



MIPI Alliance Specification for Display Command Set

Version 1.02.00 – 23 July 2009

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Contents

42			
43	Version 1.02.00 – 23 July 2009	i	
44	1 Overview	11	
45	1.1 Scope	11	
46	1.2 Purpose	11	
47	2 Document Terminology	12	
48	2.1 Glossary	12	
49	2.2 Acronyms and Abbreviations	13	
50	3 References	14	
51	4 Display Architectures	15	
52	5 Display Functional Description	18	
53	5.1 Power Level Definition	18	
54	5.2 Gamma Curves	21	
55	5.2.1 Gamma Curve 1 (GC0)	21	
56	5.2.2 Gamma Curve 2 (GC1)	21	
57	5.2.3 Gamma Curve 3 (GC2)	22	
58	5.2.4 Gamma Curve 4 (GC3)	22	
59	5.3 Self-diagnostic Functions	23	
60	5.3.1 Register Loading Detection	23	
61	5.3.2 Functionality Detection	24	
62	5.3.3 Chip Attachment Detection (optional)	25	
63	5.3.4 Display Glass Break Detection (optional)	26	
64	5.4 Display Command Set	27	
65	5.5 Command List	28	
66	5.6 Command Accessibility	31	
67	5.7 Default Modes and Values	33	
68	6 Command Description	37	

69	6.1	enter_idle_mode	38
70	6.2	enter_invert_mode	40
71	6.3	enter_normal_mode	41
72	6.4	enter_partial_mode	42
73	6.5	enter_sleep_mode	43
74	6.6	exit_idle_mode	45
75	6.7	exit_invert_mode	46
76	6.8	exit_sleep_mode	47
77	6.9	get_address_mode	49
78	6.10	get_blue_channel	51
79	6.11	get_diagnostic_result	52
80	6.12	get_display_mode	53
81	6.13	get_green_channel	55
82	6.14	get_pixel_format	56
83	6.15	get_power_mode	58
84	6.16	get_red_channel	60
85	6.17	get_scanline	61
86	6.18	get_signal_mode	62
87	6.19	nop	63
88	6.20	read_DDB_continue	64
89	6.21	read_DDB_start	65
90	6.22	read_memory_continue	67
91	6.23	read_memory_start	69
92	6.24	set_address_mode	71
93	6.25	set_column_address	76
94	6.26	set_display_off	78
95	6.27	set_display_on	79
96	6.28	set_gamma_curve	80

97	6.29	set_page_address	81
98	6.30	set_partial_columns	83
99	6.31	set_partial_rows	88
100	6.32	set_pixel_format	90
101	6.33	set_scroll_area	91
102	6.34	set_scroll_start	94
103	6.35	set_tear_off	96
104	6.36	set_tear_on	97
105	6.37	set_tear_scanline	99
106	6.38	soft_reset	101
107	6.39	write_LUT	102
108	6.40	write_memory_continue	104
109	6.41	write_memory_start	106
110		Annex A Pixel-to-Byte Mapping	108
111	A.1	Three Bits per Pixel Format	108
112	A.2	Eight Bits per Pixel Format	109
113	A.3	Twelve Bits per Pixel Format	109
114	A.4	Sixteen Bits per Pixel Format	110
115	A.5	Eighteen Bits per Pixel Format	110
116	A.6	Twenty-four Bits per Pixel Format	111
117		Annex B Color Depth Conversion Look-up Tables (informative)	112
118	B.1	Color Depth Conversion LUT – 12-bit Color to 16-bit Color	112
119	B.2	Color Depth Conversion LUT – 12-bit and 16-bit Colors to 18-bit Color	115
120	B.3	Color Depth Conversion LUT – 12-bit, 16-bit and 18-bit Colors to 24-bit Color	120
121			
122			

Figures

123	Figures	
124	Figure 1 Type 1 Display Architecture Block Diagram.....	15
125	Figure 2 Type 2 Display Architecture Block Diagram.....	16
126	Figure 3 Type 3 Display Architecture Block Diagram.....	17
127	Figure 4 Type 1 Display Architecture Power Change Sequences	19
128	Figure 5 Type 2 Display Architecture Power Change Sequence.....	20
129	Figure 6 Type 3 Display Architecture Power Change Sequence.....	20
130	Figure 7 Gamma curve 1 (GC0).....	21
131	Figure 8 Gamma Curve 2 (GC1)	21
132	Figure 9 Gamma Curve 3 (GC2)	22
133	Figure 10 Gamma Curve 4 (GC3)	22
134	Figure 11 Register Loading Detection Flow Chart.....	23
135	Figure 12 Functionality Detection Flow Chart.....	24
136	Figure 13 Chip Attachment Detection Reference.....	25
137	Figure 14 Chip Attachment Detection Flow Chart.....	25
138	Figure 15 Display Glass Break Detection Reference	26
139	Figure 16 Display Glass Break Detection Flow Chart	26
140	Figure 17 Flowchart Legend.....	37
141	Figure 18 enter_idle_mode Example.....	38
142	Figure 19 enter_idle_mode Flow Chart.....	39
143	Figure 20 enter_invert_mode Example	40
144	Figure 21 enter_invert_mode Flow Chart.....	40
145	Figure 22 enter_sleep_mode Flow Chart.....	44
146	Figure 23 exit_idle_mode Flow Chart.....	45
147	Figure 24 exit_invert_mode Example	46
148	Figure 25 exit_invert_mode Flow Chart.....	46
149	Figure 26 exit_sleep_mode Flow Chart.....	48

150	Figure 27 get_address_mode Flow Chart	50
151	Figure 28 get_blue_channel Flow Chart.....	51
152	Figure 29 get_diagnostic_result Flow Chart.....	52
153	Figure 30 get_display_mode Flow Chart	54
154	Figure 31 get_green_channel Flow Chart.....	55
155	Figure 32 get_pixel_format Flow Chart	57
156	Figure 33 get_power_mode Flow Chart.....	59
157	Figure 34 get_red_channel Flow Chart	60
158	Figure 35 get_scanline Flow Chart.....	61
159	Figure 36 get_signal_mode Flow Chart	62
160	Figure 37 read_DDB_continue Flow Chart.....	64
161	Figure 38 read_DDB_start Flow Chart.....	66
162	Figure 39 read_memory_continue Flow Chart.....	68
163	Figure 40 read_memory_start Flow Chart.....	70
164	Figure 41 B7 Page Address Order	71
165	Figure 42 B6 Column Address Order	72
166	Figure 43 B5 Page/Column Addressing Order	72
167	Figure 44 B3 RGB Order	73
168	Figure 45 B1 Flip Horizontal.....	74
169	Figure 46 B0 Flip Vertical.....	74
170	Figure 47 set_address_mode Flow Chart	75
171	Figure 48 set_column_address Example	76
172	Figure 49 set_column_address Flow Chart	77
173	Figure 50 set_display_off Example.....	78
174	Figure 51 set_display_off Flow Chart	78
175	Figure 52 set_display_on Example.....	79
176	Figure 53 set_display_on Flow Chart.....	79
177	Figure 54 set_gamma_curve Flow Chart.....	80

178	Figure 55 set_page_address Example.....	81
179	Figure 56 set_page_address Flow Chart.....	82
180	Figure 57 set_partial_columns with set_address_mode B2 = 0.....	84
181	Figure 58 set_partial_columns with set_address_mode B2=1.....	84
182	Figure 59 set_partial_columns with set_address_mode B2 = 0.....	85
183	Figure 60 set_partial_columns with set_address_mode B2 = 1.....	85
184	Figure 61 Entering Partial Display Mode Flow Chart.....	86
185	Figure 62 Exiting Partial Display Mode Flow Chart.....	87
186	Figure 63 set_partial_rows with set_address_mode B4 = 0	88
187	Figure 64 set_partial_rows with set_address_mode B4=1	89
188	Figure 65 set_partial_rows with set_address_mode B4 = 0	89
189	Figure 66 set_partial_rows with set_address_mode B4 = 1	89
190	Figure 67 set_pixel_format Flow Chart.....	90
191	Figure 68 set_scroll_area set_address_mode B4 = 1 Example.....	92
192	Figure 69 set_scroll_area set_address_mode B4 = 1 Example.....	92
193	Figure 70 set_scroll_area Flow Chart.....	93
194	Figure 71 set_scroll_start set_address_mode B4 = 0.....	94
195	Figure 72 set_scroll_start set_address_mode B4 = 1.....	95
196	Figure 73 set_tear_off Flow Chart.....	96
197	Figure 74 set_tear_on M = 0	97
198	Figure 75 set_tear_on M = 1	97
199	Figure 76 set_tear_on Flow Chart	98
200	Figure 77 set_tear_scanline	99
201	Figure 78 set_tear_scanline Flow Chart	100
202	Figure 79 soft_reset Flow Chart	101
203	Figure 80 write_LUT Flow Chart.....	103
204	Figure 81 write_memory_continue Flow Chart.....	105
205	Figure 82 write_memory_start Flow Chart	107

206	Figure 83 Three Bits per Pixel Format to Byte Mapping	108
207	Figure 84 Eight Bits per Pixel Format to Byte Mapping	109
208	Figure 85 Twelve Bits per Pixel Format to Byte Mapping.....	109
209	Figure 86 Sixteen Bits per Pixel Format to Byte Mapping.....	110
210	Figure 87 Eighteen Bits per Pixel Format to Byte Mapping	110
211	Figure 88 Twenty-four Bits per Pixel Format to Byte Mapping	111
212		
213		

214 **Tables**

215	Table 1 Command List	28
216	Table 2 Command Accessibility.....	31
217	Table 3 Default Display Mode, Power Mode and Register Values	33
218	Table 4 enter_idle_mode Memory Content vs. Display Color	38
219	Table 5 Gamma Curve Selection.....	53
220	Table 6 Interface Pixel Formats.....	56
221	Table 7 Gamma Curves	80
222	Table 8 LUT Color Depth Conversions.....	103
223	Table 9 Common Color Encoding	105
224	Table 10 Common Color Encoding.....	107
225	Table 11 12-bit to 16-bit LUT Red Component Values	112
226	Table 12 12-bit to 16-bit LUT Green Component Values.....	113
227	Table 13 12-bit to 16-bit LUT Blue Component Values	114
228	Table 14 12-bit, 16-bit to 18-bit LUT Red Component Values.....	115
229	Table 15 12-bit, 16-bit to 18-bit LUT Green Component Values	117
230	Table 16 12-bit, 16-bit to 18-bit LUT Blue Component Values.....	119
231	Table 17 12-bit, 16-bit and 18-bit Colors to 24-bit Color LUT Red Component Values.....	120
232	Table 18 12-bit, 16-bit and 18-bit Colors to 24-bit Color LUT Green Component Values.....	123
233	Table 19 12-bit, 16-bit and 18-bit Colors to 24-bit Color LUT Blue Component Values.....	126

234

MIPI Alliance Specification for Display Command Set

1 Overview

The Display Command Set specification defines display module behavior for devices that adhere to the MIPI specifications for mobile device host processor, and display interfaces in an abstract, device independent way. All commands in this specification shall be supported by display modules that adhere to *MIPI Alliance Standard for Display Pixel Interface* [MIPI01], *MIPI Alliance Standard for Display Bus Interface* [MIPI02], and *MIPI Alliance Specification for Display Serial Interface* [MIPI03] except as provided for in the individual specifications.

1.1 Scope

Display commands and logical flow are within the scope of this specification. In addition, to support device abstraction, several display architectures are also specified.

Electrical specifications and interface protocols are out of scope for this document.

1.2 Purpose

The Display Command Set specification is used by manufacturers to design products that adhere to MIPI specifications for mobile device host processor and display interfaces.

Implementing the DCS specification reduces the time-to-market and design cost of mobile devices by simplifying the interconnection of products from different manufacturers. In addition, adding new features such as larger or additional displays to mobile devices is simplified due to the extensible nature of the MIPI specifications.

2 Document Terminology

The MIPI Alliance has adopted Section 13.1 of the *IEEE Standards Style Manual*, which dictates use of the words “shall”, “should”, “may”, and “can” in the development of documentation, as follows:

The word *shall* is used to indicate mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (*shall* equals *is required to*).

The use of the word *must* is deprecated and shall not be used when stating mandatory requirements; *must* is used only to describe unavoidable situations.

The use of the word *will* is deprecated and shall not be used when stating mandatory requirements; *will* is only used in statements of fact.

The word *should* is used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain course of action is deprecated but not prohibited (*should* equals *is recommended that*).

The word *may* is used to indicate a course of action permissible within the limits of the standard (*may* equals *is permitted*).

The word *can* is used for statements of possibility and capability, whether material, physical, or causal (*can* equals *is able to*).

All sections are normative, unless they are explicitly indicated to be informative.

2.1 Glossary

Display Area: The portion of a display device used to show image data.

Display Controller: A separate silicon chip, or integrated functional block in a host device, used to control a display module. May include full-frame or partial-frame memory.

Display Device: A functional device that shows images such as a Liquid Crystal Display.

Display Driver: An integrated circuit inside a display module used to control the display device. May or may not integrate full or partial frame-memory.

Display Glass: Same as Display Device. Derived from the display material’s name.

Display Module: A functional module used to show an image. Can consist of a display device, display driver, additional peripheral components or circuits and a display interface.

Display Panel: Same as Display Device.

Frame Memory: Memory integrated in a display driver or display controller in order to provide storage for display device refreshment. Full-frame memory provides enough storage for the full display area of a display device. Partial-frame memory provides only enough storage for a portion of the display area.

289 **Type 1 Display Architecture:** A display module architecture in which the display module includes a
290 display device, display driver, full-frame memory, interface registers, timing controller, non-volatile
291 memory and a control interface.

292 **Type 2 Display Architecture:** A display module architecture in which the display module includes a
293 display device, display driver, partial-frame memory, interface registers, timing controller, non-volatile
294 memory, a control interface and a video stream interface.

295 **Type 3 Display Architecture:** Similar to the Type 2 Display Architecture except no frame memory is
296 present.

297 **2.2 Acronyms and Abbreviations**

298 The following acronyms and abbreviations are used throughout this document:

299	DBI	Display Bus Interface
300	DCS	Display Command Set
301	DPI	Display Pixel Interface
302	DSI	Display Serial Interface
303		

3 References

- [MIP101] *MIPI Alliance Standard for Display Pixel Interface (DPI-2)*, version 2.00, MIPI Alliance, Inc., 15 September 2005
- [MIP102] *MIPI Alliance Standard for Display Bus Interface (DBI-2)*, version 2.00, MIPI Alliance, Inc., 29 November 2005
- [MIP103] *MIPI Alliance Specification for Display Serial Interface (DSI)*, version 1.02.00, MIPI Alliance, Inc., In Press
- [MIP104] *MIPI Alliance Specification for Device Descriptor Block (DDB)*, version 0.82.01, MIPI Alliance, Inc., 29 October 2008

4 Display Architectures

The display module shall be based on Type 1, Type 2 or Type 3 display architecture.

The Type 1 Display Architecture should consist of the following functional blocks:

Display Device. Used to show image data.

Display Driver. May be one or more devices used to drive the display device.

Full-frame memory. Used to hold image data. Can be integrated in the display driver.

Registers. Used to configure display behavior and identification information. Can be integrated in the display driver.

Timing Controller. Provides timing signals to control the display and display driver based on configuration information. Can be integrated in the display driver.

Non-volatile memory. Used to store default register and configuration values. Can be integrated in the display driver.

Control Interface. Provides the interface between the host processor and the display driver. Can be integrated in the display driver.

Display Driving Circuit. Used to convert timing signals and voltages to signals appropriate to drive the display device.

Power Supply. Used to convert system voltages to levels usable by the display device and display driver. Can be integrated in the display driver.

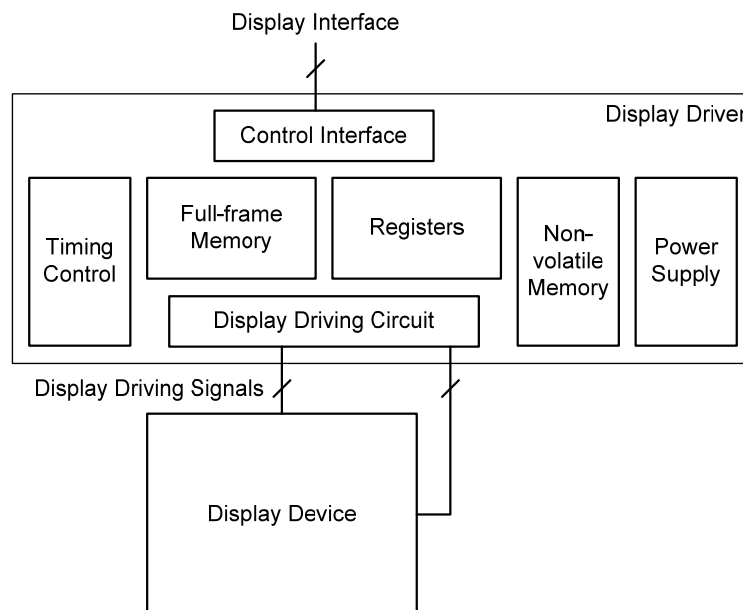


Figure 1 Type 1 Display Architecture Block Diagram

The Type 2 Display Architecture should consist of the following functional blocks:

Display Device. Used to show image data.

Display Driver. May be one or more devices used to drive the display device.

Partial-frame memory. Used to hold image data. Can be integrated in the display driver.

Registers. Used to configure display behavior and identification information. Can be integrated in the display driver.

Timing Controller. Provides timing signals to control the display and display driver based on configuration information. Can be integrated in the display driver.

Non-volatile memory. Used to store default register and configuration values. Can be integrated in the display driver.

Control Interface. Provides the interface between the host processor and the display driver. Can be integrated in the display driver.

Display Driving Circuit. Used to convert timing signals and voltages to signals appropriate to drive the display device.

Power Supply. Used to convert system voltages to levels usable by the display device and display driver. Can be integrated in the display driver.

Video Stream Interface. Used to receive video image data and timing signals from the host processor.

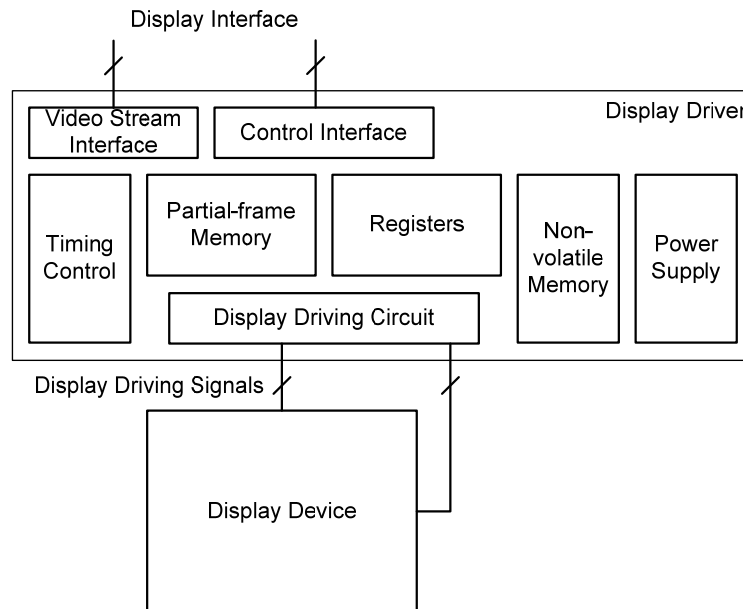


Figure 2 Type 2 Display Architecture Block Diagram

The Type 3 Display Architecture should consist of the following functional blocks:

Display Device. Used to show image data.

Display Driver. May be one or more devices used to drive the display device.

Registers. Used to configure display behavior and identification information. Can be integrated in the display driver.

