reports the Information OSD Feature enabled or disabled |
| DATA[1] | Off, 1 - 60 |  | 0x00 = Off  0x01 – 0x3C = 1 - 60 |

*Example: Current Display Information OSD Feature settings: Off (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x2D | 0x00 | 0x1B |



### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x2C = Information OSD Feature – Set** |  | Command to set the Information OSD Feature of the display enabled or disabled |
| DATA[1] | Off, 1 - 60 |  | 0x00 = Off  0x01 – 0x3C = 1 - 60 |

*Example: Set the Display to the fallowing: Information OSD Feature: Off (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x2C | 0x00 | 0x1A |

## MEMC Effect

The command is used to set/get the MEMC effects as it is defined as below.



### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x29 = MEMC Effect – Get** |  | Command requests the display to report its current MEMC effect status |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x29 | 0x2C |



### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x29 = MEMC Effect – Report** |  | Command reports the MEMC effect level |
| DATA[1] | Off/Low/Medium/High |  | 0x00 = Off  0x01 = Low  0x02 = Medium  0x03 = High |

*Example: Current Display MEMC settings: Off (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x29 | 0x00 | 0x2D |



### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x28 = MEMC Effect – Set** |  | Command to set the MEMC level of the display for various picture motion performance |
| DATA[1] | Off/Low/Medium/High |  | 0x00 = Off  0x01 = Low  0x02 = Medium  0x03 = High |

*Example: Set the Display to the fallowing: MEMC Effect Off (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x28 | 0x00 | 0x2C |

## Touch Feature

The command is used to set/get the Touch Feature as it is defined as below.



### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x1F = Touch Feature – Get** |  | Command requests the display to report its current Touch Feature status |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x1F | 0x1A |



### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x1F = Touch Feature – Report** |  | Command reports the Touch Feature enabled or disabled |
| DATA[1] | On / Off |  | 0x00 = Off  0x01 = On |

*Example: Current Display Touch Feature settings: Off (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x1F | 0x00 | 0x1B |



### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x1E = Touch Feature – Set** |  | Command to set the Touch Feature of the display enabled or disabled |
| DATA[1] | On /Off |  | 0x00 = Off  0x01 = On |

*Example: Set the Display to the fallowing: Touch Feature Off (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x1E | 0x00 | 0x1A |

## Noise Reduction

The command is used to set/get the Noise reduction Feature as it is defined as below.



### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x2B = Noise Reduction Feature – Get** |  | Command requests the display to report its current Touch Feature status |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x2B | 0x1A |



### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x2B = Noise reduction Feature – Report** |  | Command reports the Noise Reduction Feature enabled or disabled |
| DATA[1] | Off / Low / Middle / High |  | 0x00 = Off  0x01 = Low  0x02 = Middle  0x03 = High |

*Example: Current Display Noise Reduction Feature settings: Off (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x2B | 0x00 | 0x1B |



### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x2A = Noise reduction Feature – Set** |  | Command to set the Noise Reduction Feature of the display enabled or disabled |
| DATA[1] | Off / Low / Middle / High |  | 0x00 = Off  0x01 = Low  0x02 = Middle  0x03 = High |

*Example: Set the Display to the fallowing: Noise Reduction Feature Off (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x2A | 0x00 | 0x1A |

## Scan Mode

The command is used to set/get the Scan Mode Feature as it is defined as below.



### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x51 = Scan Mode Feature – Get** |  | Command requests the display to report its current Scan Mode Feature status |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x51 | 0x1A |



### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x51 = Scan Mode Feature – Report** |  | Command reports the Scan Mode Feature enabled or disabled |
| DATA[1] | Overscan / Underscan |  | 0x00 = Overscan  0x01 = Underscan |

*Example: Current Display Scan Mode Feature settings: Overscan (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x51 | 0x00 | 0x1B |



### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x50 = Scan Mode Feature – Set** |  | Command to set the Scan mode Feature of the display enabled or disabled |
| DATA[1] | Overscan / Underscan |  | 0x00 = Overscan  0x01 = Underscan |

*Example: Set the Display to the fallowing: Scan Mode Feature Overscan (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x50 | 0x00 | 0x1A |

## Scan Conversion

The command is used to set/get the Scan Conversion Feature as it is defined as below.



### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x53 = Scan Conversion Feature – Get** |  | Command requests the display to report its current Scan Conversion Feature status |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x53 | 0x1A |



### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x53 = Scan Conversion Feature – Report** |  | Command reports the Scan Conversion Feature enabled or disabled |
| DATA[1] | Progressive / Interlace |  | 0x00 = Progressive  0x01 = Interlace |

*Example: Current Display Scan Conversion Feature settings: Progressive (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x53 | 0x00 | 0x1B |



### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x52 = Scan Conversion Feature – Set** |  | Command to set the Scan Conversion Feature of the display enabled or disabled |
| DATA[1] | Progressive / Interlace |  | 0x00 = Progressive  0x01 = Interlace |

*Example: Set the Display to the fallowing: Scan Conversion Feature Progressive (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x52 | 0x00 | 0x1A |

## Switch On Delay (Tiling)

The command is used to set/get the Switch On Delay (Tiling) Feature as it is defined as below.

