RS232 Command List

PM-48

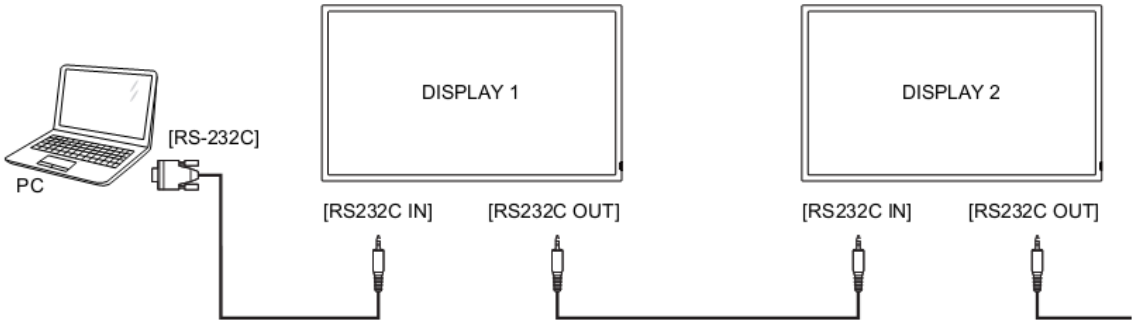
Version: 1.0

displays.agneovo.com

1. INTRODUCTION

1.1 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.



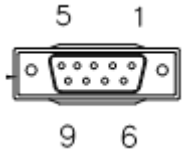
1.2 Definitions, Abbreviations and Acronyms

PBS	Professional Business Solutions
RC	Remote Control
ACK	Acknowledge
NACK	Not Acknowledge
NAV	Not Available
ID	Identification
0xXX	Hexadecimal notation

2. COMMAND PACKET FORMAT

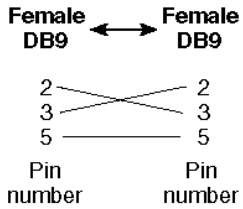
2.1 Physical Specifications

1. Baud Rate : 9600
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 provided crossover cable (null modem) is needed for connection to the host controller:



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

2.2 ***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.

Note: For LAN control, the port number is 5000.

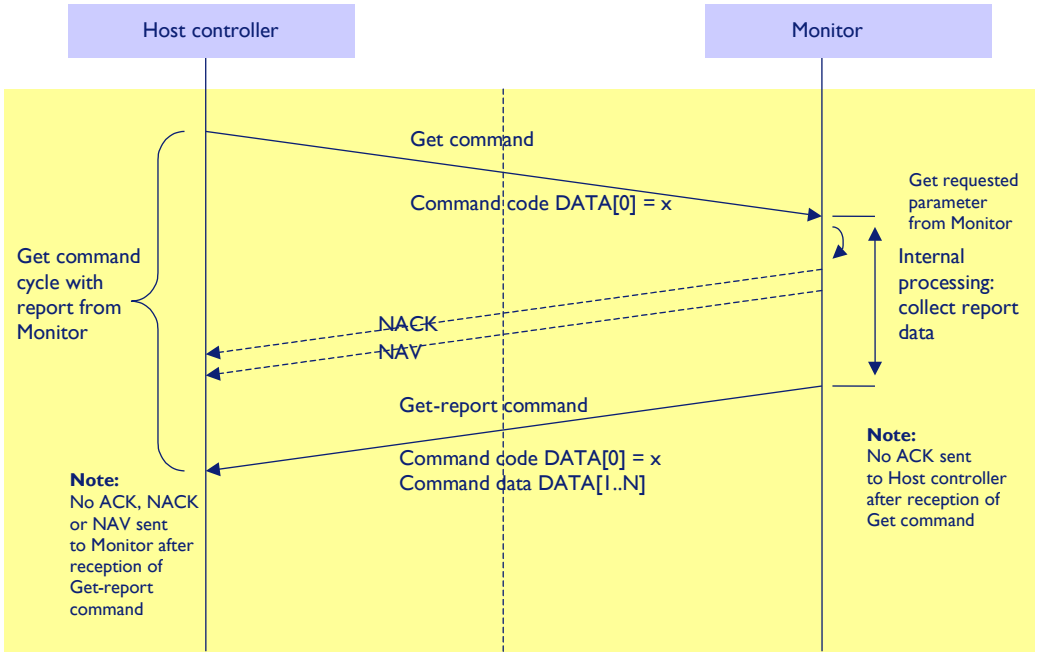


Figure 1: Explanation of mechanism of Get Command.