Timing Controller. Provides timing signals to control the display and display driver based on configuration information. Can be integrated in the display driver.

Non-volatile memory. Used to store default register and configuration values. Can be integrated in the display driver.

Control Interface. Provides the interface between the host processor and the display driver. Can be integrated in the display driver.

Display Driving Circuit. Used to convert timing signals and voltages to signals appropriate to drive the display device.

Power Supply. Used to convert system voltages to levels usable by the display device and display driver. Can be integrated in the display driver.

Video Stream Interface. Used to receive video image data and timing signals from the host processor.

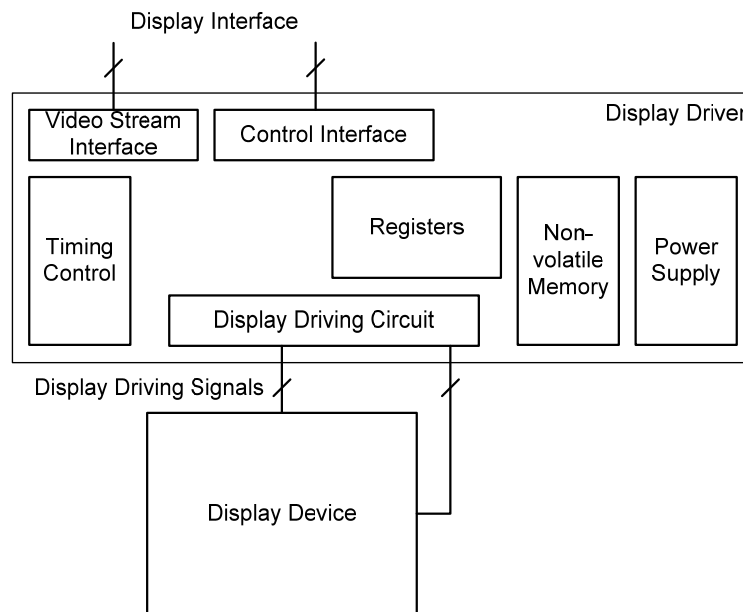


Figure 3 Type 3 Display Architecture Block Diagram

In all architecture types, it is assumed the power supply is under the control of the display driver.

The Display Command Set is used through the mentioned control interface.

5 Display Functional Description

5.1 Power Level Definition

Display modules designed using the Type 1 display architecture shall implement the power sequence shown in Figure 4.

Display modules designed using the Type 2 display architecture shall implement the power sequence shown in Figure 5.

Display modules designed using the Type 3 display architecture shall implement the power sequence shown in Figure 6.

Each power sequence consists of a combination of different display and power modes as follows.

In **Normal mode**, the display module shows image data using the full display area of the display device. See section 6.3 for a description of Normal mode.

In **Partial mode**, the display module shows image data in only a portion of the full display area of the display device. See section 6.30 for a description of Partial mode.

In **Idle mode**, the display module shows image data using a limited number of colors. Turning off Idle mode displays the image data using the full number of colors supported by the display device. See section 6.1 for a description of Idle mode.

In **Sleep mode**, the display module does not show any image data. In addition, the display interface shall remain powered and along with those functional blocks necessary to maintain the data in the frame memory and registers. The remaining functional blocks are placed in their low power modes. See section 6.5 for a description of Sleep mode.

When Sleep mode is off, the display module shows image data on the display device and all functional blocks operate normally. See section 6.8 for a description of operation when Sleep mode is off.

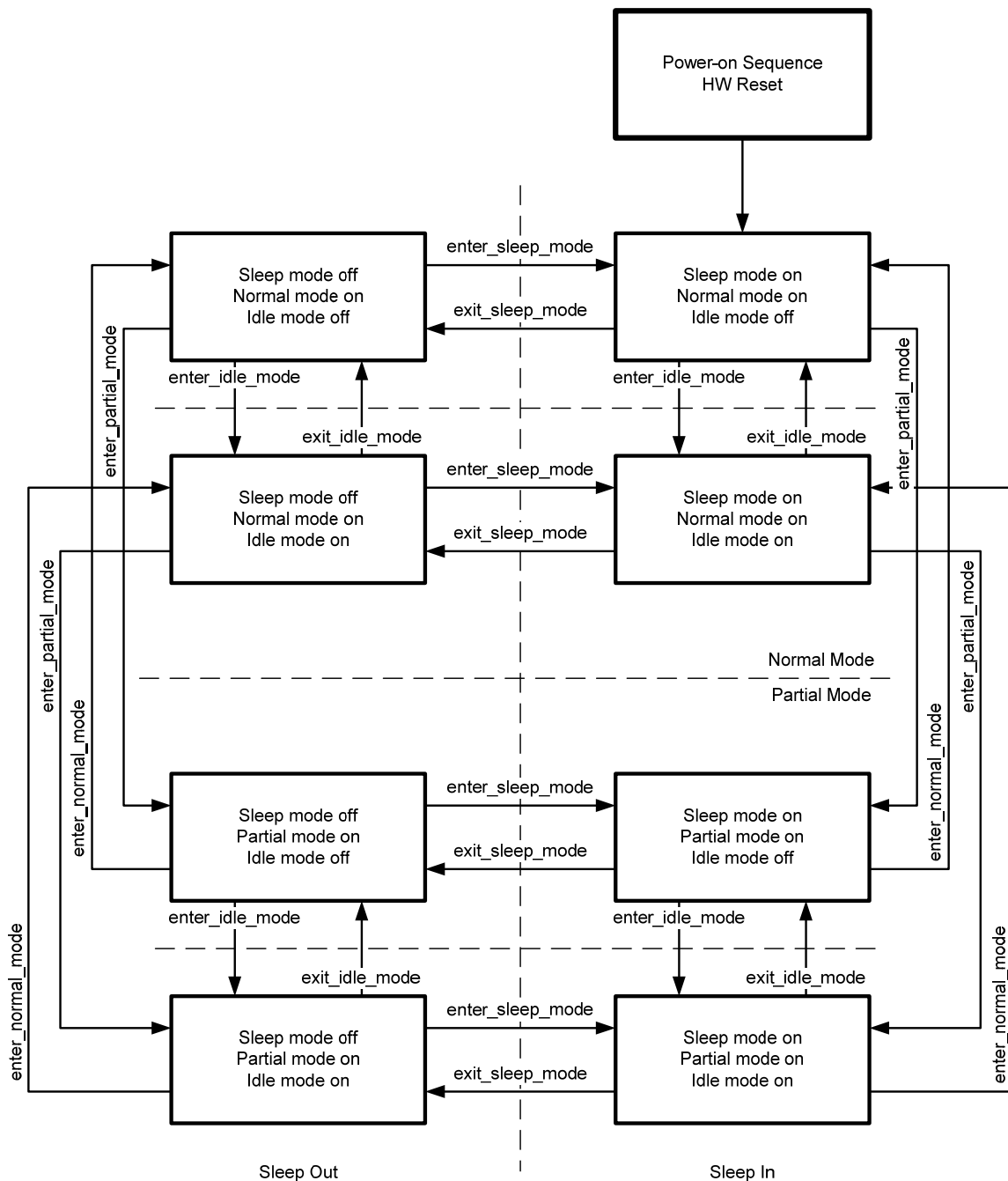


Figure 4 Type 1 Display Architecture Power Change Sequences

Note 1: There shall be no abnormal visual effect when changing between power modes.

Note 2: The display module can change between any power modes without restriction.

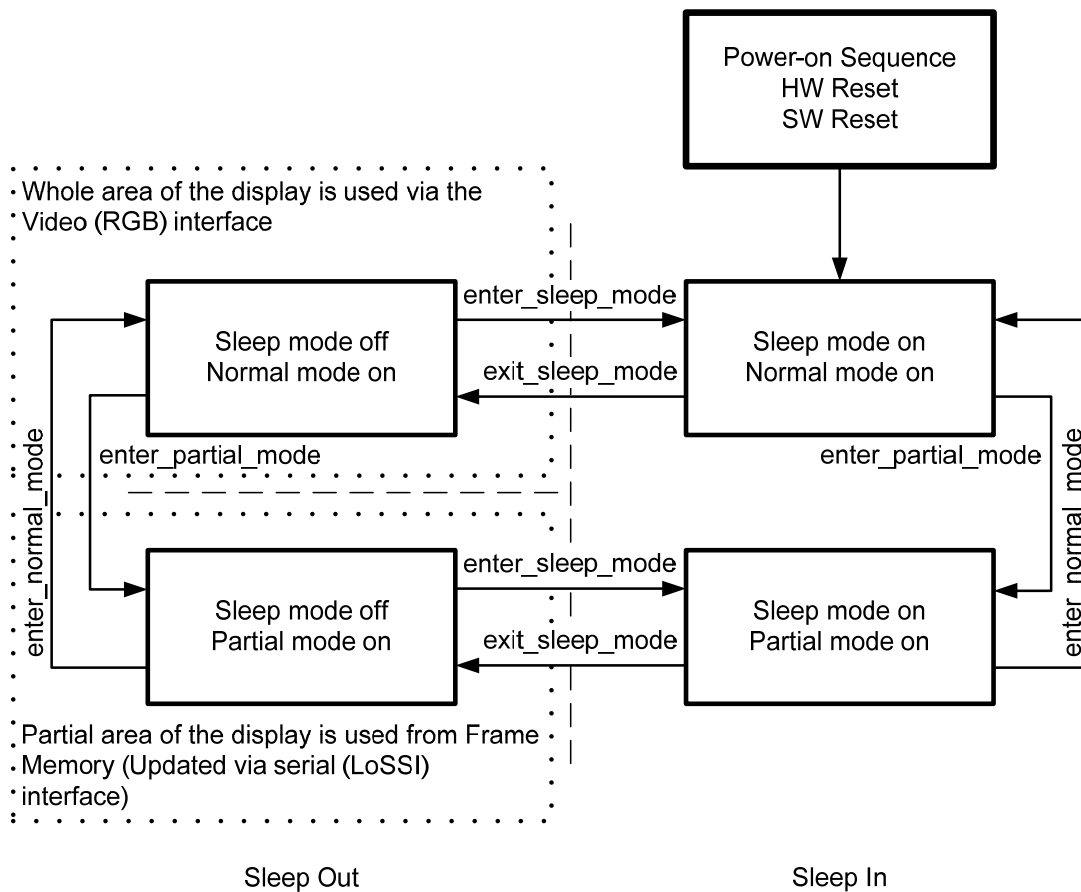


Figure 5 Type 2 Display Architecture Power Change Sequence

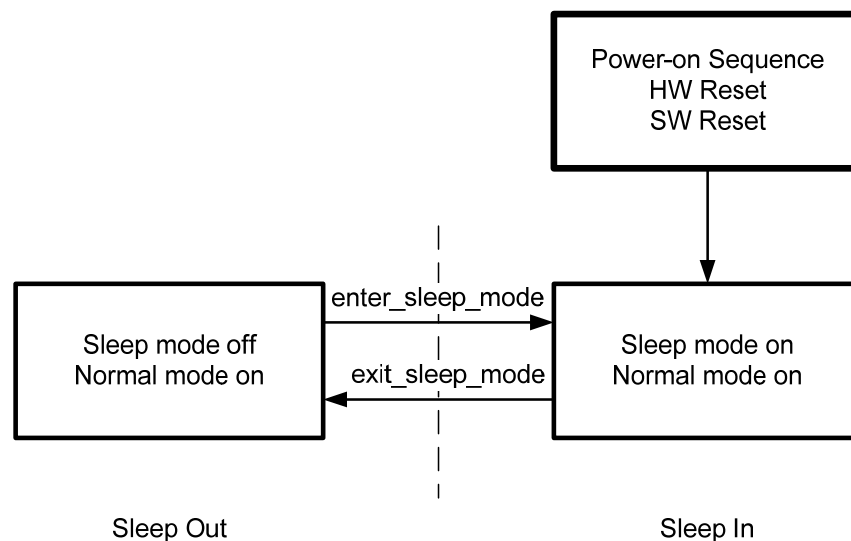


Figure 6 Type 3 Display Architecture Power Change Sequence

Note 1: There shall be no abnormal visual effect when changing between power modes.

Note 2: The display module can change between any power modes without restriction.

5.2 Gamma Curves

The display module can implement a gamma adjustment. If gamma adjustment is implemented then the display module shall support at a minimum Gamma Curve 1 as described in section 5.2.1. The display module can also implement up to three additional gamma curves as described in sections 5.2.2 through 5.2.4.

In the gamma curve figures x is the normalized image data supplied by the host processor to the display module and y is the normalized response of the display device.

5.2.1 Gamma Curve 1 (GC0)

Gamma Curve 1 (GC0) is 2.2, i.e. $y=x^{2.2}$

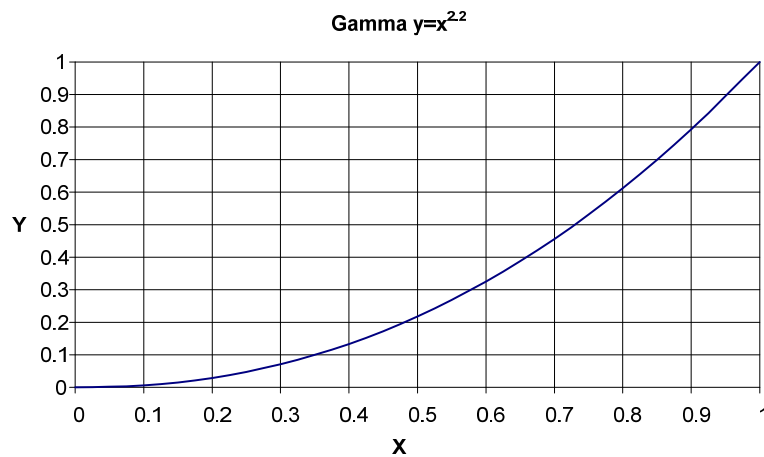


Figure 7 Gamma curve 1 (GC0)

5.2.2 Gamma Curve 2 (GC1)

Gamma Curve 2 (GC1) is 1.8, i.e. $y=x^{1.8}$

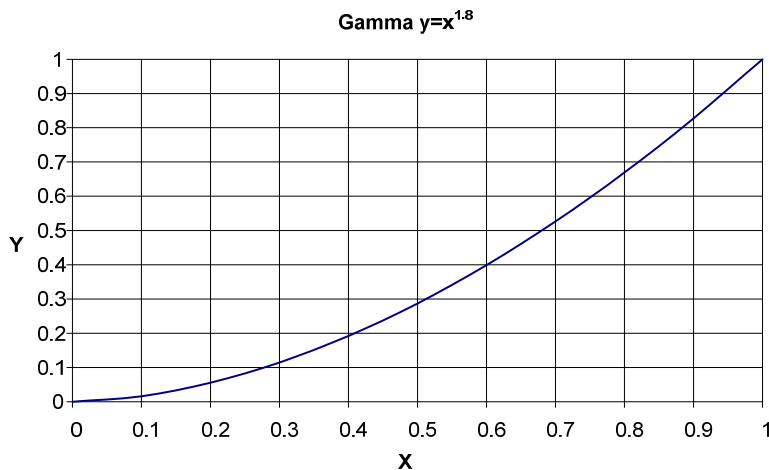


Figure 8 Gamma Curve 2 (GC1)

5.2.3 Gamma Curve 3 (GC2)

Gamma Curve 3 (GC2) is 2.5, i.e. $y=x^{2.5}$

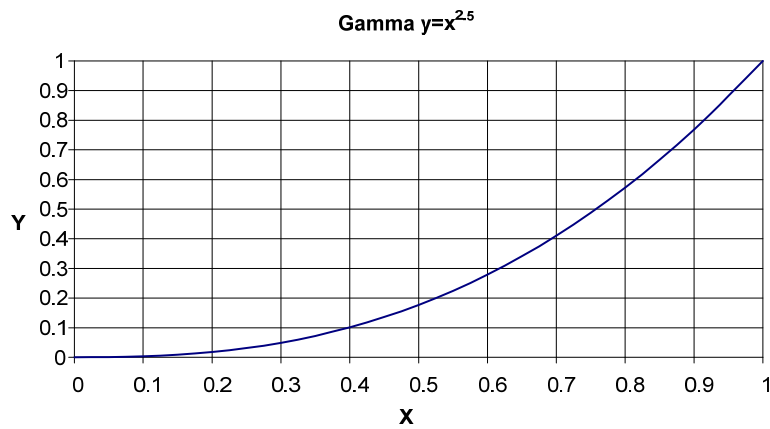


Figure 9 Gamma Curve 3 (GC2)

5.2.4 Gamma Curve 4 (GC3)

Gamma Curve 4 (GC3) is linear, i.e. $y=x^1$

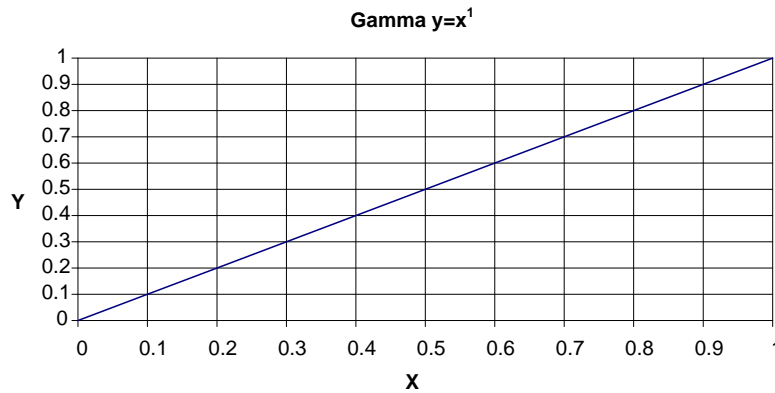


Figure 10 Gamma Curve 4 (GC3)

5.3 Self-diagnostic Functions

The display module shall support all the self-diagnostic functions in this section except those functions indicated as optional. Optional functions can be implemented in the display module at the manufacturer's discretion.

5.3.1 Register Loading Detection

The `exit_sleep_mode` command (see section 6.8) is a trigger for the Register Loading Detection function. This function indicates if the display module correctly loaded the factory default values from Non-volatile memory to the registers. If the registers were loaded properly then bit D7 of the SDR register is inverted, otherwise the value is unchanged. See section 6.11 for a description of the SDR register.

The flow chart for the Register Loading Detection function is shown in Figure 11.

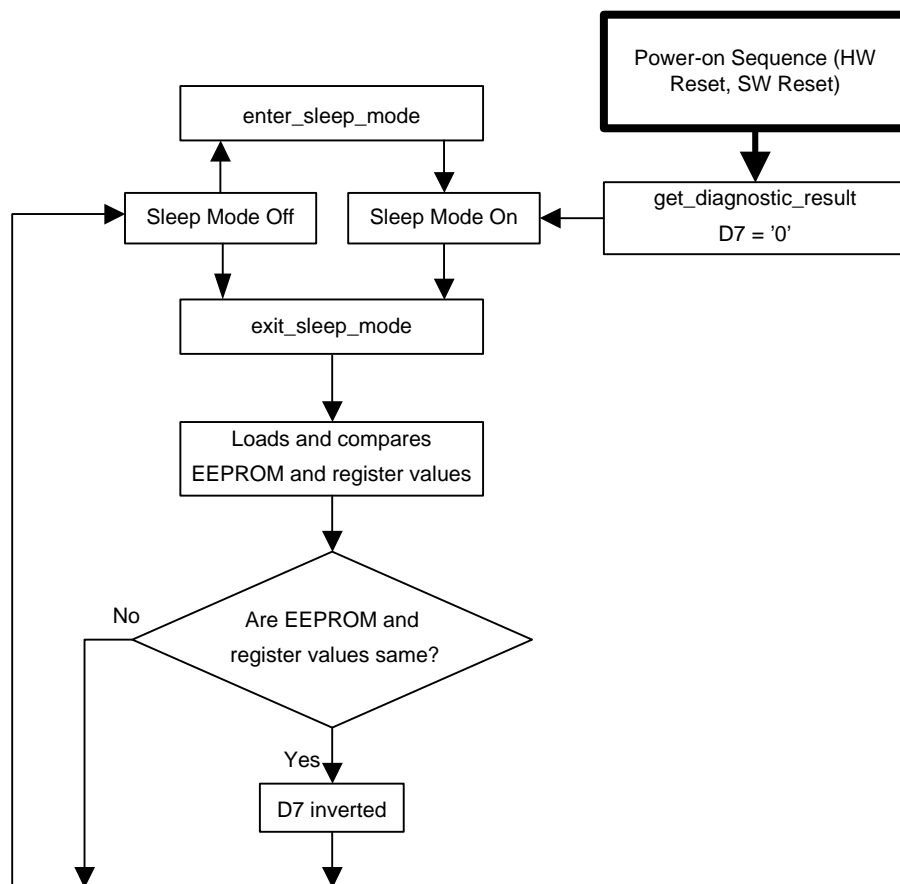


Figure 11 Register Loading Detection Flow Chart

Note: Registers modified by the display module after loading are not verified.