Value in(**OFF(0), 2, 4, 6, 8, 10, 20, 30, 40, 50, Auto(60)**)



### Message-Get

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x55 = Switch On Delay (Tiling) Feature – Get** |  | Command requests the display to report its current Switch On Delay (Tiling) Feature status |

*Example: (Display address 01)*

|  |  |  |  |
| --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Checksum |
| 0x04 | 0x01 | 0x55 | 0x1A |



### Message-Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x55 = Switch On Delay (Tiling) Feature – Report** |  | Command reports the Switch On Delay (Tiling) Feature enabled or disabled |
| DATA[1] | Off, 1 – 50, Auto |  | 0x00 = Off  0x01 – 0x32 = 1 – 50  0x33 = Auto |

*Example: Current Display Switch On Delay (Tiling) Feature settings: Off (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x55 | 0x00 | 0x1B |



### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x54 = Switch On Delay (Tiling) Feature – Set** |  | Command to set the Switch On Delay (Tiling) Feature of the display enabled or disabled |
| DATA[1] | Off, 1 – 50, Auto |  | 0x00 = Off  0x01 – 0x32 = 1 – 50  0x33 = Auto |

*Example: Set the Display to the fallowing: Switch On Delay (Tiling) Feature: Off (Display address 01)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MsgSize | Control | Data (0) | Data (1) | Checksum |
| 0x05 | 0x01 | 0x54 | 0x00 | 0x1A |

## Factory Reset

The command is used to set/get the Factory Reset as it is defined as below.



### Message-Set

|  |  |  |  |
| --- | --- | --- | --- |
| **Bytes** | **Bytes Description** | **Bits** | **Description** |
| DATA[0] | **0x56 = Factory Reset – Set** |  | Command to do the Factory Reset of the display   |  |  |  | | --- | --- | --- | | 1 | User Input Control: Local KeyBoard/Remote Control |  | | 2 | User Input Control State: Remote Control State/Local Keyboard State |  | | 3 | Power at Cold Start |  | | 4 | Auto Signal Detecting |  | | 5 | Video Parameters: Brightness/Contrast/Sharpness/Color/Tint/Black Level/Gamma | 每個Input source設定都會回到default。 | | 6 | Color Temperature | 每個Input source設定都會回到default。 | | 7 | Color Parameters: Red Gain/Green Gain/Blue Gain/Red Offset/Green Offset/Blue Offset | 每個Input source設定都會回到default。 | | 8 | Picture Format | 每個Input source設定都會回到default。 | | 9 | nVGA Video Parameters: Clock/Clock Phase/Hor Position/Ver Position | 所有Input source儲存的User timing Position設定都會回到default。 | | 10 | Picture-in-Picture（Disable PIP function）:PIP Off |  | | 11 | Volume |  | | 12 | Volume Limits: Max/Min/SwitchOn（After reset, put Max=100，Min=0，SwitchOn=0） |  | | 13 | Audio Parameters: Treble/Bass | 每個Input source設定都會回到default。 | | 14 | Smart Power |  | | 15 | Tiling: Position/V.Monitor/H.Monitor(Clear Tiling，Position=1, V.Monitor=1, H.Monitor=1) |  | | 16 | Light Sensor | No supported. | | 17 | OSD Rotating | No supported. | | 18 | Information OSD Feature |  | | 19 | MEMC Effect | No supported. | | 20 | Touch Feature | No supported. | | 21 | Noise Reduction Feature | 每個Input source設定都會回到default。 | | 22 | Scan Mode Feature | 每個Input source設定都會回到default。 | | 23 | Scan Conversion Feature | 每個Input source設定都會回到default。 | | 24 | Switch On Delay (Tiling) Feature |  |  |  |  | | --- | --- | | ~~1~~ | ~~User Input Control: Local KeyBoard/Remote Control~~ | | ~~2~~ | ~~User Input Control State: Remote Control State/Local Keyboard State~~ | | ~~3~~ | ~~Power at Cold Start~~ | | ~~4~~ | ~~Auto Signal Detecting~~ | | ~~5~~ | ~~Video Parameters: Brightness/Contrast/Sharpness/Color/Tint/Black Level/Gamma~~ | | ~~6~~ | ~~Color Temperature~~ | | ~~7~~ | ~~Color Parameters: Red Gain/Green Gain/Blue Gain/Red Offset/Green Offset/Blue Offset~~ | | ~~8~~ | ~~Picture Format~~ | | ~~9~~ | ~~VGA Video Parameters: Clock/Clock Phase/Hor Position/Ver Position~~ | | ~~10~~ | ~~Picture-in-Picture（Disable PIP function）:PIP Off~~ | | ~~11~~ | ~~Volume~~ | | ~~12~~ | ~~Volume Limits: Max/Min/SwitchOn（After reset, put Max=100，Min=0，SwitchOn=default）~~ | | ~~13~~ | ~~Audio Parameters: Treble/Bass~~ | | ~~14~~ | ~~Smart Power~~ | | ~~15~~ | ~~Tiling: Position/V.Monitor/H.Monitor(Clear Tiling，Position=1, V.Monitor=1, H.Monitor=1)~~ | | ~~16~~ | ~~Light Sensor~~ | | ~~17~~ | ~~OSD Rotating~~ | | ~~18~~ | ~~Information OSD Feature~~ | | ~~19~~ | ~~MEMC Effect~~ | | ~~20~~ | ~~Touch Feature~~ | | ~~21~~ | ~~Noise Reduction Feature~~ | | ~~22~~ | ~~Scan Mode Feature~~ | | ~~23~~ | ~~Scan Conversion Feature~~ | | ~~24~~ | ~~Switch On Delay (Tiling) Feature~~ | |