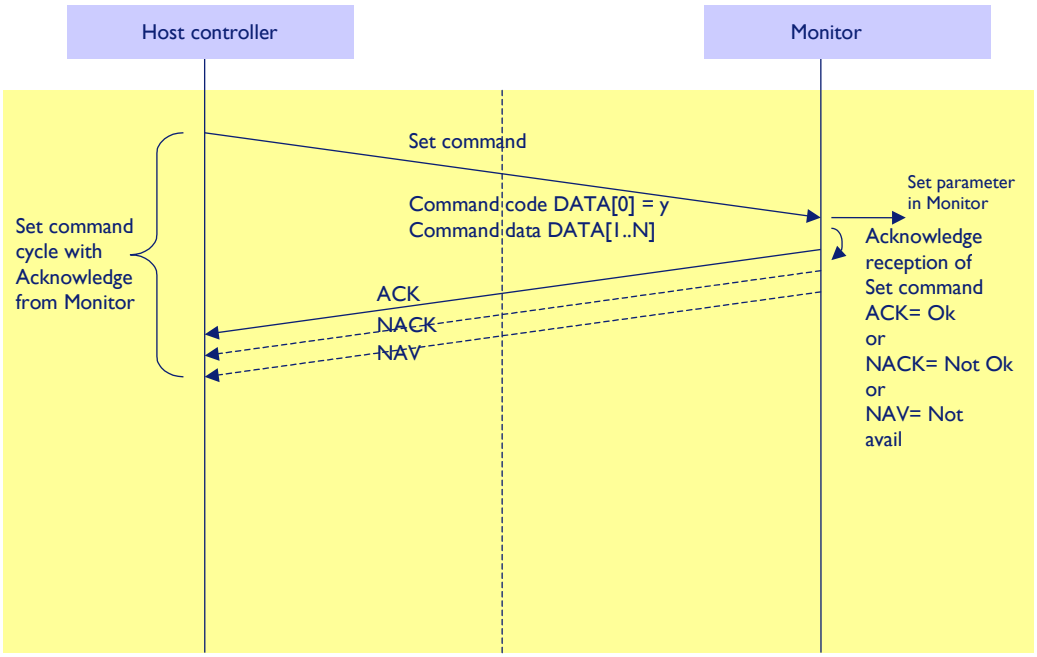


Figure 2: Explanation of mechanism of Set Command.

*2.3 **Command Format***

The RS232 packet format:

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	…	Data[N]	Checksum

In detail:

Number of Field	Name of Field	Description
Byte 1	Header	Header = 0xA6
Byte 2	Monitor ID	Monitor ID Range : 1 ~ 255
Byte 3	Category	Category = 0x00 (fixed)
Byte 4	Code0 (Page)	
Byte 5	Code1 (Function)	
Byte 6	Length	Length has to be calculated in the fallowing way: Length = N + 3
Byte 7	Data Control	Data Control = 0x01 (fixed)
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 = [Header] XOR [Monitor ID] XOR … DATA[0] … XOR DATA[N]

MESSAGES - SYSTEM

2.4 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.

2.4.1 Message-Report

Number of Field	Name of Field	Description
Byte 1	Header	Header = 0x21
Byte 2	Monitor ID	Monitor ID Range : 1 ~ 255
Byte3	Category	0x00
Byte4	Page	0x00
Byte5	MsgLen	Length of message plus checksum code. Calculate the length from Control byte to Checksum byte.
Byte6	Control	0x01
Byte7	Data[0]	Copy the received Command code.
Byte8~Byte8+(N-1)	Data[1]~Data[N]	Returned data associated with command code.
Byte 8+N	Checksum	XOR of all byte in reply/report packet(except checksum itself).