5.3.2 Functionality Detection

The `exit_sleep_mode` command (see section 6.8) is a trigger for the Functionality Detection function. This function indicates if the display module functional blocks, e.g. power supply, clock generator, etc. are operating correctly. If the functional blocks are operating properly then bit D6 of the SDR register is inverted, otherwise the value is unchanged. See section 6.11 for a description of the SDR register.

The flow chart for the Functionality Detection function is shown in Figure 12.

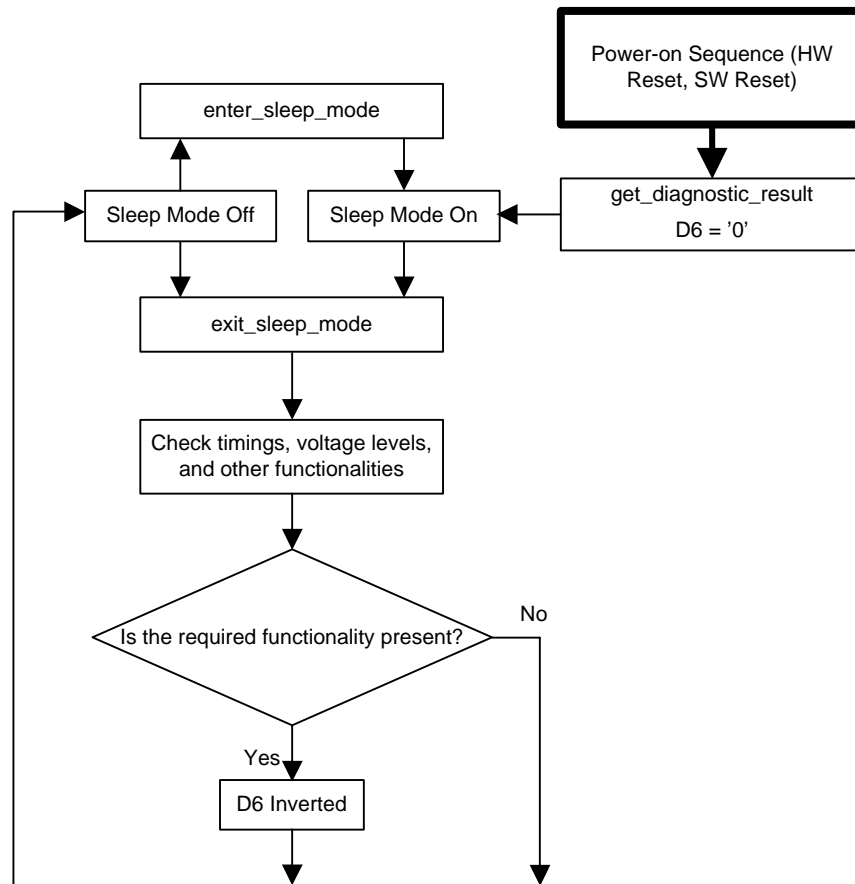


Figure 12 Functionality Detection Flow Chart

Note: The host processor shall wait before sending a `get_power_mode` command so the display module can exit Sleep mode and finish the Functionality Detection function.

5.3.3 Chip Attachment Detection (optional)

The `exit_sleep_mode` command (see section 6.8) is a trigger for the Chip Attachment Detection function. This function indicates if certain chips, e.g. display driver IC, are attached to the display module. If the chips are properly attached to the display module then bit D5 of the SDR register is inverted, otherwise the value is unchanged. See section 6.11 for a description of the SDR register.

The flow chart for the Chip Attachment Detection function is shown in Figure 14.

Figure 13 is a reference implementation for the Chip Attachment Detection function. Two bumps are connected together via a conductor on the flex foil or the display glass substrate in all four corners of the chip.

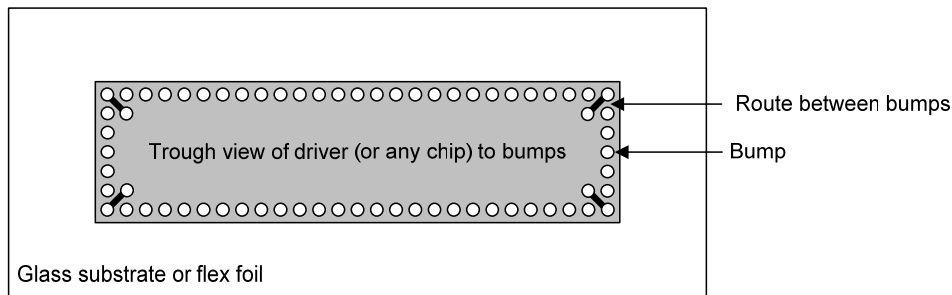


Figure 13 Chip Attachment Detection Reference

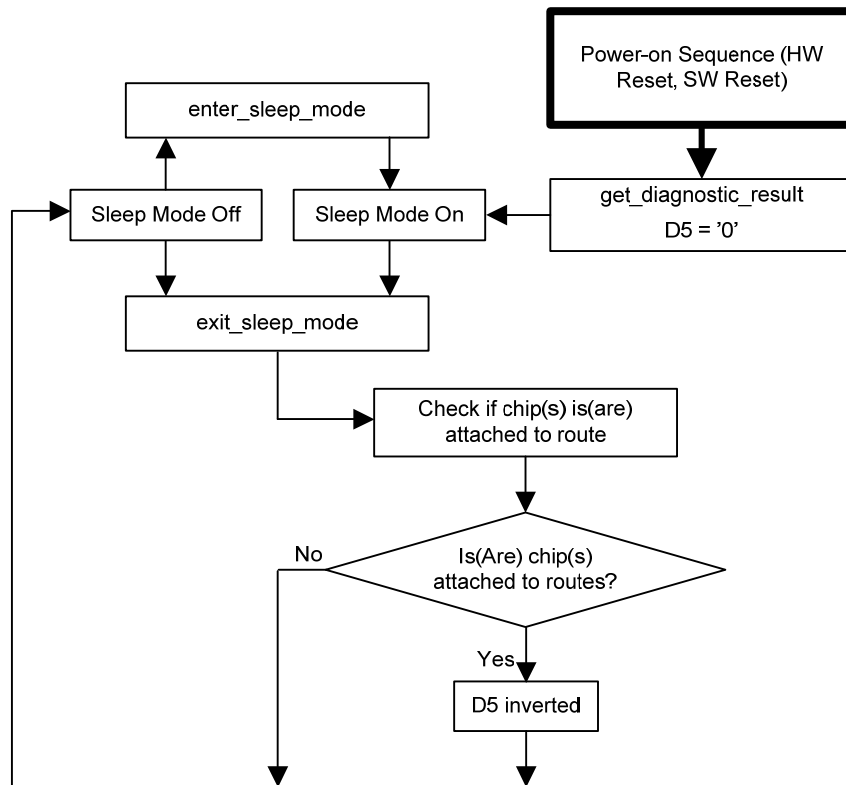


Figure 14 Chip Attachment Detection Flow Chart

5.3.4 Display Glass Break Detection (optional)

The `exit_sleep_mode` command (see section 6.8) is a trigger for the Display Glass Break Detection function. This function indicates if display glass is broken. If the display glass is broken then bit D4 of the SDR register is inverted, otherwise the value is unchanged. See section 6.11 for a description of the SDR register.

The flow chart for the Display Glass Break Detection function is shown in Figure 16.

Figure 15 is a reference implementation for the Display Glass Break Detection function. Two bumps are connected together via a conductor routed on the outside edge of the display glass substrate.

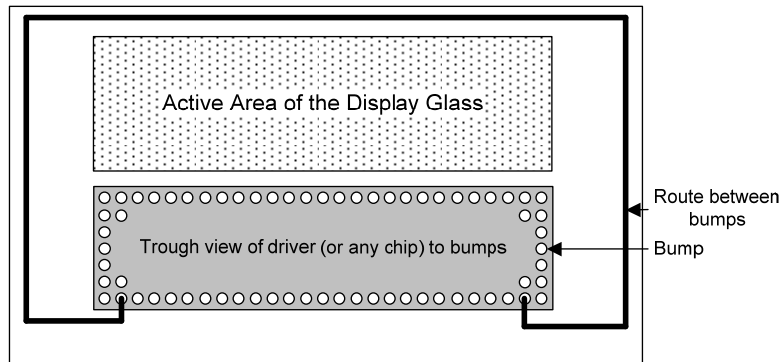


Figure 15 Display Glass Break Detection Reference

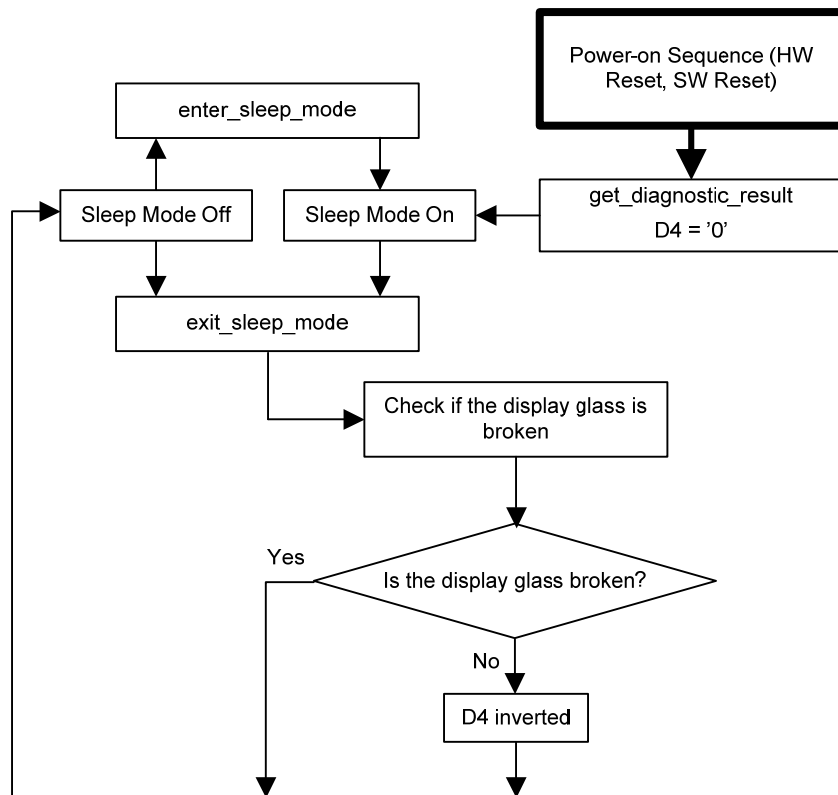


Figure 16 Display Glass Break Detection Flow Chart

5.4 Display Command Set

The Display Command Set is used to store image data, configure the display module behavior and retrieve display module data including identification information by accessing the frame memory and the display module registers.

The DCS is separated into two functional areas: the User Command Set and the Manufacturer Command Set. Each command is an eight-bit code with 00h to AFh assigned to the User Command Set and all other codes assigned to the Manufacturer Command Set.

The Manufacturer Command Set (MCS) is a device dependent interface intended for factory programming of the display module default parameters. Once the display module is configured, the MCS shall be disabled by the manufacturer. Once disabled, all MCS commands are treated as nop by the display interface. The MCS is not defined in this specification.

The User Command Set provides a display device independent interface targeted at the operating system's hardware abstraction layer. All commands listed in this section shall be implemented except write_LUT which is optional.

Any unused command codes shall be treated as nop by the display module.

The remainder of this section is divided into three sections. Section 5.5 is an alphabetical list of the supported commands. Section 5.6 and 5.7 describe command functionality in different display architectures and operating modes.

509 **5.5 Command List**

510

Table 1 Command List

Command	Hex Code	Description	Number of Parameters	Display Architecture Implementation Requirement		
				Type 1	Type 2	Type 3
enter_idle_mode	39h	Reduced color depth is used on the display panel.	0	Yes	No	No
enter_invert_mode	21h	Displayed image colors are inverted.	0	Yes	Yes	Yes
enter_normal_mode	13h	The whole display area is used for image display.	0	Yes	Yes	No
enter_partial_mode	12h	Part of the display area is used for image display.	0	Yes	Yes	No
enter_sleep_mode	10h	Power for the display panel is off.	0	Yes	Yes	Yes
exit_idle_mode	38h	Full color depth is used on the display panel.	0	Yes	No	No
exit_invert_mode	20h	Displayed image colors are not inverted.	0	Yes	Yes	Yes
exit_sleep_mode	11h	Power for the display panel is on.	0	Yes	Yes	Yes
get_address_mode	0Bh	Get the data order for transfers from the Host to the display module and from the frame memory to the display device.	1	Yes	Yes	Yes
get_blue_channel	08h	Get the blue component of the pixel at (0, 0).	1	No	Yes	Yes
get_diagnostic_result	0Fh	Get Peripheral Self-Diagnostic Result	1	Yes	Yes	Yes
get_display_mode	0Dh	Get the current display mode from the peripheral.	1	Yes	Yes	Yes
get_green_channel	07h	Get the green component of the pixel at (0, 0).	1	No	Yes	Yes
get_pixel_format	0Ch	Get the current pixel format.	1	Yes	Yes	Yes
get_power_mode	0Ah	Get the current power mode.	1	Yes	Yes	Yes
get_red_channel	06h	Get the red component of the pixel at (0, 0).	1	No	Yes	Yes
get_scanline	45h	Get the current scanline.	2	Yes	Yes	No

Command	Hex Code	Description	Number of Parameters	Display Architecture Implementation Requirement		
				Type 1	Type 2	Type 3
get_signal_mode	0Eh	Get display module signaling mode.	1	Yes	Yes	Yes
nop	00h	No Operation	0	Yes	Yes	Yes
read_DDB_continue	A8h	Continue reading the DDB from the last read location.	variable	Yes	Yes	Yes
read_DDB_start	A1h	Read the DDB from the provided location.	variable	Yes	Yes	Yes
read_memory_continue	3Eh	Read image data from the peripheral continuing after the last read_memory_continue or read_memory_start.	variable	Yes	Yes	No
read_memory_start	2Eh	Transfer image data from the peripheral to the Host Processor interface starting at the location provided by set_column_address and set_page_address.	variable	Yes	Yes	No
set_address_mode	36h	Set the data order for transfers from the Host to the display module and from the frame memory to the display device.	1	Yes	Yes	Yes
set_column_address	2Ah	Set the column extent.	4	Yes	Yes	No
set_display_off	28h	Blanks the display device.	0	Yes	Yes	Yes
set_display_on	29h	Show the image on the display device.	0	Yes	Yes	Yes
set_gamma_curve	26h	Selects the gamma curve used by the display device.	1	Yes	Yes	Yes
set_page_address	2Bh	Set the page extent.	4	Yes	Yes	No
set_partial_columns	31h	Defines the number of columns in the partial display area on the display device.	4	Yes	Yes	No
set_partial_rows	30h	Defines the number of rows in the partial display area on the display device.	4	Yes	Yes	No

Command	Hex Code	Description	Number of Parameters	Display Architecture Implementation Requirement		
				Type 1	Type 2	Type 3
set_pixel_format	3Ah	Defines how many bits per pixel are used in the interface.	1	Yes	Yes	Yes
set_scroll_area	33h	Defines the vertical scrolling and fixed area on display device.	6	Yes	No	No
set_scroll_start	37h	Defines the vertical scrolling starting point.	2	Yes	No	No
set_tear_off	34h	Synchronization information is not sent from the display module to the host processor.	0	Yes	No	No
set_tear_on	35h	Synchronization information is sent from the display module to the host processor at the start of VFP.	1	Yes	No	No
set_tear_scanline	44h	Synchronization information is sent from the display module to the host processor when the display device refresh reaches the provided scanline.	2	Yes	No	No
soft_reset	01h	Software Reset	0	Yes	Yes	Yes
write_LUT	2Dh	Fills the peripheral look-up table with the provided data.	variable	optional	No	No
write_memory_continue	3Ch	Transfer image information from the Host Processor interface to the peripheral from the last written location.	variable	Yes	Yes	No
write_memory_start	2Ch	Transfer image data from the Host Processor to the peripheral starting at the location provided by set_column_address and set_page_address.	variable	Yes	Yes	No

5.6 Command Accessibility

Table 2 provides command accessibility of several combinations of display and power modes.

Table 2 Command Accessibility

Command	Hex Code	Command Accessibility				
		Normal Mode On, Idle Mode Off, Sleep Mode Off	Normal Mode On, Idle Mode On, Sleep Mode Off	Partial Mode On, Idle Mode Off, Sleep Mode Off	Partial Mode On, Idle Mode On, Sleep Mode Off	Sleep Mode On
enter_idle_mode	39h	Yes	Yes	Yes	Yes	Yes
enter_invert_mode	21h	Yes	Yes	Yes	Yes	Yes
enter_normal_mode	13h	Yes	Yes	Yes	Yes	Yes
enter_partial_mode	12h	Yes	Yes	Yes	Yes	Yes
enter_sleep_mode	10h	Yes	Yes	Yes	Yes	Yes
exit_idle_mode	38h	Yes	Yes	Yes	Yes	Yes
exit_invert_mode	20h	Yes	Yes	Yes	Yes	Yes
exit_sleep_mode	11h	Yes	Yes	Yes	Yes	Yes
get_address_mode	0Bh	Yes	Yes	Yes	Yes	Yes
get_blue_channel	08h	Yes	Yes	N/A	N/A	Yes
get_diagnostic_result	0Fh	Yes	Yes	Yes	Yes	Yes
get_display_mode	0Dh	Yes	Yes	Yes	Yes	Yes
get_green_channel	07h	Yes	Yes	N/A	N/A	Yes
get_pixel_format	0Ch	Yes	Yes	Yes	Yes	Yes
get_power_mode	0Ah	Yes	Yes	Yes	Yes	Yes
get_red_channel	06h	Yes	Yes	N/A	N/A	Yes
get_scanline	45h	Yes	Yes	Yes	Yes	Yes
get_signal_mode	0Eh	Yes	Yes	Yes	Yes	Yes
nop	00h	Yes	Yes	Yes	Yes	Yes
read_DDB_continue	A8h	Yes	Yes	Yes	Yes	Yes
read_DDB_start	A1h	Yes	Yes	Yes	Yes	Yes
read_memory_continue	3Eh	Yes	Yes	Yes	Yes	Yes
read_memory_start	2Eh	Yes	Yes	Yes	Yes	Yes
set_address_mode	36h	Yes	Yes	Yes	Yes	Yes
set_column_address	2Ah	Yes	Yes	Yes	Yes	Yes
set_display_off	28h	Yes	Yes	Yes	Yes	Yes
set_display_on	29h	Yes	Yes	Yes	Yes	Yes

Command	Hex Code	Command Accessibility				
		Normal Mode On, Idle Mode Off, Sleep Mode Off	Normal Mode On, Idle Mode On, Sleep Mode Off	Partial Mode On, Idle Mode Off, Sleep Mode Off	Partial Mode On, Idle Mode On, Sleep Mode Off	Sleep Mode On
set_gamma_curve	26h	Yes	Yes	Yes	Yes	Yes
set_page_address	2Bh	Yes	Yes	Yes	Yes	Yes
set_partial_columns	31h	Yes	Yes	Yes	Yes	Yes
set_partial_rows	30h	Yes	Yes	Yes	Yes	Yes
set_pixel_format	3Ah	Yes	Yes	Yes	Yes	Yes
set_scroll_area	33h	Yes	Yes	Yes	Yes	Yes
set_scroll_start	37h	Yes	Yes	Yes	Yes	Yes
set_tear_off	34h	Yes	Yes	Yes	Yes	Yes
set_tear_on	35h	Yes	Yes	Yes	Yes	Yes
set_tear_scanline	44h	Yes	Yes	Yes	Yes	Yes
soft_reset	01h	Yes	Yes	Yes	Yes	Yes
write_LUT	2Dh	Yes	Yes	Yes	Yes	Yes
write_memory_continue	3Ch	Yes	Yes	Yes	Yes	Yes
write_memory_start	2Ch	Yes	Yes	Yes	Yes	Yes

515

5.7 Default Modes and Values

Table 3 provides default display modes, power modes and register values.