*Example: Set the Display to factory reset*

|  |  |  |
| --- | --- | --- |
| MsgSize | Control | Data (0) |
| 0x03 | 0x01 | 0x56 |

# Command summary

| **Command name** | **Set**  **Command** | **Get**  **Command** | **Command**  **Code** | **Remarks** |
| --- | --- | --- | --- | --- |
| Communication Control | √ | √ | 0x00 | Generic report |
| Platform and version labels |  | √ | 0xA2 |  |
|  |  |  |  |  |
| Power state Get |  | √ | 0x19 |  |
| Power state Set | √ |  | 0x18 |  |
| User Input Control State Get |  | √ | 0x1B |  |
| User Input Control State Set | √ |  | 0x1A |  |
| User Input Control Get |  | √ | 0x1D |  |
| User Input Control Set | √ |  | 0x1C |  |
| Power state at cold start Get |  | √ | 0xA4 |  |
| Power state at cold start Set | √ |  | 0xA3 |  |
|  |  |  |  |  |
| Input Source | √ |  | 0xAC |  |
| Current Source |  | √ | 0xAD |  |
| Auto Signal Detecting Get |  | √ | 0xAF |  |
| Auto Signal Detecting Set | √ |  | 0xAE |  |
|  |  |  |  |  |
| Video parameters Get |  | √ | 0x33 | Brightness, etc. |
| Video parameters Set | √ |  | 0x32 |
| Color Temperature Get |  | √ | 0x35 |  |
| Color Temperature Set | √ |  | 0x34 |  |
| Color Parameters Get |  | √ | 0x37 |  |
| Color Parameters Set | √ |  | 0x36 |  |
| VGA Video Parameters Get |  | √ | 0x39 |  |
| VGA Video Parameters Set | √ |  | 0x38 |  |
| Picture Format Get |  | √ | 0x3B |  |
| Picture Format Set | √ |  | 0x3A |  |
| Picture-in-picture Get |  | √ | 0x3D |  |
| Picture-in-picture Set | √ |  | 0x3C |  |
| PIP source Get |  | √ | 0x85 |  |
| PIP source Set | √ |  | 0x84 |  |
|  |  |  |  |  |
| Volume Get |  | √ | 0x45 |  |
| Volume Set | √ |  | 0x44 |  |
| Volume limits | √ |  | 0xB8 |  |
| Audio parameters Get |  |  | 0x43 |  |
| Audio parameters Set |  |  | 0x42 |  |
|  |  |  |  |  |
| Miscellaneous info |  | √ | 0x0F | Operating hours |
| Smart power Get |  | √ | 0xDE | Dimming backlight |
| Smart power Set | √ |  | 0xDD | Dimming backlight |
| Auto Adjust | √ |  | 0x70 | VGA only |
| Temperature Get |  | √ | 0x2F |  |
| Serial Code Get |  | √ | 0x15 |  |
| Tiling Get |  | √ | 0x23 |  |
| Tiling Set | √ |  | 0x22 |  |
| Light Sensor Get |  | √ | 0x25 |  |
| Light Sensor Set | √ |  | 0x24 |  |
| OSD Rotating Get |  | √ | 0x27 |  |
| OSD Rotating Set | √ |  | 0x26 |  |
| MEMC Effect Get |  | √ | 0x29 |  |
| MEMC Effect Set | √ |  | 0x28 |  |
| Information OSD Features Get |  | √ | 0x2D |  |
| Information OSD Features Set | √ |  | 0x2C |  |
| Noise Reduction Get |  | √ | 0x2B |  |
| Noise Reduction Set | √ |  | 0x2A |  |
| Touch Feature Get |  | √ | 0x1F |  |
| Touch Feature Set | √ |  | 0x1E |  |
| Scan Mode Get |  | √ | 0x51 |  |
| Scan Mode Set | √ |  | 0x50 |  |
| Scan Conversion Get |  | √ | 0x53 |  |
| Scan Conversion Set | √ |  | 0x52 |  |
| Switch On Delay Get |  | √ | 0x55 |  |
| Switch On Delay Set | √ |  | 0x54 |  |
| Factory Reset Set | √ |  | 0x56 |  |