Example ACK reply: (Display address 01)

Header	Monitor ID	Category	Page	Length	Control	Data[0]	Data[1]	Checksum	Description
0x21	0x01	0x00	0x00	0x04	0x01	0x00	0x00	0x25	Command is well executed.

Example NACK reply: (Display address 01)

Header	Monitor ID	Category	Page	Length	Control	Data[0]	Data[1]	Checksum	Description
0x21	0x01	0x00	0x00	0x04	0x01	0x00	0x03	0x26	No this command code-Data(0), the system will reply “NACK”.

Example NAV reply: (Display address 01)

Header	Monitor ID	Category	Page	Length	Control	Data[0]	Data[1]	Checksum	Description
0x21	0x01	0x00	0x00	0x04	0x01	0x00	0x04	0x21	1.Checksum error, the system will reply “NAV”. 2.No this parameter-Data(1), the system will reply “NAV”.

3. MESSAGES - GENERAL

3.1 Platform and Version Labels

This command provides the model name of platform and the display Software version to the host controller.

3.1.1 Message-Get

Bytes	Bytes Description	Bits	Description
DATA[0]	**0xA2 = Platform and Version Labels - Get**		Request the label version.
DATA[1]	Label		0x00 = Get the FW version 0x01 = Get model name of the platform.

Example: Get version (Display address 01)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Data[1]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x04	0x01	0xA2	0x00	0x00

3.1.2 Message-Report

Bytes	Bytes Description	Bits	Description
DATA[0]	**0xA2 = Platform and Version Label – Report**		Request the internal label 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.

3.2 ***Power state***

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

3.2.1 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)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x03	0x01	0x19	0xBC

3.2.2 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)

Header	Monitor ID	Category	Page	Length	Control	Data[0]	Data[1]	Checksum
0x21	0x01	0x00	0x00	0x04	0x01	0x19	0x02	0x3E

3.2.3 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)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Data[1]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x04	0x01	0x18	0x01	0xBB

3.3 User Input Control

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

3.3.1 Message-Get

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

Example: (Display address 01)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x03	0x01	0x1D	0xB8

3.3.2 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..2	Not used
		Bit 1	Local Keyboard
		Bit 0	Remote Control

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

Header	Monitor ID	Category	Page	Length	Control	Data[0]	Data[1]	Checksum
0x21	0x01	0x00	0x00	0x04	0x01	0x1D	0x01	0x39

3.3.3 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..2	Not used.
		Bit 1	Local Keyboard
		Bit 0	Remote Control

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

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Data[1]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x04	0x01	0x1C	0x03	0xBD

3.4 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.

3.4.1 Message-Set

Bytes	Bytes Description	Bits	Description
DATA[0]	**0xA3 = Power at Cold Start - Set**		Set Power state at Cold Start
DATA[1]	Power state 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)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Data[1]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x04	0x01	0xA3	0x02	0x03

4. MESSAGES - INPUT SOURCES

4.1 Input Source

This command is used to change the current input source.

4.1.1 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 0x07 = Card DVI-D 0x07 = Display Port 0x08 = Card OPS 0x08 = USB 0x09 = HDMI 0x09 = DVI-D 0x0A = Network
DATA[2]	Input Source Number		0x00 = VIDEO 0x01 = S-VIDEO 0x00 = COMPONENT 0x01 = CVI 2 (not applicable) 0x00 = VGA 0x00 = Card DVI-D 0x01 = Display Port 0x00 = Card OPS 0x01 = USB 0x00 = HDMI 0x01 = DVI-D 0x00 = Network
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]	Reserved	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)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Data[1]	Data[2]	Data[3]	Data[4]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x07	0x01	0xAC	0x09	0x01	0x01	0x00	0x05

4.2 Current Source

4.2.1 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)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x03	0x01	0xAD	0x08