Table 3 Default Display Mode, Power Mode and Register Values

Command	Hex Code	Parameters	Default Modes and Values, Hex		
			Power-on Sequence	SW Reset	HW Reset
enter_idle_mode	39h	None	Idle Mode Off	Idle Mode Off	Idle Mode Off
enter_invert_mode	21h	None	Display Inversion Off	Display Inversion Off	Display Inversion Off
enter_normal_mode	13h	None	Normal Display mode On	Normal Display mode On	Normal Display mode On
enter_partial_mode	12h	None	Normal Display Mode On	Normal Display Mode On	Normal Display Mode On
enter_sleep_mode	10h	None	Sleep Mode On	Sleep Mode On	Sleep Mode On
exit_idle_mode	38h	None	Idle Mode Off	Idle Mode Off	Idle Mode Off
exit_invert_mode	20h	None	Display Inversion Off	Display Inversion Off	Display Inversion Off
exit_sleep_mode	11h	None	Sleep Mode On	Sleep Mode On	Sleep Mode On
get_address_mode	0Bh	1 st	Refer to corresponding command parameter(s)	Refer to corresponding command parameter(s)	Refer to corresponding command parameter(s)
get_blue_channel	08h	1 st	00h	00h	00h
get_diagnostic_result	0Fh	1 st	00h	00h	00h
get_display_mode	0Dh	1 st	Refer to corresponding command parameter(s)	Refer to corresponding command parameter(s)	Refer to corresponding command parameter(s)
get_green_channel	07h	1 st	00h	00h	00h
get_pixel_format	0Ch	1 st	Refer to corresponding command parameter(s)	Refer to corresponding command parameter(s)	Refer to corresponding command parameter(s)
get_power_mode	0Ah	1 st	08h	08h	08h
get_red_channel	06h	1 st	00h	00h	00h

Command	Hex Code	Parameters	Default Modes and Values, Hex		
			Power-on Sequence	SW Reset	HW Reset
get_scanline	45h	1 st & 2 nd	Refer to corresponding command parameter(s)	Refer to corresponding command parameter(s)	Refer to corresponding command parameter(s)
get_signal_mode	0Eh	1 st	Refer to corresponding command parameter(s)	Refer to corresponding command parameter(s)	Refer to corresponding command parameter(s)
nop	00h	None	N/A	N/A	N/A
read_DDB_continue	A8h	all	See [MIPI04]		
read_DDB_start	A1h	all	See [MIPI04]		
read_memory_continue	3Eh	all	Random values	Not cleared	Not cleared
read_memory_start	2Eh	all	Random values	Not cleared	Not cleared
set_address_mode	36h	1 st	00000000b	No change from the value before SW reset	00000000b
set_column_address	2Ah	1 st	00h	00h	00h
		2 nd	00h	00h	00h
		3 rd	The frame memory column address corresponding to the last vertical line.	If set_address_mode's B5 = 0; The frame memory column address corresponding to the last vertical line. If set_address_mode's B5 = 1; The frame memory column address corresponding to the last horizontal line.	The frame memory column address corresponding to the last vertical line.
		4 th			
set_display_off	28h	None	Display Off	Display Off	Display Off
set_display_on	29h	None	Display Off	Display Off	Display Off
set_gamma_curve	26h	1 st	01h	01h	01h
set_page_address	2Bh	1 st	00h	00h	00h
		2 nd			

Command	Hex Code	Parameters	Default Modes and Values, Hex		
			Power-on Sequence	SW Reset	HW Reset
		3 rd	The frame memory page address corresponding to the last horizontal line.	If set_address_mode's B5 = 0; The frame memory page address corresponding to the last horizontal line. If set_address_mode's B5 = 1; The frame memory page address corresponding to the last vertical line.	The frame memory page address corresponding to the last horizontal line.
		4 th			
set_partial_columns	31h	1 st	00h	00h	00h
		2 nd			
		3 rd	The frame memory column address corresponding to the last vertical line.	The frame memory column address corresponding to the last vertical line.	The frame memory column address corresponding to the last vertical line.
set_partial_rows	30h	1 st	00h	00h	00h
		2 nd			
		3 rd	The frame memory page address corresponding to the last horizontal line.	The frame memory page address corresponding to the last horizontal line.	The frame memory page address corresponding to the last horizontal line.
		4 th			
set_pixel_format	3Ah	1 st	07h	07h	07h
set_scroll_area	33h	1 st	00h	00h	00h
		2 nd	00h	00h	00h
		3 rd	The frame memory page address corresponding to the last horizontal line.	The frame memory page address corresponding to the last horizontal line.	The frame memory page address corresponding to the last horizontal line.
		4 th			
		5 th	00h	00h	00h

Command	Hex Code	Parameters	Default Modes and Values, Hex		
			Power-on Sequence	SW Reset	HW Reset
		6 th	00h	00h	00h
set_scroll_start	37h	1 st	00h	00h	00h
		2 nd	00h	00h	00h
set_tear_off	34h	None	TE line output OFF	TE line output OFF	TE line output OFF
set_tear_on	35h	1 st			
set_tear_scanline	44h	1 st	00h	00h	00h
		2 nd	00h	00h	00h
soft_reset	01h	None	N/A	N/A	N/A
write_LUT	2Dh	all	Random values	Contents of LUT protected	Random values
write_memory_continue	3Ch	all	Random values	Not cleared	Not cleared
write_memory_start	2Ch	all	Random values	Not cleared	Not cleared

6 Command Description

This section defines the commands supported by display modules implementing MIPI Alliance specifications for display interfaces.

All commands consist of a single 8-bit byte, in some cases accompanied by parameters that supply necessary information for the correct execution of the command. Generally, the command and accompanying parameter bytes are transferred using serial or parallel bits 0 through 7 of the display interface, regardless of the physical interface width and architecture. The only exceptions are the `read_memory_continue`, `read_memory_start`, `write_memory_continue`, and `write_memory_start` commands in a DBI system (see [MIPI02]). The full width of the display interface may be used by these commands. See sections 6.22, 6.23, 6.40, and 6.41 for the command descriptions.

Command flow charts in this section use the symbols defined in Figure 17.

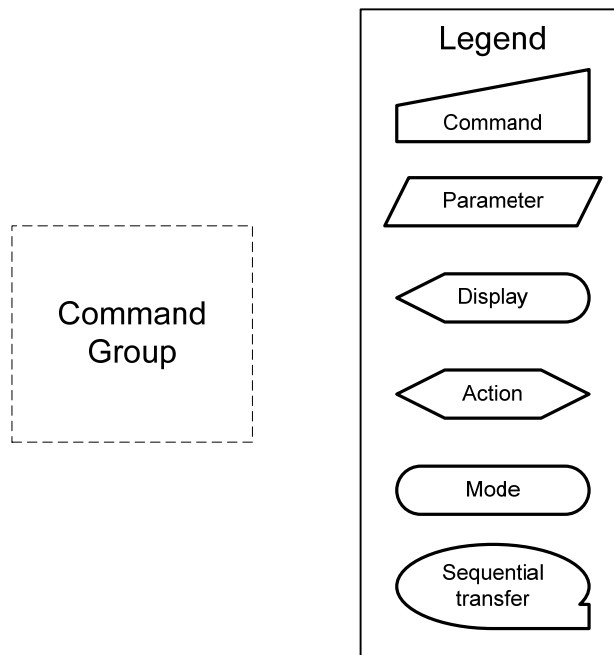


Figure 17 Flowchart Legend

6.1 enter_idle_mode

Interface All
Command 39h
Parameters None

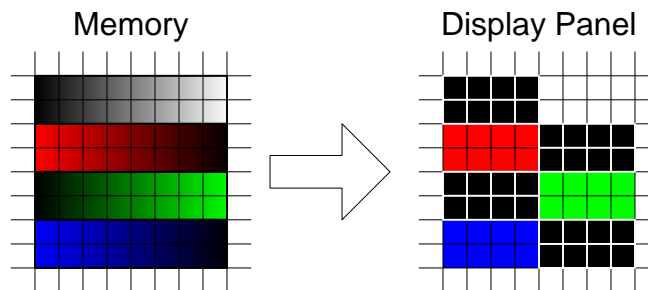
Command

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	1	1	0	0	1	39h

Description

This command causes the display module to enter Idle Mode.

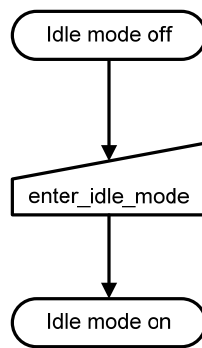
In Idle Mode, color expression is reduced. Colors are shown on the display device using the MSB of each of the R, G and B color components in the frame memory.

**Figure 18 enter_idle_mode Example****Table 4 enter_idle_mode Memory Content vs. Display Color**

Color	R ₇ R ₆ R ₅ R ₄ R ₃ R ₂ R ₁ R ₀	G ₇ G ₆ G ₅ G ₄ G ₃ G ₂ G ₁ G ₀	B ₇ B ₆ B ₅ B ₄ B ₃ B ₂ B ₁ B ₀
Black	0XXXXXXXX	0XXXXXXXX	0XXXXXXXX
Blue	0XXXXXXXX	0XXXXXXXX	1XXXXXXXX
Red	1XXXXXXXX	0XXXXXXXX	0XXXXXXXX
Magenta	1XXXXXXXX	0XXXXXXXX	1XXXXXXXX
Green	0XXXXXXXX	1XXXXXXXX	0XXXXXXXX
Cyan	0XXXXXXXX	1XXXXXXXX	1XXXXXXXX
Yellow	1XXXXXXXX	1XXXXXXXX	0XXXXXXXX
White	1XXXXXXXX	1XXXXXXXX	1XXXXXXXX

Restrictions

This command has no effect when the display module is already in Idle Mode.

549 **Flow Chart**550
551 **Figure 19 enter_idle_mode Flow Chart**
552

6.2 enter_invert_mode

Interface All
Command 21h
Parameters None

Command

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	0	0	0	0	1	21h

Description

This command causes the display module to invert the image data only on the display device. The frame memory contents remain unchanged. No status bits are changed.

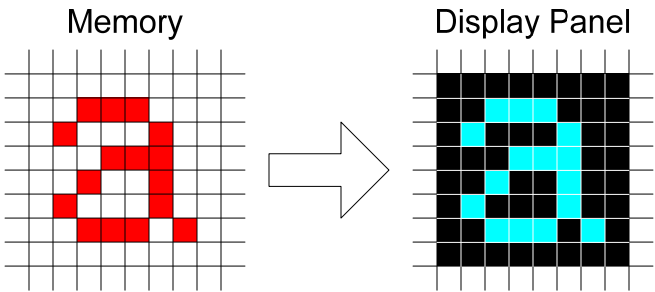


Figure 20 enter_invert_mode Example

Restrictions

This command has no effect when the display module is already inverting the display image.

Flow Chart

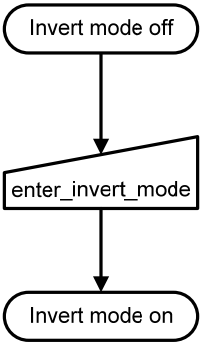


Figure 21 enter_invert_mode Flow Chart

569 **6.3 enter_normal_mode**

570 **Interface** All
 571 **Command** 13h
 572 **Parameters** None

573 **Command**

	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
Direction H→D	0	0	0	1	0	0	1	1	13h

574 **Description**

575 This command causes the display module to enter the Normal mode.

576 Normal Mode is defined as Partial Display mode and Scroll mode are off.

577 The host processor sends PCLK, HS and VS information to Type 2 display modules two frames before this
 578 command is sent when the display module is in Partial Display Mode.

579 **Restrictions**

580 This command has no effect when Normal Display mode is already active.

581 **Flow Chart**

582 See section 6.30 and section 6.33 for details of when to use this command.

583

584 **6.4 enter_partial_mode**585 **Interface** All586 **Command** 12h587 **Parameters** None588 **Command**

	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
Direction H→D	0	0	0	1	0	0	1	0	12h

589 **Description**

590 This command causes the display module to enter the Partial Display Mode. The Partial Display Mode
 591 window is described by the set_partial_columns and set_partial_rows commands. See sections 6.30
 592 and 6.31, respectively, for details.

593 To leave Partial Display Mode, the enter_normal_mode command should be written.

594 The host processor continues to send PCLK, HS and VS information to Type 2 display modules for two
 595 frames after this command is sent when the display module is in Normal Display Mode.

596 **Restrictions**

597 This command has no effect when Partial Display Mode is already active.

598 **Flow Chart**

599 See section 6.30.

600

601 **6.5 enter_sleep_mode**602 **Interface** All603 **Command** 10h604 **Parameters** None605 **Command**

	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
Direction H→D	0	0	0	1	0	0	0	0	10h

606 **Description**

607 This command causes the display module to enter the Sleep mode.

608 In this mode, all unnecessary blocks inside the display module are disabled except interface
 609 communication. This is the lowest power mode the display module supports.

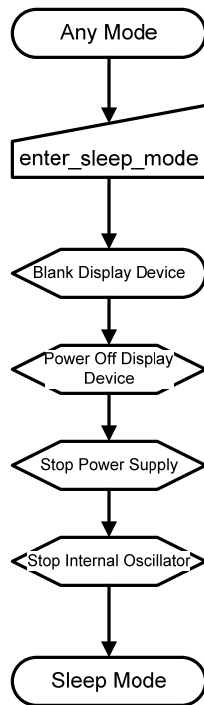
610 DBI or DSI Command Mode remains operational and the frame memory maintains its contents. The host
 611 processor continues to send PCLK, HS and VS information to Type 2 and Type 3 display modules for two
 612 frames after this command is sent when the display module is in Normal mode.

613 **Restrictions**

614 This command has no effect when the display module is already in Sleep mode.

615 The host processor must wait five milliseconds before sending any new commands to a display module
 616 following this command to allow time for the supply voltages and clock circuits to stabilize.

617 The host processor must wait 120 milliseconds after sending an exit_sleep_mode command before sending
 618 an enter_sleep_mode command.

619 **Flow Chart**620
621 **Figure 22 enter_sleep_mode Flow Chart**
622

623 **6.6 exit_idle_mode**624 **Interface** All625 **Command** 38h626 **Parameters** None627 **Command**

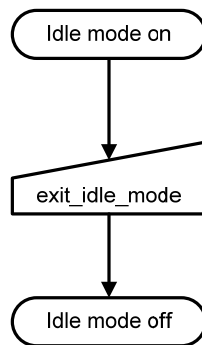
	Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
	H→D	0	0	1	1	1	0	0	0	38h

628 **Description**

629 This command causes the display module to exit Idle mode.

630 **Restrictions**

631 This command has no effect when the display module is not in Idle mode.

632 **Flow Chart**633 **Figure 23 exit_idle_mode Flow Chart**

6.7 exit_invert_mode

Interface All
Command 20h
Parameters None

Command

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	0	0	0	0	0	20h

Description

This command causes the display module to stop inverting the image data on the display device. The frame memory contents remain unchanged. No status bits are changed.

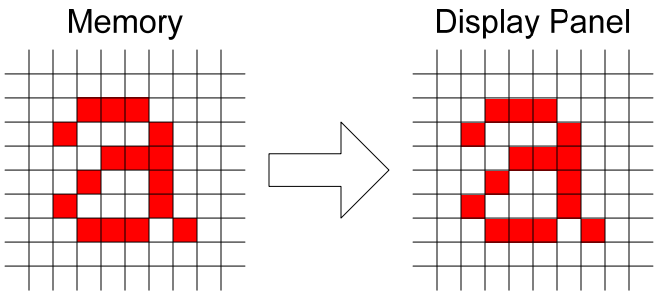


Figure 24 exit_invert_mode Example

Restrictions

This command has no effect when the display module is not inverting the display image.

Flow Chart

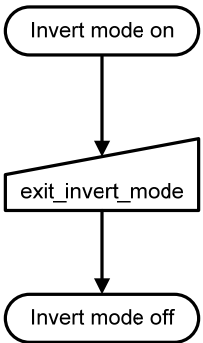


Figure 25 exit_invert_mode Flow Chart

652 **6.8 exit_sleep_mode**

653 **Interface** All
 654 **Command** 11h
 655 **Parameters** None

656 **Command**

	Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
	H→D	0	0	0	1	0	0	0	1	11h

657 **Description**

658 This command causes the display module to exit Sleep mode. All blocks inside the display module are
 659 enabled.

660 The host processor sends PCLK, HS and VS information to Type 2 and Type 3 display modules two frames
 661 before this command is sent when the display module is in Normal Mode.

662 **Restrictions**

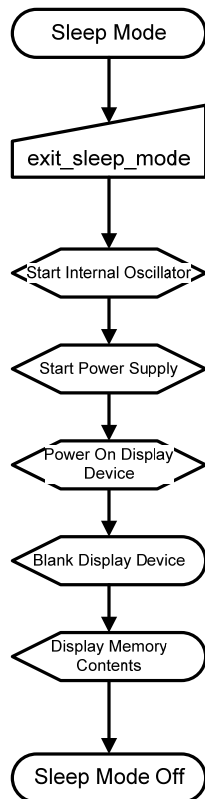
663 This command shall not cause any visible effect on the display device when the display module is not in
 664 Sleep mode.

665 The host processor must wait five milliseconds after sending this command before sending another
 666 command. This delay allows the supply voltages and clock circuits to stabilize.

667 The host processor must wait 120 milliseconds after sending an exit_sleep_mode command before sending
 668 an enter_sleep_mode command.

669 The display module loads the display module's default values to the registers when exiting the Sleep mode.
 670 There shall not be any abnormal visual effect on the display device when loading the registers if the factory
 671 default and register values are the same or when the display module is not in Sleep mode.

672 The display module runs the self-diagnostic functions after this command is received. See section 5.3 for a
 673 description of the self-diagnostic functions.

674 **Flow Chart**

675
676 **Figure 26 exit_sleep_mode Flow Chart**
677

678 **6.9 get_address_mode**679 **Interface** All680 **Command** 0Bh681 **Parameters** See below682 **Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	0	0	1	0	1	1	0Bh

683 **Parameter**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	D7	D6	D5	D4	D3	D2	D1	D0	XXh

684 **Description**

685 The display module returns the current status.

686 Bit D7 – Page Address Order

687 ‘0’ = Top to Bottom

688 ‘1’ = Bottom to Top

689 Bit D6 – Column Address Order

690 ‘0’ = Left to Right

691 ‘1’ = Right to Left

692 Bit D5 - Page/Column Order

693 ‘0’ = Normal Mode

694 ‘1’ = Reverse Mode

695 Bit D4 – Line Address Order

696 ‘0’ = LCD Refresh Top to Bottom

697 ‘1’ = LCD Refresh Bottom to Top

698 Bit D3 – RGB/BGR Order

699 ‘0’ = RGB

700 ‘1’ = BGR

701 Bit D2 – Display Data Latch Data Order

702 ‘0’ = LCD Refresh Left to Right

703 ‘1’ = LCD Refresh Right to Left

704 Not applicable for display modules scanned line by line

705 Bit D1 – Flip Horizontal

706 This bit flips the image shown on the display device left to right. No change is made to the frame
707 memory.

708 ‘0’ = Normal

709 ‘1’ = Flipped

710 Bit D0 – Flip Vertical

711 This bit flips the image shown on the display device top to bottom. No change is made to the frame
712 memory.

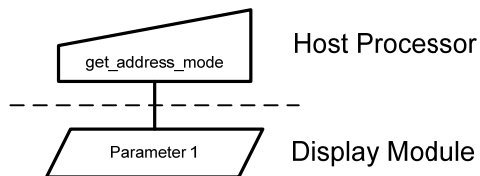
713 ‘0’ = Normal

714 ‘1’ = Flipped

715 **Restrictions**

716 None

717 **Flow Chart**



718 **Figure 27 `get_address_mode` Flow Chart**

719

720

6.10 get_blue_channel**Interface** All**Command** 08h**Parameters** See below**Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	0	0	1	0	0	0	08h

Parameter

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	B7	B6	B5	B4	B3	B2	B1	B0	XXh

Description

The display module returns the blue component value of the first pixel in the active frame. This command is only valid for Type 2 and Type 3 display modules.

B7 is the MSB and B0 is the LSB.

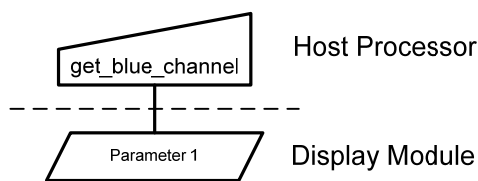
Only the relevant bits are used according to the pixel format; unused bits are set to '0'.

Examples:

- 12 bit format: B3 is MSB and B0 is LSB. B[7:4] are set to '0'.
- 16 bit format: B5 is MSB, B1 is LSB and B7, B6 and B0 are set to '0'.
- 18 bit format: B5 is MSB and B0 is LSB. B7 and B6 are set to '0'.
- 24 bit format: B7 is MSB and B0 is LSB. All bits are used.

Restrictions

None

Flow Chart**Figure 28 get_blue_channel Flow Chart**

6.11 get_diagnostic_result

Interface All
Command 0Fh
Parameters See below

Command

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	0	0	1	1	1	1	0Fh

Parameter

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	D7	D6	D5	D4	0	0	0	0	XXh

Description

The display module returns the self-diagnostic results following a Sleep Out command. See section 5.3 for a description of the status results.

Bit D7 – Register Loading Detection

Bit D6 – Functionality Detection

Bit D5 – Chip Attachment Detection

Set to '0' if feature unimplemented.

Bit D4 – Display Glass Break Detection

Set to '0' if feature unimplemented.

Bits D[3:0] – Reserved

Set to '0'.

Restrictions

None

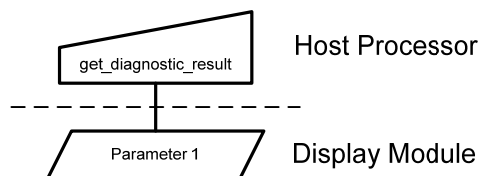
Flow Chart

Figure 29 get_diagnostic_result Flow Chart

6.12 get_display_mode**Interface** All**Command** 0Dh**Parameters** See below**Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	0	0	1	1	0	1	0Dh

Parameter

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	D7	0	D5	0	0	D2	D1	D0	XXh

Description

The display module returns the Display Image Mode status.

Bit D7 – Vertical Scrolling Status

‘0’ = Vertical Scrolling is Off.

‘1’ = Vertical Scrolling is On.

Bit D6 – Reserved

Set to ‘0’.

Bit D5 – Inversion On/Off

‘0’ = Inversion is Off.

‘1’ = Inversion is On.

Bit D4 – Reserved

Set to ‘0’.

Bit D3 – Reserved

Set to ‘0’.

Bits D[2:0] – Gamma Curve Selection

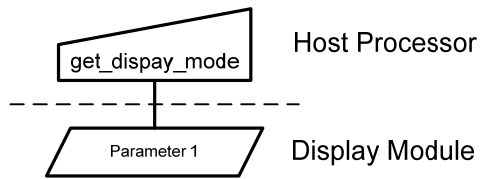
Table 5 Gamma Curve Selection

Gamma Curve Selection	D2	D1	D0	Gamma Set (26h) Parameter
Gamma Curve 1	0	0	0	GC0
Gamma Curve 2	0	0	1	GC1
Gamma Curve 3	0	1	0	GC2
Gamma Curve 4	0	1	1	GC3

Gamma Curve Selection	D2	D1	D0	Gamma Set (26h) Parameter
Reserved	1	0	0	Reserved
Reserved	1	0	1	Reserved
Reserved	1	1	0	Reserved
Reserved	1	1	1	Reserved

791 **Restrictions**

792 None

793 **Flow Chart**794 **Figure 30 `get_display_mode` Flow Chart**

795

796

6.13 get_green_channel**Interface** All**Command** 07h**Parameters** See below**Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	0	0	0	1	1	1	07h

Parameter

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	G7	G6	G5	G4	G3	G2	G1	G0	XXh

Description

The display module returns the green component value of the first pixel in the active frame. This command is only valid for Type 2 and Type 3 display modules.

G7 is the MSB and G0 is the LSB.

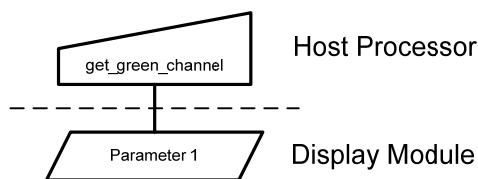
Only the relevant bits are used according to the pixel format; unused bits are set to '0'.

Examples:

- 12 bit format: G3 is MSB and G0 is LSB. G[7:4] are set to '0'.
- 16 bit format: G5 is MSB and G0 is LSB. G7 and G6 are set to '0'.
- 18 bit format: G5 is MSB and G0 is LSB. G7 and G6 are set to '0'.
- 24 bit format: G7 is MSB and G0 is LSB. All bits are used.

Restrictions

None

Flow Chart**Figure 31 get_green_channel Flow Chart**

6.14 get_pixel_format**Interface** All**Command** 0Ch**Parameters** See below**Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	0	0	1	1	0	0	0Ch

Parameter

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	0	D6	D5	D4	0	D2	D1	D0	XXh

Description

This command gets the pixel format for the RGB image data used by the interface.

Bits D[6:4] – DPI Pixel Format Definition

Bits D[2:0] – DBI Pixel Format Definition

Bits D7 and D3 are not used.

The pixel formats are shown in Table 6.

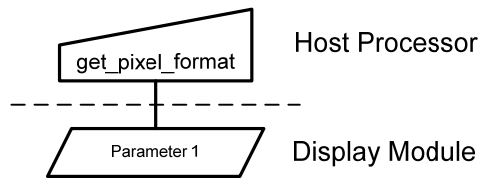
Table 6 Interface Pixel Formats

Pixel Format	D6/D2	D5/D1	D4/D0
Reserved	0	0	0
3 bits/pixel	0	0	1
8 bits/pixel	0	1	0
12 bits/pixel	0	1	1
Reserved	1	0	0
16 bits/pixel	1	0	1
18 bits/pixel	1	1	0
24 bits/pixel	1	1	1

If a particular interface, either DBI or DPI, is not used then the corresponding bits in the parameter returned from the display module are undefined. Therefore, for a DBI display module, the Host shall ignore D[6:4] and for a DPI display module, the Host shall ignore D[2:0].

Restrictions

None

837 **Flow Chart**

838

839

Figure 32 `get_pixel_format` Flow Chart

840

841 **6.15 get_power_mode**842 **Interface** All843 **Command** 0Ah844 **Parameters** See below845 **Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	0	0	1	0	1	0	0Ah

846 **Parameter**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	D7	D6	D5	D4	D3	D2	0	0	XXh

847 **Description**

848 The display module returns the current power mode.

849 Bit D7 – Reserved

850 Set to ‘0’

851 Bit D6 - Idle Mode On/Off

852 ‘0’ = Idle Mode Off.

853 ‘1’ = Idle Mode On.

854 Bit D5 – Partial Mode On/Off

855 ‘0’ = Partial Mode Off.

856 ‘1’ = Partial Mode On.

857 Bit D4 – Sleep Modet

858 ‘0’ = Sleep Mode On.

859 ‘1’ = Sleep Mode Off.

860 Bit D3 – Display Normal Mode On/Off

861 ‘0’ = Display Normal Mode Off.

862 ‘1’ = Display Normal Mode On.

863 Bit D2 – Display On/Off

864 ‘0’ = Display is Off.

865 ‘1’ = Display is On.

866 Bit D1 – Reserved

867 Set to '0'

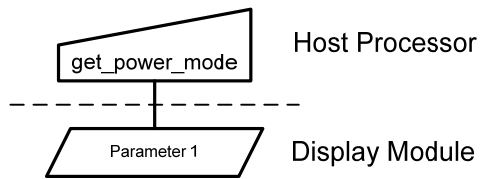
868 Bit D0 – Reserved

869 Set to '0'

870 **Restrictions**

871 None

872 **Flow Chart**



873
874 **Figure 33 `get_power_mode` Flow Chart**

875

876 **6.16 get_red_channel**877 **Interface** All878 **Command** 06h879 **Parameters** See below880 **Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	0	0	0	1	1	0	06h

881 **Parameter**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	R7	R6	R5	R4	R3	R2	R1	R0	XXh

882 **Description**

883 The display module returns the red component value of the first pixel in the active frame. This command is
 884 only valid for Type 2 and Type 3 display modules.

885 R7 is the MSB and R0 is the LSB.

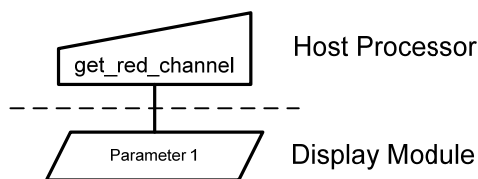
886 Only the relevant bits are used according to the pixel format; unused bits are set to '0'.

887 Examples:

- 888 • 12 bit format: R3 is MSB and R0 is LSB. R[7:4] are set to '0'.
- 889 • 16 bit format: R5 is MSB, R1 is LSB and R7, R6 and R0 are set to '0'.
- 890 • 18 bit format: R5 is MSB and R0 is LSB. R7 and R6 are set to '0'.
- 891 • 24 bit format: R7 is MSB and R0 is LSB. All bits are used.

892 **Restrictions**

893 None

894 **Flow Chart**

895
 896 **Figure 34 get_red_channel Flow Chart**
 897

6.17 get_scanline**Interface** All**Command** 45h**Parameters** See below**Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	1	0	0	0	1	0	1	45h

Parameter 1

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	N15	N14	N13	N12	N11	N10	N9	N8	XXh

Parameter 2

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	N7	N6	N5	N4	N3	N2	N1	N0	XXh

Description

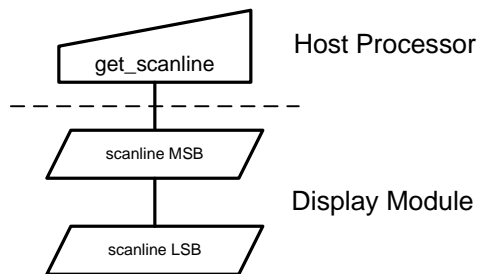
The display module returns the current scanline, N, used to update the display device. The total number of scanlines on a display device is defined as VSYNC + VBP + VACT + VFP. The first scanline is defined as the first line of V Sync and is denoted as Line 0.

When in Sleep Mode, the value returned by get_scanline is undefined.

See [MIPI01] for definitions of VSYNC, VBP, VACT, and VFP.

Restrictions

None

Flow Chart**Figure 35 get_scanline Flow Chart**

917 **6.18 get_signal_mode**

918 **Interface** All

919 **Command** 0Eh

920 **Parameters** See below

921 **Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	0	0	1	1	1	0	0Eh

922 **Parameter**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	D7	D6	0	0	0	0	0	0	X0h

923 **Description**

924 The display module returns the Display Signal Mode.

925 Bit D7 – Tearing Effect Line

926 ‘0’ = Tearing Effect Line Off.

927 ‘1’ = Tearing Effect On.

928 Bit D6 – Tearing Effect Line Output Mode.

929 See [MIPI02] and section 6.36 for mode definitions.

930 ‘0’ = Mode 0.

931 ‘1’ = Mode 1.

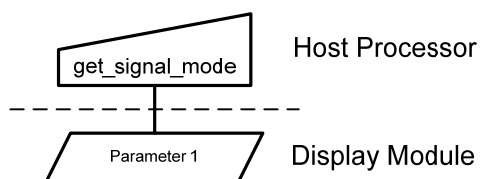
932 Bit D[5:0] – Reserved

933 Set to ‘0’.

934 **Restrictions**

935 None

936 **Flow Chart**



937 **Figure 36 get_signal_mode Flow Chart**

940 **6.19 nop**

941 **Interface** All
 942 **Command** 00h
 943 **Parameters** None

944 **Command**

	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
Direction H→D	0	0	0	0	0	0	0	0	00h

945 **Description**

946 This command does not have any effect on the display module. It can be used to terminate a Frame
 947 Memory Write or Read as described in the descriptions for write_memory_continue and
 948 read_memory_continue.

949 **Restrictions**

950 None

951 **Flow Chart**

952 None

953

6.20 read_DDB_continue**Interface** All**Command** A8h**Parameters** See below**Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	1	0	1	0	1	0	0	0	A8h

Parameter 1

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	D7	D6	D5	D4	D3	D2	D1	D0	XXh

.
 .
 .

Parameter N

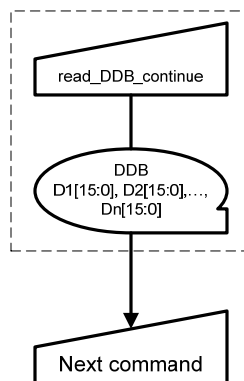
Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	D7	D6	D5	D4	D3	D2	D1	D0	XXh

Description

See section 6.21.

Restrictions

A read_DDB_start command should be executed at least once before a read_DDB_continue command to define the read location. Otherwise, data read with a read_DDB_continue command is undefined.

Flow Chart**Figure 37 read_DDB_continue Flow Chart**

973 **6.21 read_DDB_start**

974 **Interface** All

975 **Command** A1h

976 **Parameters** See below

977 **Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	1	0	1	0	0	0	0	1	A1h

978 **Parameter 1**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	D15	D14	D13	D12	D11	D10	D9	D8	XXh

979 **Parameter 2**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	D7	D6	D5	D4	D3	D2	D1	D0	XXh

980 **Parameter 3**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	D15	D14	D13	D12	D11	D10	D9	D8	XXh

981 **Parameter 4**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	D7	D6	D5	D4	D3	D2	D1	D0	XXh

982 **Parameter 5**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	D7	D6	D5	D4	D3	D2	D1	D0	XXh

983 **Description**

984 This command reads identifying and descriptive information from the peripheral. This information is
 985 organized in the Device Descriptor Block (DDB) stored on the peripheral. The response to this command
 986 returns a sequence of bytes that may be any length up to 64K bytes. Note that the returned sequence of
 987 bytes does not necessarily correspond to the entire DDB; it may be a portion of a larger block of data.

988 The format of returned data is as follows:

989 Parameter 1: MS (most significant) byte of Supplier ID. Supplier ID is a unique value assigned to each
 990 peripheral supplier by the MIPI organization.

991 Parameter 2: LS (least significant) byte of Supplier ID.

992 Parameter 3: MS (most significant) byte of Supplier Elective Data. This is a byte of information that is
 993 determined by the supplier. It could include model number or revision information, for
 994 example.

995 Parameter 4: LS (least significant) byte of Supplier Elective Data

996 Parameter 5: single-byte *Escape or Exit Code* (EEC). The code is interpreted as follows:

- 997 • FFh - Exit code – there is no more data in the Descriptor Block
- 998 • 00h - Escape code – there is supplier-proprietary data in the Descriptor Block (does not conform to
999 any MIPI Alliance specification)
- 1000 • Any other value – there is DDB data in the Descriptor Block.

1001 DDBs may contain many more data fields providing information about the peripheral.

1002 In a DSI system, read activity takes the form of two separate transactions across the bus: first the read
1003 command read_DDB_start from host processor to peripheral, which includes the bus turn-around token.
1004 The peripheral then takes control of the bus and returns the requested data. The peripheral response to
1005 read_DDB_start is a Long Packet type, so its length may be up to 64K bytes unless limited by a previous
1006 set_max_return_size command.

1007 The response to a read_DDB_start command always starts at the beginning of the Device Descriptor Block.
1008 After receiving the first packet and processing the returned DDB data, the host processor may initiate a
1009 read_DDB_continue command to access the next portion of the DDB. A read_DDB_continue command
1010 begins the next read at the location following the last byte of the previous data read from the DDB.

1011 Subsequent read_DDB_continue commands can be used to read a DDB or supplier-proprietary block of
1012 arbitrary size. There is, however, no obligation to read the entire block. The host processor may choose to
1013 stop reading after completion of any read_DDB_xxx command.

1014 **Restrictions**

1015 None

1016 **Flow Chart**

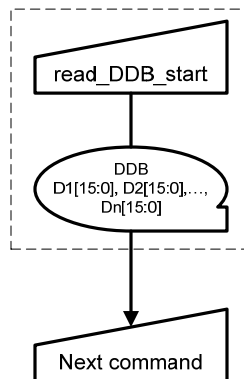


Figure 38 read_DDB_start Flow Chart

1020 **6.22 read_memory_continue**

1021 **Interface** All
 1022 **Command** 3Eh
 1023 **Parameters** See below

1024 **Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	1	1	1	1	0	3Eh

1025 **Pixel Data 1**

Direction	D15	D14	D13	D12	D11	D10	D9	D8	Hex Code
D→H	P15	P14	P13	P12	P11	P10	P9	P8	XXh

1026

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	P7	P6	P5	P4	P3	P2	P1	P0	XXh

1027

1028

1029

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·
·

1030 **Pixel Data N**

Direction	D15	D14	D13	D12	D11	D10	D9	D8	Hex Code
D→H	P15	P14	P13	P12	P11	P10	P9	P8	XXh

1031

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	P7	P6	P5	P4	P3	P2	P1	P0	XXh

1032 **Description**

1033 This command transfers image data from the display module's frame memory to the host processor
 1034 continuing from the location following the previous read_memory_continue or read_memory_start
 1035 command.

1036 If set_address_mode B5 = 0:

1037 Pixels are read continuing from the pixel location after the read range of the previous read_memory_start or
 1038 read_memory_continue. The column register is then incremented and pixels are read from the frame
 1039 memory until the column register equals the End Column (EC) value. The column register is then reset to
 1040 SC and the page register is incremented. Pixels are read from the frame memory until the page register
 1041 equals the End Page (EP) value and the column register equals the EC value, or the host processor sends
 1042 another command.