4.2.2 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 0x08 = VGA 0x0A = HDMI 0x0B = DVI-D 0x0D = Display Port 0x0E = Card OPS 0x0F = USB 0xFF = Unknown

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

Header	Monitor ID	Category	Page	Length	Control	Data[0]	Data[1]	Data[2]	Checksum
0x21	0x01	0x00	0x00	0x05	0x01	0xAD	0xFD	0x0A	0x7E

4.3 Auto Signal Detecting

4.3.1 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)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x03	0x01	0xAF	0xBC

4.3.2 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)

Header	Monitor ID	Category	Page	Length	Control	Data[0]	Data[1]	Checksum
0x21	0x01	0x00	0x00	0x04	0x01	0xAF	0x01	0x8B

4.3.3 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 On (Display address 01)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Data[1]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x04	0x01	0xAE	0x01	0x0D

5. MESSAGES - VIDEO

5.1 Video Parameters

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

5.1.1 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)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x03	0x01	0x33	0x96

5.1.2 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]	Color.		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 20(0x0 ~ 0x14) of the user selectable range of the display.
DATA[5]	Tint (Hue)		-50 to 50(0x0 ~ 0x64) of the user selectable range of the display.

Example: All video parameters are set to 0x64 (100 %) (Display address 01)

Header	Monitor ID	Category	Page	Length	Control	Data[0]	Data[1]	Data[2]	Data[3]	Data[4]	Data[5]	Checksum
0x21	0x01	0x00	0x00	0x08	0x01	0x33	0x64	0x64	0x64	0x14	0x64	0x0E

5.1.3 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 20(0x0 ~ 0x14) of the user selectable range of the display.
DATA[5]	Tint (Hue)		-50 to 50(0x0 ~ 0x64) of the user selectable range of the display.

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

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Data[1]	Data[2]	Data[3]	Data[4]	Data[5]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x08	0x01	0x32	0x37	0x37	0x37	0x37	0x37	0xAB

5.2 Picture Format

This command is used to control the display screen format.

5.2.1 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)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x03	0x01	0x3B	0x9E

5.2.2 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 = 4:3 0x01 = Custom 0x02 = Unscaled 0x03 = Wide Screen 0x04 = Movie expand 16:9 0x05 = Auto

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

Header	Monitor ID	Category	Page	Length	Control	Data[0]	Data[1]	Checksum
0x21	0x01	0x00	0x00	0x04	0x01	0x3B	0x03	0x1D

5.2.3 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 = 4:3 0x01 = Custom 0x02 = Unscaled 0x03 = Wide Screen 0x04 = Movie expand 16:9 0x05 = Auto

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)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Data[1]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x04	0x01	0x3A	0x03	0x9B

6. MESSAGES - AUDIO

6.1 Volume

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

6.1.1 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)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x03	0x01	0x45	0xE0

6.1.2 Message-Report

Bytes	**Bytes Description**	**Bits**	**Description**
DATA[0]	**0x45 = Volume – Report**		Command reports current Volume level
DATA[1]	Volume.		0 to 60 of the user selectable range of the display.

Example: Current Display settings: Volume:50 (0x32) (Display address 01)

Header	Monitor ID	Category	Page	Length	Control	Data[0]	Data[1]	Checksum
0x21	0x01	0x00	0x00	0x04	0x01	0x45	0x32	0x52

6.1.3 Message-Set

Bytes	**Bytes Description**	**Bits**	**Description**
DATA[0]	**0x44 = Volume – Set**		
DATA[1]	Volume.		0 to 60 of the user selectable range of the display.

Example: Set the Display Volume to 20 (0x14) (Display address 01)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Data[1]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x04	0x01	0x44	0x14	0xF2

6.2 ***Volume Limits***

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

6.2.1 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 60 of the user selectable range of the display.
DATA[2]	Maximum Volume		0 to 60 of the user selectable range of the display.
DATA[3]	Switch On Volume		0 to 60 of the user selectable range of the display.