1043 If set_address_mode B5 = 1:

1044 Pixels are read continuing from the pixel location after the read range of the previous read_memory_start or
 1045 read_memory_continue. The page register is then incremented and pixels are read from the frame memory
 1046 until the page register equals the End Page (EP) value. The page register is then reset to SP and the column
 1047 register is incremented. Pixels are read from the frame memory until the column register equals the End
 1048 Column (EC) value and the page register equals the EP value, or the host processor sends another
 1049 command.

1050 See section 6.25 for descriptions of the Start Column and End Column values.

1051 See section 6.29 for descriptions of the Start Page and End Page values.

1052 See section 8 in [MIPI01] and section 10 in [MIPI02] for color encoding for 8 or 9 bit image data.

1053 Note the command description above shows 16-bit pixel data transferred over a 16-bit bus. Other
 1054 possibilities not illustrated here would show 9-bit pixel data transferred over a 9-bit bus, and 8-bit pixel
 1055 data transferred over an 8-bit bus. See Annex A for details on pixel to byte mapping.

1056 **Restrictions**

1057 Regardless of the interface format chosen with the set_pixel_format command, the pixel format of the
 1058 returned data is always the maximum pixel depth supported by the display module. The display module
 1059 documentation shall describe the maximum pixel depth as well as the format of the data returned by the
 1060 display module when using this command.

1061 A read_memory_start should follow a set_column_address, set_page_address or set_address_mode to
 1062 define the read location. Otherwise, data read with read_memory_continue is undefined.

1063 **Flow Chart**

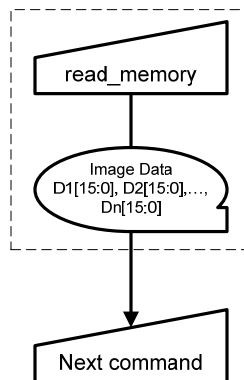


Figure 39 read_memory_continue Flow Chart

6.23 read_memory_start**Interface** All**Command** 2Eh**Parameters** See below**Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	0	1	1	1	0	2Eh

Pixel Data 1

Direction	D15	D14	D13	D12	D11	D10	D9	D8	Hex Code
D→H	P15	P14	P13	P12	P11	P10	P9	P8	XXh

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	P7	P6	P5	P4	P3	P2	P1	P0	XXh

.
 .
 .

Pixel Data N

Direction	D15	D14	D13	D12	D11	D10	D9	D8	Hex Code
D→H	P15	P14	P13	P12	P11	P10	P9	P8	XXh

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
D→H	P7	P6	P5	P4	P3	P2	P1	P0	XXh

Description

This command transfers image data from the display module's frame memory to the host processor starting at the pixel location specified by preceding set_column_address and set_page_address commands.

If set_address_mode B5 = 0:

The column and page registers are reset to the Start Column (SC) and Start Page (SP), respectively.

Pixels are read from frame memory at (SC, SP). The column register is then incremented and pixels read from the frame memory until the column register equals the End Column (EC) value. The column register is then reset to SC and the page register is incremented. Pixels are read from the frame memory until the page register equals the End Page (EP) value and the column register equals the EC value, or the host processor sends another command.

If set_address_mode B5 = 1:

The column and page registers are reset to the Start Column (SC) and Start Page (SP), respectively.

Pixels are read from frame memory at (SC, SP). The page register is then incremented and pixels read from the frame memory until the page register equals the End Page (EP) value. The page register is then reset to SP and the column register is incremented. Pixels are read from the frame memory until the column register

1094 equals the End Column (EC) value and the page register equals the EP value, or the host processor sends
 1095 another command.

1096 See section 6.25 for descriptions of the Start Column and End Column values.

1097 See section 6.29 for descriptions of the Start Page and End Page values.

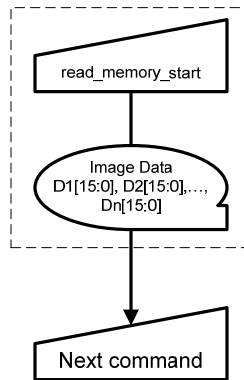
1098 See section 8 in [MIPI01] and section 10 in [MIPI02] for color encoding for 8 or 9 bit image data.

1099 Note the command description above shows 16-bit pixel data transferred over a 16-bit bus. Other
 1100 possibilities not illustrated here would show 9-bit pixel data transferred over a 9-bit bus, and 8-bit pixel
 1101 data transferred over an 8-bit bus. See Annex A for details on pixel to byte mapping.

1102 **Restrictions**

1103 Regardless of the interface format chosen with the set_pixel_format command, the pixel format of the
 1104 returned data is always the maximum pixel depth supported by the display module. The display module
 1105 documentation shall describe the maximum pixel depth as well as the format of the data returned by the
 1106 display module when using this command.

1107 **Flow Chart**



1108
 1109 **Figure 40 read_memory_start Flow Chart**
 1110

6.24 set_address_mode

Interface All
Command 36h
Parameters See below

Command

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	1	0	1	1	0	36h

Parameter

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	B7	B6	B5	B4	B3	B2	B1	B0	XXh

Description

This command sets the data order for transfers from the host processor to display module's frame memory, bits B[7:5], and from the display module's frame memory to the display device, bits B[4:0].

All bits are valid for peripherals based on the Type 2 display architecture operating in Command Mode, or for peripherals based on the Type 1 display architecture. Bits B5, B4, B2, B1 and B0 have no effect on peripherals based on the Type 2 display architecture operating in Video Mode, or for peripherals based on the Type 3 display architecture.

No status bits are changed.

Bit B7 – Page Address Order

This bit controls the order that Pages of data are transferred from the host processor to the peripheral's frame memory for a Type 1 or a Type 2 display architecture operating in Command Mode. This bit also controls the Host processor to display device data latching order for a Type 2 or Type 3 display architecture operating in Video Mode.

'0' = Top to Bottom, Pages transferred from SP to EP

'1' = Bottom to Top, Pages transferred from EP to SP

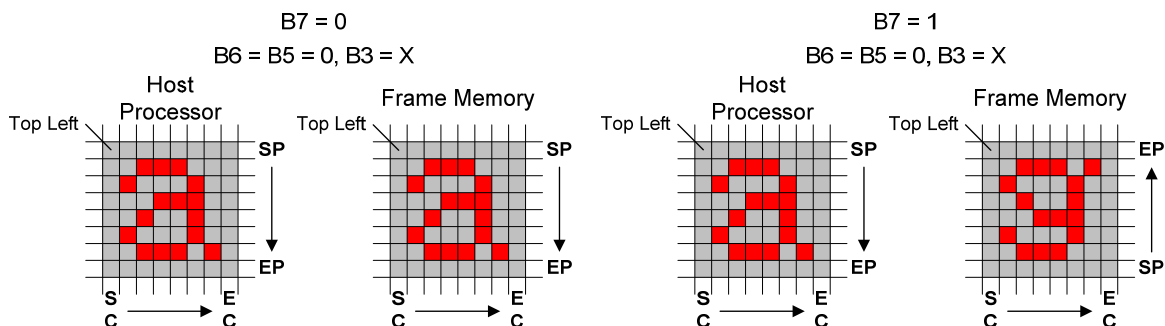


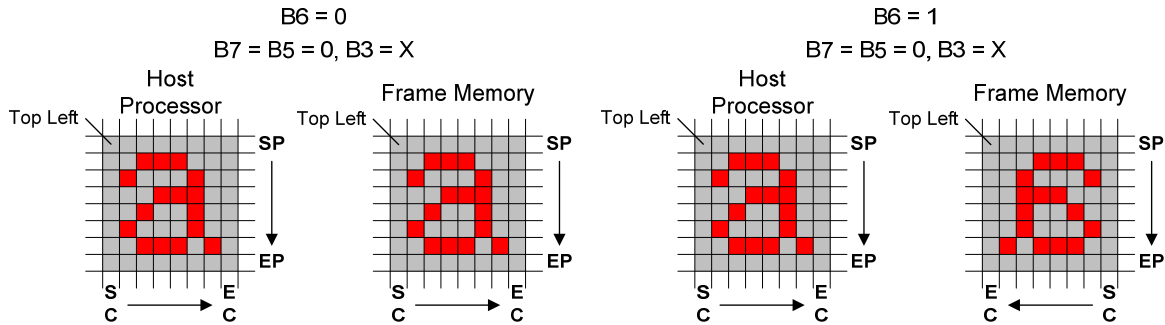
Figure 41 B7 Page Address Order

1135 Bit B6 – Column Address Order

1136 This bit controls the order that Columns of data are transferred from the host processor to the peripheral's
 1137 frame memory for a Type 1 or Type 2 display architecture operating in Command Mode. This bit also
 1138 controls the Host processor to display device data latching order for a Type 2 or Type 3 display architecture
 1139 operating in Video Mode.

1140 '0' = Left to Right, Columns transferred from SC to EC

1141 '1' = Right to Left, Columns transferred from EC to SC



1142
1143
1144 **Figure 42 B6 Column Address Order**

1145 Bit B5 – Page/Column Addressing Order

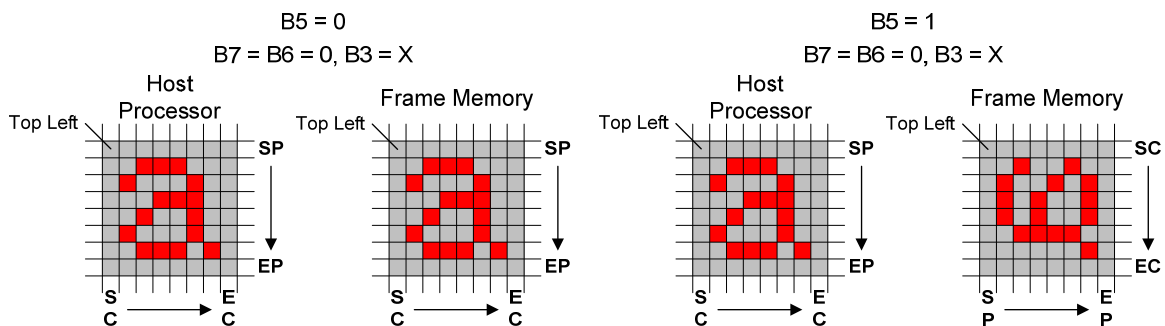
1146 This bit controls the order that Columns of data are transferred from the host processor to the peripheral's
 1147 frame memory.

1148 '0' = Normal Mode

1149 See section 6.41 (B5 = 0) for a description of Normal Mode operation.

1150 '1' = Reverse Mode

1151 See section 6.41 (B5 = 1) for a description of Reverse Mode operation.



1152
1153
1154 **Figure 43 B5 Page/Column Addressing Order**

1155 Bit B4 – Display Device Line Refresh Order

1156 This bit controls the display device's horizontal line refresh order. The image shown on the display device
 1157 is unaffected, regardless of the bit setting.

1158 '0' = Display device is refreshed from the top line to the bottom line

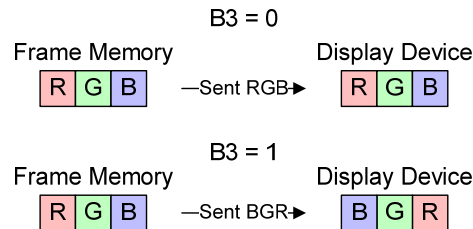
1159 '1' = Display device is refreshed from the bottom line to the top line

1160 Bit B3 – RGB/BGR Order

1161 This bit controls the RGB data latching order transferred from the peripheral's frame memory to the display
 1162 device for a Type 1 or a Type 2 display architecture operating in Command Mode. This bit also controls the
 1163 RGB data latching order transfer from the Host processor to the display device for a Type 2 or a Type 3
 1164 display architecture operating in Video Mode.

1165 '0' = Pixels sent in RGB order

1166 '1' = Pixels sent in BGR order



1167

1168

Figure 44 B3 RGB Order

1169 Bit B2 – Display Data Latch Data Order

1170 This bit controls the display device's vertical line data latch order. The image shown on the display device
 1171 is unaffected, regardless of the bit setting.

1172 '0' = Display device is refreshed from the left side to the right side

1173 '1' = Display device is refreshed from the right side to the left side

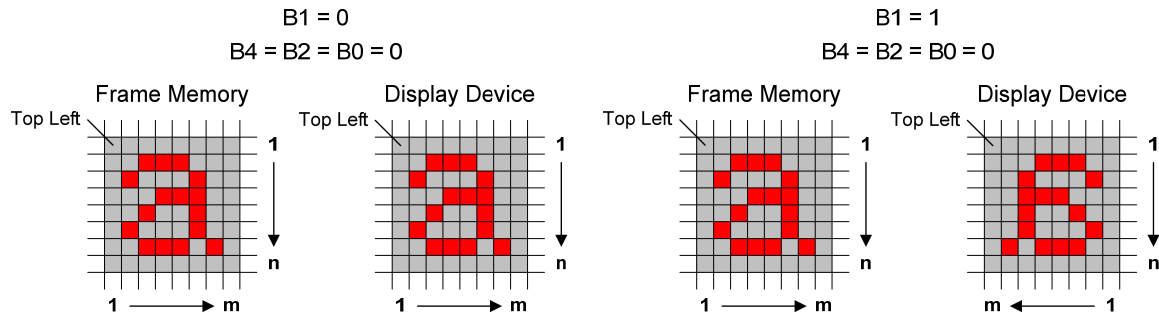
1174 Note: This bit has no visual effect if the display device is refreshed line by line.

1175 Bit B1 – Flip Horizontal

1176 This bit flips the image shown on the display device left to right. No change is made to the frame memory.

1177 ‘0’ = Normal

1178 ‘1’ = Flipped



1179
1180

1181

Figure 45 B1 Flip Horizontal

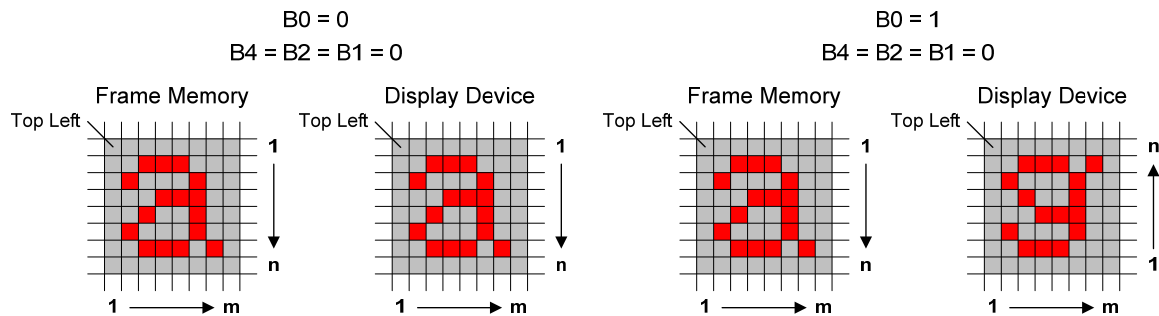
1182 Bit B0 – Flip Vertical

1183 This bit flips the image shown on the display device top to bottom by changing the gate scanning order.

1184 Neither the frame memory contents nor the order data is read from frame memory is changed.

1185 ‘0’ = Normal

1186 ‘1’ = Flipped



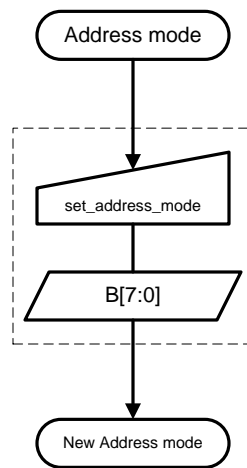
1187
1188

1189

Figure 46 B0 Flip Vertical

1190 **Restrictions**

1191 None

1192 **Flow Chart**1193 **Figure 47 set_address_mode Flow Chart**
1194
1195

6.25 set_column_address**Interface** All**Command** 2Ah**Parameters** See below**Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	0	1	0	1	0	2Ah

Parameter 1

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	SC15	SC14	SC13	SC12	SC11	SC10	SC9	SC8	XXh

Parameter 2

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	SC7	SC6	SC5	SC4	SC3	SC2	SC1	SC0	XXh

Parameter 3

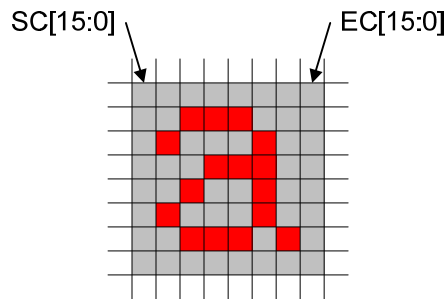
Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	EC15	EC14	EC13	EC12	EC11	EC10	EC9	EC8	XXh

Parameter 4

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	EC7	EC6	EC5	EC4	EC3	EC2	EC1	EC0	XXh

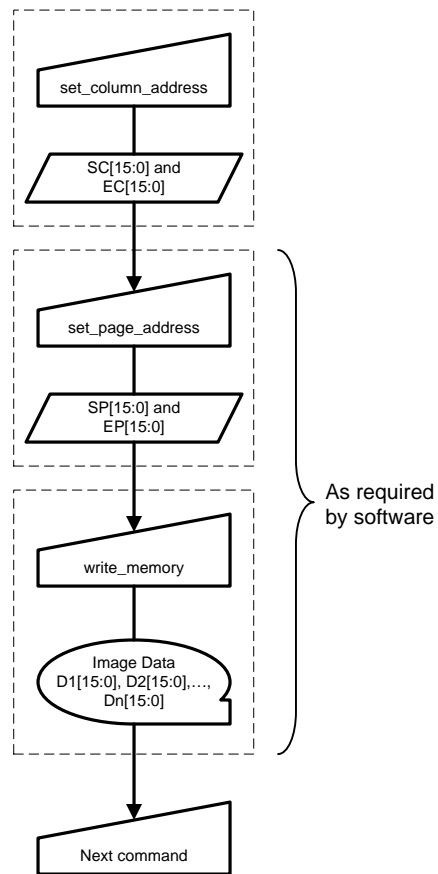
Description

This command defines the column extent of the frame memory accessed by the host processor with the read_memory_continue and write_memory_continue commands. No status bits are changed.

**Figure 48 set_column_address Example****Restrictions**

SC[15:0] must always be equal to or less than EC[15:0].

If SC[15:0] or EC[15:0] is greater than the available frame memory then the parameter is not updated.

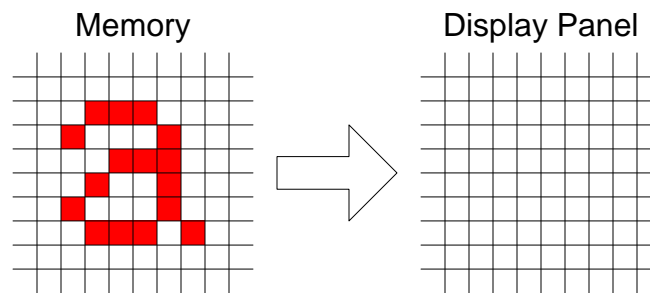
1213 **Flow Chart**1214 **Figure 49 set_column_address Flow Chart**
1215
1216

1217 **6.26 set_display_off**1218 **Interface** All1219 **Command** 28h1220 **Parameters** None1221 **Command**

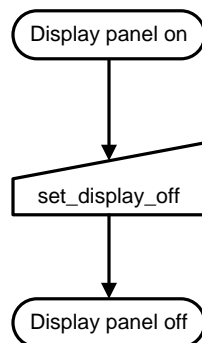
Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	0	1	0	0	0	28h

1222 **Description**

1223 This command causes the display module to stop displaying the image data on the display device. The
 1224 frame memory contents remain unchanged. No status bits are changed.

1225
1226 **Figure 50 set_display_off Example**1227 **Restrictions**

1228 This command has no effect when the display panel is already off.

1229 **Flow Chart**1230
1231 **Figure 51 set_display_off Flow Chart**
1232

6.27 set_display_on

Interface All
Command 29h
Parameters None

Command

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	0	1	0	0	1	29h

Description

This command causes the display module to start displaying the image data on the display device. The frame memory contents remain unchanged. No status bits are changed.

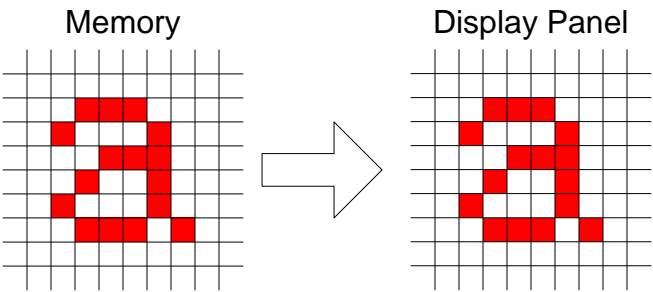


Figure 52 set_display_on Example

Restrictions

This command has no effect when the display panel is already on.

Flow Chart

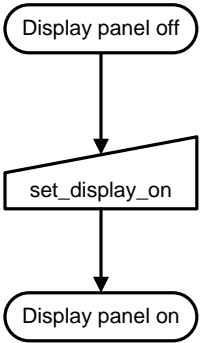


Figure 53 set_display_on Flow Chart

6.28 set_gamma_curve**Interface** All**Command** 26h**Parameters** See below**Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	0	0	1	1	0	26h

Parameter

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	GC7	GC6	GC5	GC4	GC3	GC2	GC1	GC0	XXh

Description

This command selects the desired gamma curve for the display device. Four fixed gamma curves are defined in section 5.2. A curve is selected by setting the appropriate bit in the parameter as described in the following table.

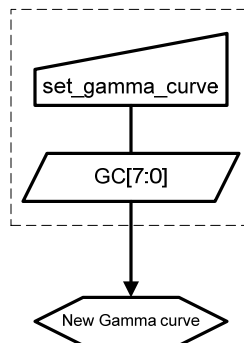
Table 7 Gamma Curves

GC[7:0]	Parameter	Curve Selected
00h	None	No curve selected
01h	GC0	Gamma Curve 1
02h	GC1	Gamma Curve 2
04h	GC2	Gamma Curve 3
08h	GC3	Gamma Curve 4

Note: All other values are reserved.

Restrictions

Values of GC[7:0] not shown in Table 7 above are reserved and shall not change the currently selected gamma curve.

Flow Chart**Figure 54 set_gamma_curve Flow Chart**

6.29 set_page_address**Interface** All**Command** 2Bh**Parameters** See below**Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	0	1	0	1	1	2Bh

Parameter 1

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	SP15	SP14	SP13	SP12	SP11	SP10	SP9	SP8	XXh

Parameter 2

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	SP 7	SP 6	SP 5	SP 4	SP 3	SP 2	SP 1	SP 0	XXh

Parameter 3

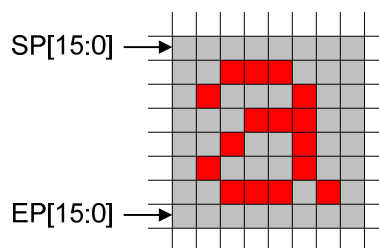
Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	EP15	EP14	EP13	EP12	EP11	EP10	EP9	EP8	XXh

Parameter 4

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	EP7	EP 6	EP 5	EP 4	EP 3	EP 2	EP 1	EP 0	XXh

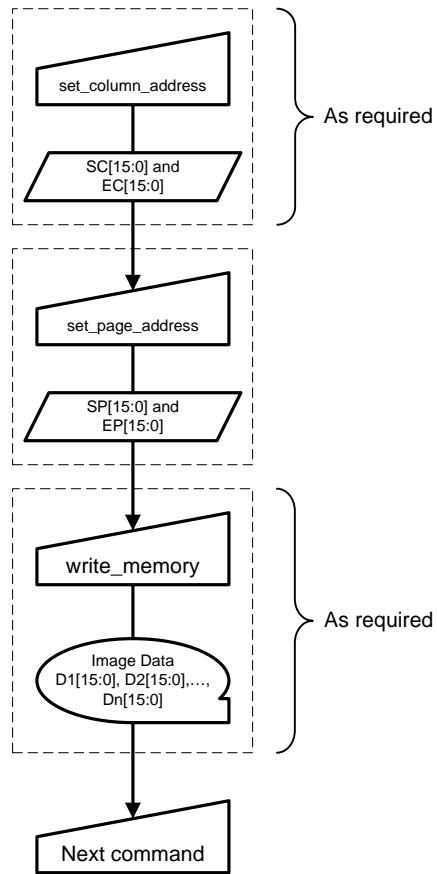
Description

This command defines the page extent of the frame memory accessed by the host processor with the write_memory_continue and read_memory_continue command. No status bits are changed.

**Figure 55 set_page_address Example****Restrictions**

SP[15:0] must always be equal to or less than EP[15:0]

If SP[15:0] or EP[15:0] is greater than the available frame memory then the parameter is not updated.

1285 **Flow Chart**1286 **Figure 56 set_page_address Flow Chart**

1287

1288

1289 **6.30 set_partial_columns**1290 **Interface** All1291 **Command** 31h1292 **Parameters** See below1293 **Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	1	0	0	0	1	31h

1294 **Parameter 1**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	PSC15	PSC14	PSC13	PSC12	PSC11	PSC10	PSC9	PSC8	XXh

1295 **Parameter 2**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	PSC7	PSC6	PSC5	PSC4	PSC3	PSC2	PSC1	PSC0	XXh

1296 **Parameter 3**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	PEC15	PEC14	PEC13	PEC12	PEC11	PEC10	PEC9	PEC8	XXh

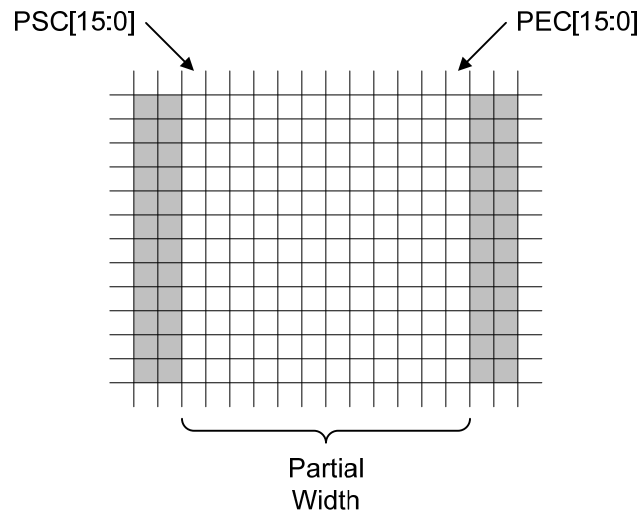
1297 **Parameter 4**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	PEC7	PEC6	PEC5	PEC4	PEC3	PEC2	PEC1	PEC0	XXh

1298 **Description**

1299 This command defines the Partial Display mode's display width. There are two parameters associated with
 1300 this command, the first defines the Start Column (PSC) and the second the End Column (PEC), as
 1301 illustrated in Figure 57 through Figure 60. PSC and PEC refer to the Frame Memory Column Pointer.

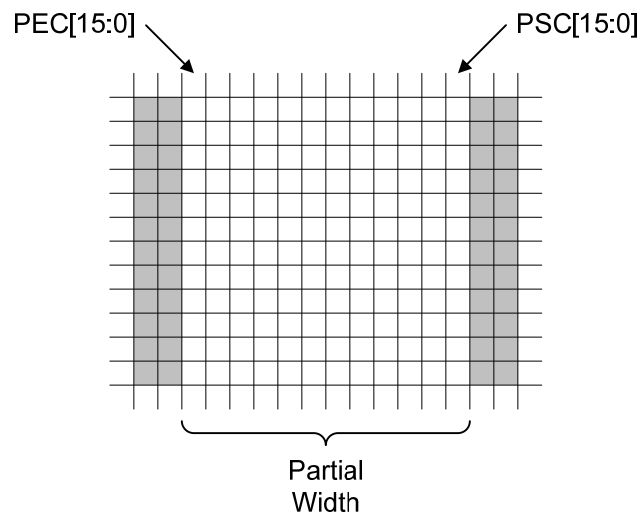
1302 If End Column > Start Column



1303

1304

Figure 57 set_partial_columns with set_address_mode B2 = 0

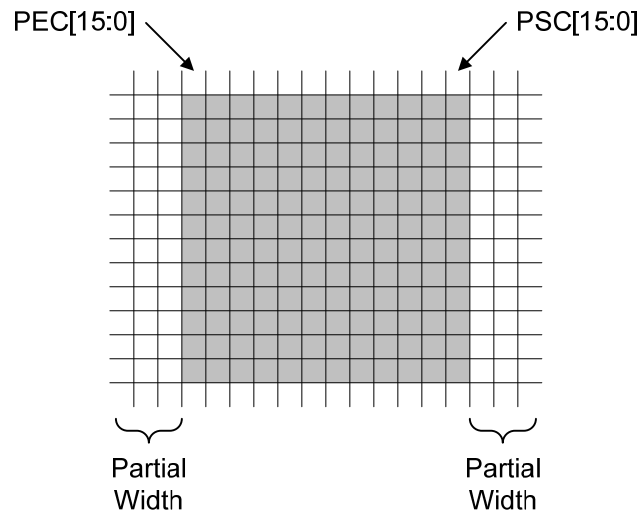


1305

1306

Figure 58 set_partial_columns with set_address_mode B2=1

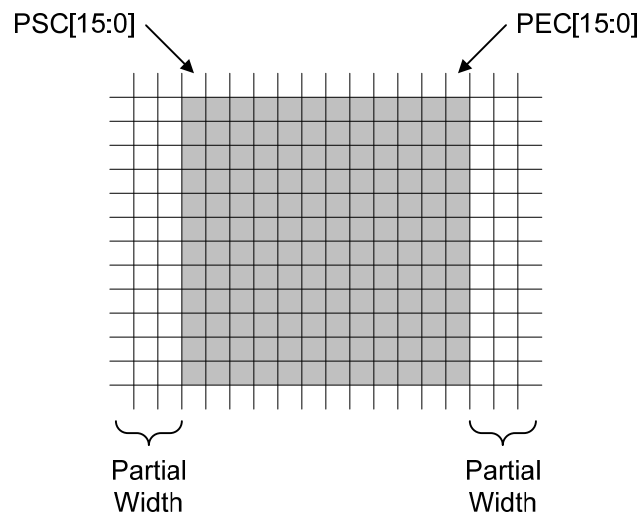
1307 If Start Column > End Column



1308

1309

Figure 59 set_partial_columns with set_address_mode B2 = 0



1310

1311

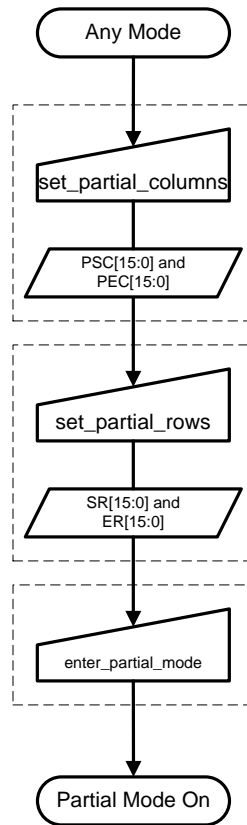
Figure 60 set_partial_columns with set_address_mode B2 = 1

1312 **Restrictions**

1313 PSC[15:0] and PEC[15:0] cannot be 0000h nor exceed the last horizontal column number.

1314 **Flow Chart**

1315 To enter Partial Display mode



1316

1317

Figure 61 Entering Partial Display Mode Flow Chart

1318 To exit Partial Display mode

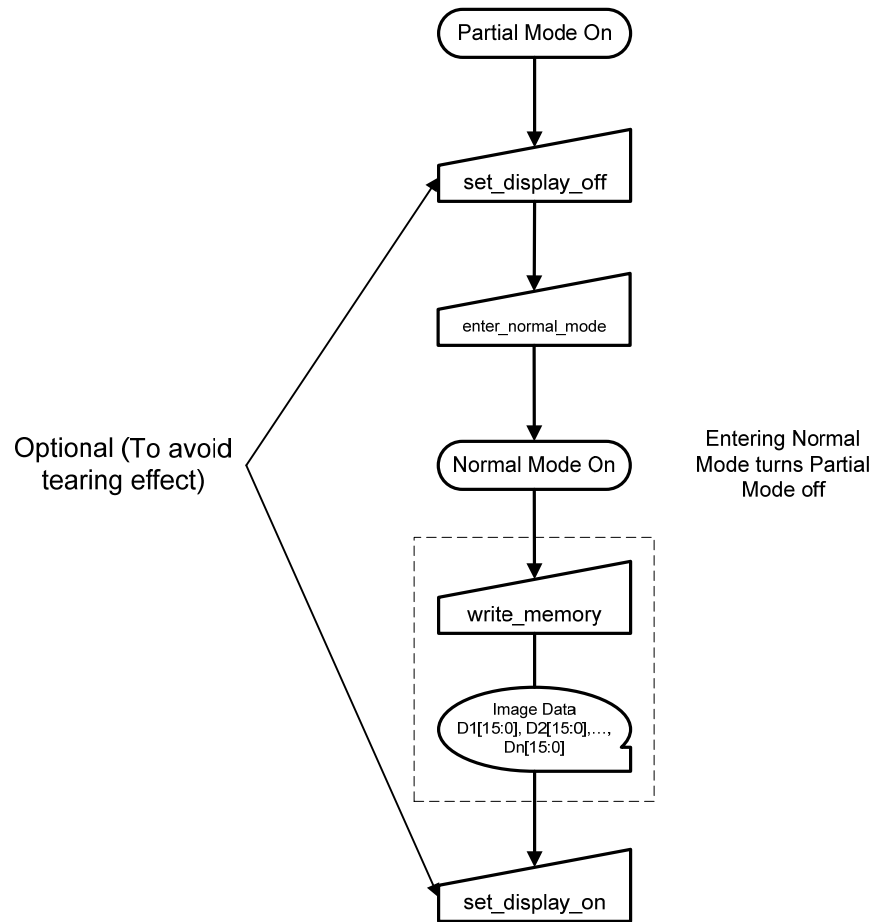


Figure 62 Exiting Partial Display Mode Flow Chart

1322 **6.31 set_partial_rows**1323 **Interface** All1324 **Command** 30h1325 **Parameters** See below1326 **Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	1	0	0	0	0	30h

1327 **Parameter 1**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	SR15	SR14	SR13	SR12	SR11	SR10	SR9	SR8	XXh

1328 **Parameter 2**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	SR7	SR6	SR5	SR4	SR3	SR2	SR1	SR0	XXh

1329 **Parameter 3**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	ER15	ER14	ER13	ER12	ER11	ER10	ER9	ER8	XXh

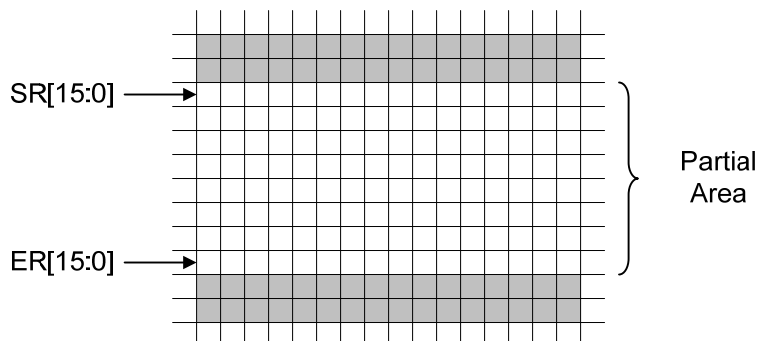
1330 **Parameter 4**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	ER7	ER6	ER5	ER4	ER3	ER2	ER1	ER0	XXh

1331 **Description**

1332 This command defines the Partial Display mode's display height. There are two parameters associated with
 1333 this command, the first defines the Start Row (SR) and the second the End Row (ER), as illustrated
 1334 in Figure 63 through Figure 66. SR and ER refer to the Frame Memory Line Pointer.

1335 If End Row > Start Row



1336

1337 **Figure 63 set_partial_rows with set_address_mode B4 = 0**

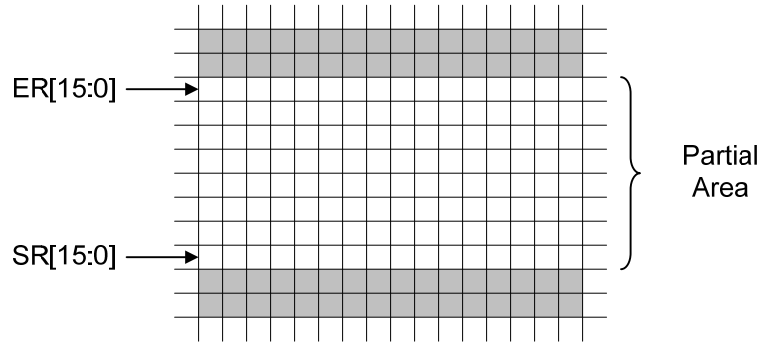


Figure 64 set_partial_rows with set_address_mode B4=1

If Start Row > End Row

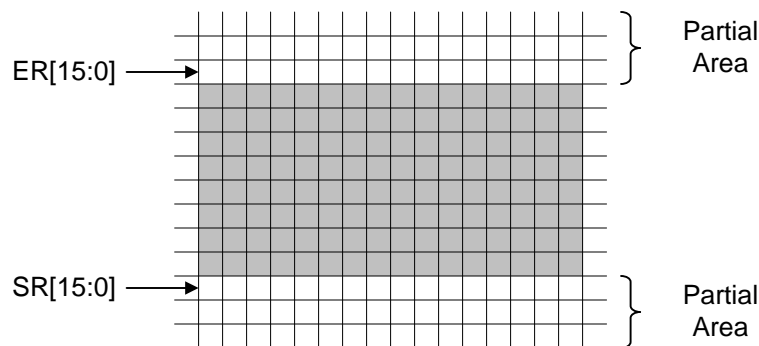


Figure 65 set_partial_rows with set_address_mode B4 = 0

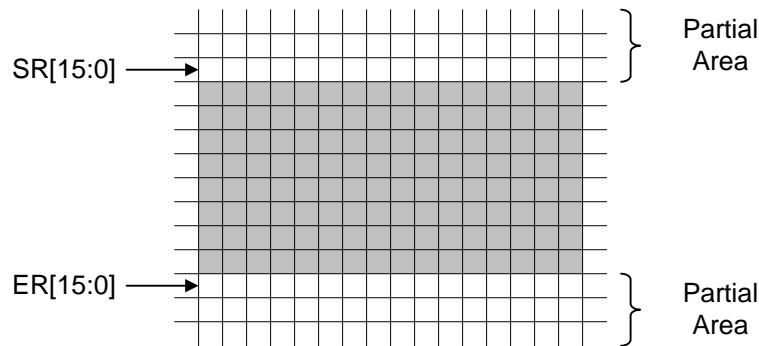


Figure 66 set_partial_rows with set_address_mode B4 = 1

Restrictions

SR[15:0] and ER[15:0] cannot be 0000h nor exceed the last vertical line number.

Flow Chart

See section 6.30.

6.32 set_pixel_format**Interface** All**Command** 3Ah**Parameters** See below**Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	1	1	0	1	0	3Ah

Parameter

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	X	D6	D5	D4	X	D2	D1	D0	XXh

Description

This command sets the pixel format for the RGB image data used by the interface.