Example: Set the Display to the following: 20 (0x14), 60 (0x3C), 50 (0x32) (Display address 01)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Data[1]	Data[2]	Data[3]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x06	0x01	0xB8	0x14	0x3C	0x32	0x02

7.1 Audio Parameters

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

7.1.1 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)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x03	0x01	0x43	0xE6

7.1.2 Message-Report

Bytes	Bytes Description	Bits	Description
DATA[0]	**0x43 = Audio Parameters – Report**		Command reports Audio Parameters
DATA[1]	Treble.		-8 to 8(0x2A ~ 0x3A) of the user selectable range of the display.
DATA[2]	Bass.		-8 to 8(0x2A ~ 0x3A) of the user selectable range of the display.

Example: Current Display settings: Treble:0 (0x32) , Bass:0 (0x32) (Display address 01)

Header	Monitor ID	Category	Page	Length	Control	Data[0]	Data[1]	Data[2]	Checksum
0x21	0x01	0x00	0x00	0x05	0x01	0x43	0x32	0x32	0x67

7.1.3 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.		-8 to 8(0x2A ~ 0x3A) of the user selectable range of the display.
DATA[2]	Bass.		-8 to 8(0x2A ~ 0x3A) 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:0 (0x32) , Bass:0 (0x32) (Display address 01)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Data[1]	Data[2]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x05	0x01	0x42	0x32	0x32	0xE1

8. MISCELLANEOUS

8.1 Operating Hours

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

8.1.1 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]	Subcommand		0x02 = Operating Hours (All other values are reserved)

Example: (Display address 01)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Data[1]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x04	0x01	0x0F	0x02	0xAF

8.1.2 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)

Header	Monitor ID	Category	Page	Length	Control	Data[0]	Data[1]	Data[2]	Checksum
0x21	0x01	0x00	0x00	0x05	0x01	0x0F	0x00	0x0A	0x21

8.2 Auto Adjust

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

8.2.1 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]	Subcommand		0x40 = Auto Adjust (* All other values are reserved *)
DATA[2]	Reserved		(reserved, fixed 0)

Example: (Display address 01)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Data[1]	Data[2]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x05	0x01	0x70	0x40	0x00	0x93

8.3 Serial Code

8.3.1 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)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x03	0x01	0x15	0xB0

8.3.2 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)

9. MESSAGES – IR Remote Command

9.1 IR Remote Command

The command is used to send IR Key to Control display.

9.1.1 Message-Set

Bytes	Bytes Description	Bits	Description
DATA[0]	**0xDB = IR Remote Command – Set**		Command to simulate the IR Remote to send IR Key to display
DATA[1]	IR KEY		0xA0: Power 0xA1: Menu 0xA2: Input 0xA3: Vol_Up 0xA4: Vol_Down 0xA5: Mute 0xA6: Cursor_Up 0xA7: Cursor_Down 0xA8: Cursor_Left 0xA9: Cursor_Right 0xB1: OK 0xB2: Return 0xC1: Red 0xC2: Green 0xC3: Yellow 0xC4: Blue 0xD1: Format 0xD2: Info 0x00: Btn_0 0x01: Btn_1 0x02: Btn_2 0x03: Btn_3 0x04: Btn_4 0x05: Btn_5 0x06: Btn_6 0x07: Btn_7 0x08: Btn_8 0x09: Btn_9

Example: Send Power Key (Display address 01)

Header	Monitor ID	Category	Code0	Code1	Length	Data Control	Data[0]	Data[1]	Checksum
0xA6	0x01	0x00	0x00	0x00	0x04	0x01	0xDB	0xA0	0xD9

10. 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 get		√	0x1D	
User Input Control set	√		0x1C	
Power state at cold start	√		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	
Picture Format get		√	0x3B	
Picture Format set	√		0x3A	
Volume get		√	0x45	
Volume set	√		0x44	
Volume limits	√		0xB8	
Audio parameters get		√	0x43	
Audio parameters set	√		0x42	
Miscellaneous info		√	0x0F	Operating hours
Auto Adjust	√		0x70	VGA only
Serial Code Get		√	0x15	
IR Remote	√		0xDB	