Bits D[6:4] – DPI Pixel Format Definition

Bits D[2:0] – DBI Pixel Format Definition

Bits D7 and D3 are not used.

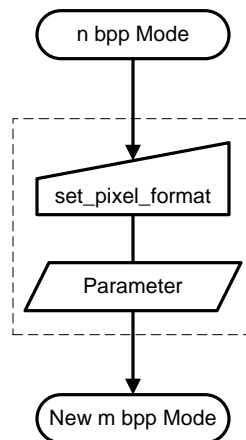
The pixel formats are shown in Table 6.

If a particular interface, either DBI or DPI, is not used then the corresponding bits in the parameter are ignored.

In 12, 16 & 18 bits/Pixel modes, the LUT is applied to transfer data into the frame memory.

Restrictions

There is no visible effect until the frame memory is written.

Flow Chart**Figure 67 set_pixel_format Flow Chart**

1371 **6.33 set_scroll_area**1372 **Interface** All1373 **Command** 33h1374 **Parameters** See below1375 **Command**

	Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
	H→D	0	0	1	1	0	0	1	1	33h

1376 **Parameter 1**

	Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
	H→D	TFA15	TFA14	TFA13	TFA12	TFA11	TFA10	TFA9	TFA8	XXh

1377 **Parameter 2**

	Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
	H→D	TFA7	TFA6	TFA5	TFA4	TFA3	TFA2	TFA1	TFA0	XXh

1378 **Parameter 3**

	Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
	H→D	VSA15	VSA14	VSA13	VSA12	VSA11	VSA10	VSA9	VSA8	XXh

1379 **Parameter 4**

	Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
	H→D	VSA7	VSA6	VSA5	VSA4	VSA3	VSA2	VSA1	VSA0	XXh

1380 **Parameter 5**

	Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
	H→D	BFA15	BFA14	BFA13	BFA12	BFA11	BFA10	BFA9	BFA8	XXh

1381 **Parameter 6**

	Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
	H→D	BFA7	BFA6	BFA5	BFA4	BFA3	BFA2	BFA1	BFA0	XXh

1382 **Description**

1383 This command defines the display module's Vertical Scrolling Area.

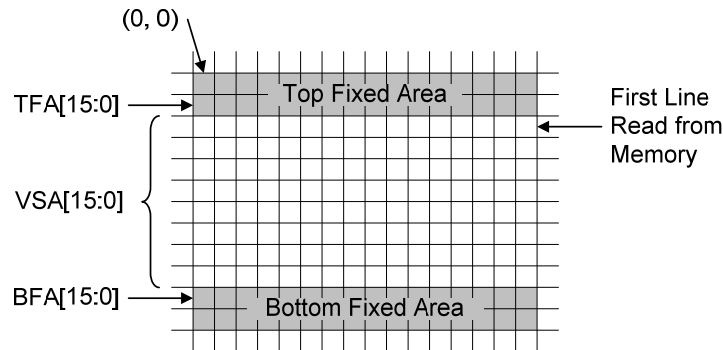
1384 If set_address_mode B4 = 0:

1385 The 1st & 2nd parameter, TFA[15:0], describes the Top Fixed Area in number of lines from the top of the
 1386 frame memory. The top of the frame memory and top of the display device are aligned.

1387 The 3rd & 4th parameter, VSA[15:0], describes the height of the Vertical Scrolling Area in number of lines
 1388 of frame memory from the Vertical Scrolling Start Address. The first line of the Vertical Scrolling Area
 1389 starts immediately after the bottom most line of the Top Fixed Area. The last line of the Vertical Scrolling
 1390 Area ends immediately before the top most line of the Bottom Fixed Area.

1391 The 5th & 6th parameter, BFA[15:0], describes the Bottom Fixed Area in number of lines from the bottom
 1392 of the frame memory. The bottom of the frame memory and bottom of the display device are aligned.

1393 TFA, VSA and BFA refer to the Frame Memory Line Pointer.



1394 **Figure 68 set_scroll_area set_address_mode B4 = 1 Example**

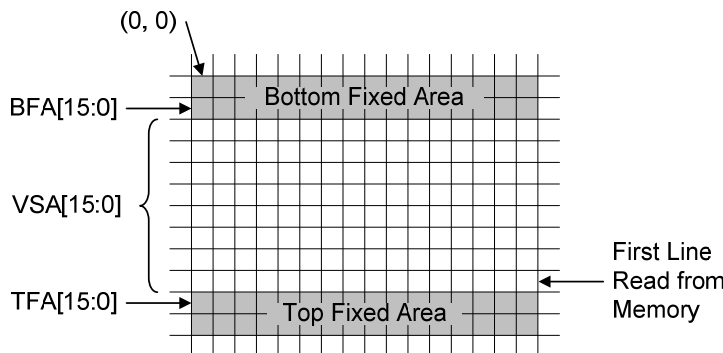
1396 If set_address_mode B4 = 1:

1397 The 1st & 2nd parameter, TFA[15:0], describes the Top Fixed Area in number of lines from the bottom of
 1398 the frame memory. The bottom of the frame memory and bottom of the display device are aligned.

1399 The 3rd & 4th parameter, VSA[15:0], describes the height of the Vertical Scrolling Area in number of lines
 1400 of frame memory from the Vertical Scrolling Start Address. The first line of the Vertical Scrolling Area
 1401 starts immediately after the top most line of the Top Fixed Area. The last line of the Vertical Scrolling Area
 1402 ends immediately before the bottom most line of the Bottom Fixed Area.

1403 The 5th & 6th parameter, BFA[15:0], describes the Bottom Fixed Area in number of lines from the top of the
 1404 frame memory. The top of the frame memory and top of the display device are aligned.

1405 TFA, VSA and BFA refer to the Frame Memory Line Pointer.

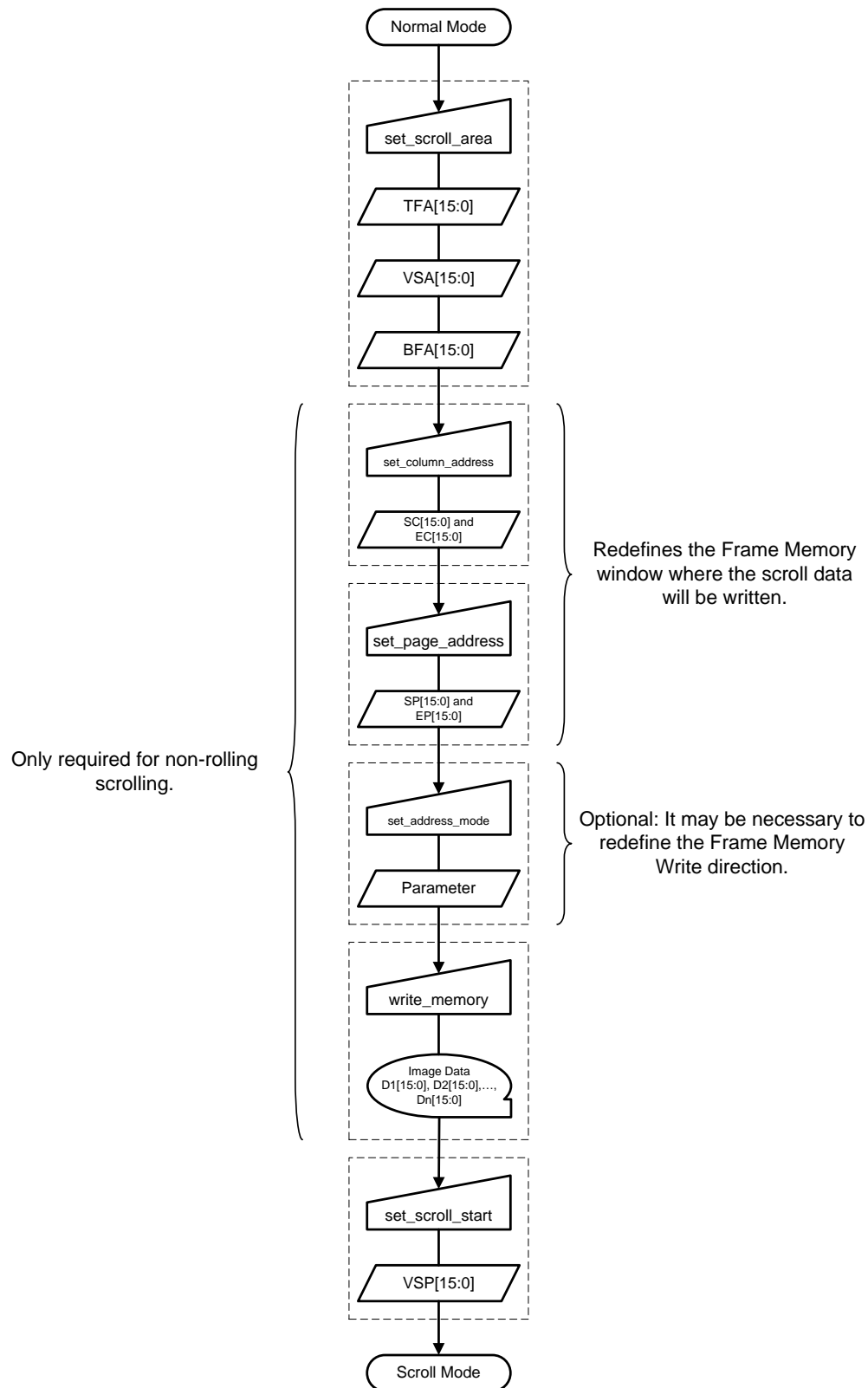


1406 **Figure 69 set_scroll_area set_address_mode B4 = 1 Example**

1408 Restrictions

1409 The sum of TFA, VSA and BFA must equal the number of the display device's horizontal lines (pages),
 1410 otherwise Scrolling mode is undefined.

1411 In Vertical Scroll Mode, set_address_mode B5 should be set to '0' – this only affects the Frame Memory
 1412 Write.

1413 **Flow Chart****Figure 70 set_scroll_area Flow Chart**

6.34 set_scroll_start

Interface All
Command 37h
Parameters See below

Command

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	1	0	1	1	1	37h

Parameter 1

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	VSP15	VSP14	VSP13	VSP12	VSP11	VSP10	VSP9	VSP8	XXh

Parameter 2

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	VSP7	VSP6	VSP5	VSP4	VSP3	VSP2	VSP1	VSP0	XXh

Description

This command sets the start of the vertical scrolling area in the frame memory. The vertical scrolling area is fully defined when this command is used with the set_scroll_area command

The set_scroll_start command has one parameter, the Vertical Scroll Pointer. The VSP defines the line in the frame memory that is written to the display device as the first line of the vertical scroll area. See section 6.33 for a description of the vertical scroll area.

The displayed image also depends on the setting of the Line Address Order bit, B4, in the set_address_mode register. See the examples below.

If set_address_mode B4 = 0:

Example:

When Top Fixed Area = Bottom Fixed Area = 0, Vertical Scrolling Area = YY and VSP = 3.

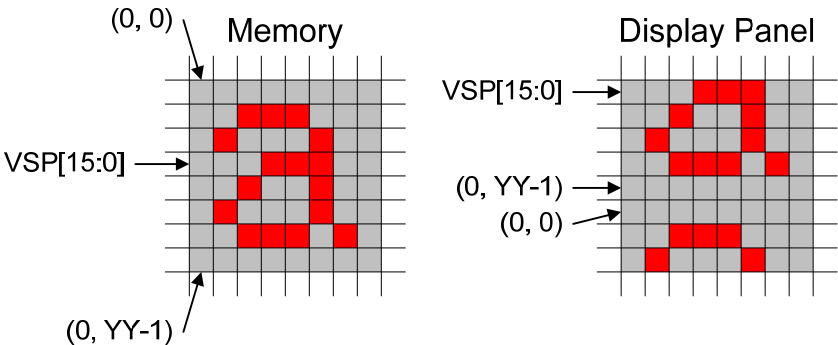


Figure 71 set_scroll_start set_address_mode B4 = 0

1436 If set_address_mode B4 = 1:

1437 Example:

1438 When Top Fixed Area = Bottom Fixed Area = 0, Vertical Scrolling Area = YY and VSP = 3.

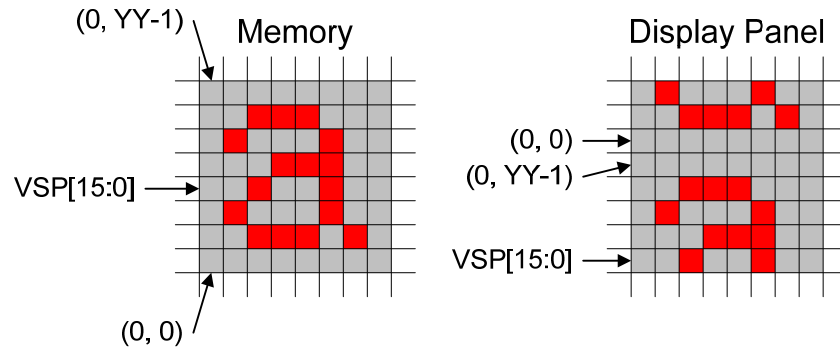


Figure 72 set_scroll_start set_address_mode B4 = 1

Restrictions

Since the value of the Vertical Scrolling Start Address is absolute with reference to the Frame Memory, it must not enter the fixed areas, see section 6.33, otherwise an undesirable image may be shown on the Display Panel.

The following conditions shall apply:

If set_address_mode B4 = 0, $TFA[15:0] - 1 < VSP[15:0] < \# \text{ of lines in frame memory} - BFA[15:0]$

If set_address_mode B4 = 1, $BFA[15:0] - 1 < VSP[15:0] < \# \text{ of lines in frame memory} - TFA[15:0]$

Flow Chart

See section 6.33 description.

1451 **6.35 set_tear_off**
 1452 **Interface** All
 1453 **Command** 34h
 1454 **Parameters** None

1455 **Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	1	0	1	0	0	34h

1456 **Description**

1457 This command turns off the display module's Tearing Effect output signal on the TE signal line.

1458 **Restrictions**

1459 This command has no effect when the Tearing Effect output is already off.

1460 **Flow Chart**

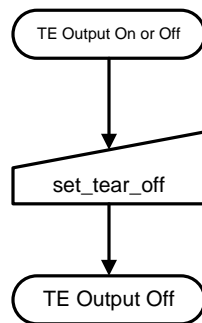


Figure 73 set_tear_off Flow Chart

1464 **6.36 set_tear_on**
 1465 **Interface** All
 1466 **Command** 35h
 1467 **Parameters** See below

1468 **Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	1	0	1	0	1	35h

1469 **Parameter**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	X	X	X	X	X	X	X	M	XXh

1470 **Description**

1471 This command turns on the display module's Tearing Effect output signal on the TE signal line. The TE
 1472 signal is not affected by changing set_address_mode bit B4.

1473 set_tear_on has one parameter that describes the Tearing Effect Output Line mode.

1474 If M = 0 (Mode 0):

1475 The Tearing Effect Output line consists of V-Blanking information only.

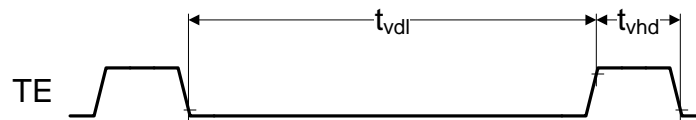


Figure 74 set_tear_on M = 0

1478 If M = 1 (Mode 1):

1479 The Tearing Effect Output Line consists of both V-Blanking and H-Blanking information.

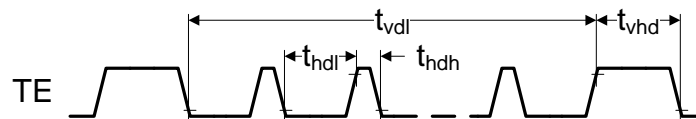


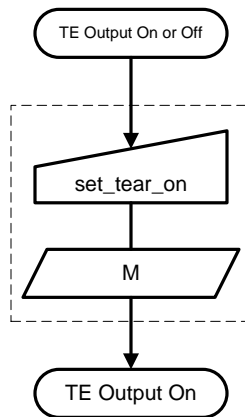
Figure 75 set_tear_on M = 1

1482 The Tearing Effect Output line shall be active low when the display module is in Sleep mode.

1483 See [MIPI02] for definitions of t_{vdl} , t_{vdh} , t_{hdl} and t_{hdh} .

1484 **Restrictions**

1485 This command takes affect on the frame following the current frame. Therefore, if the Tear Effect (TE)
 1486 output is already ON, the TE output shall continue to operate as programmed by the previous set_tear_on,
 1487 or set_tear_scanline, command until the end of the frame.

1488 **Flow Chart**1489 **Figure 76 set_tear_on Flow Chart**
1490
1491

6.37 set_tear_scanline**Interface** All**Command** 44h**Parameters** See below**Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	1	0	0	0	1	0	0	44h

Parameter 1

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	N15	N14	N13	N12	N11	N10	N9	N8	XXh

Parameter 2

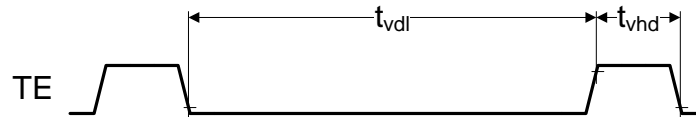
Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	N7	N6	N5	N4	N3	N2	N1	N0	XXh

Description

This command turns on the display module's Tearing Effect output signal on the TE signal line when the display module reaches line N. The TE signal is not affected by changing set_address_mode bit B4.

The Tearing Effect Line On has one parameter that describes the Tearing Effect Output Line mode.

After issuing a set_tear_scanline command to the display module, the Tearing Effect output signal, e.g. as in DBI-2 systems, shall be a delayed version of V-Blanking information as illustrated by Figure 77.

**Figure 77 set_tear_scanline**

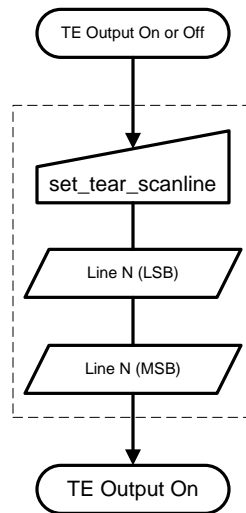
Note that set_tear_scanline with N = 0 is equivalent to set_tear_on with M = 0.

The Tearing Effect Output line shall be active low when the display module is in Sleep mode.

See [MIPI02] for definitions of t_{vdl} and t_{vhd} and [MIPI03] for definition of display module line numbers.

Restrictions

This command takes affect on the frame following the current frame. Therefore, if the Tear Effect (TE) output is already ON, the TE output shall continue to operate as programmed by the previous set_tear_on, or set_tear_scanline, command until the end of the frame.

1514 **Flow Chart**1515 **Figure 78 set_tear_scanline Flow Chart**
1516
1517

1518 **6.38 soft_reset**1519 **Interface** All1520 **Command** 01h1521 **Parameters** None1522 **Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	0	0	0	0	0	1	01h

1523 **Description**

1524 The display module performs a software reset. Registers are written with their SW Reset default values.
 1525 See section 5.7 for a list of the reset values.

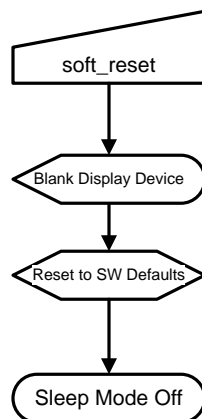
1526 Frame Memory contents are unaffected by this command.

1527 **Restrictions**

1528 The host processor must wait five milliseconds before sending any new commands to a display module
 1529 following this command. The display module updates the registers during this time.

1530 If a soft_reset is sent when the display module is in Sleep Mode, the host processor must wait 120
 1531 milliseconds before sending an exit_sleep_mode command.

1532 soft_reset should not be sent when the display module is not in Sleep mode.

1533 **Flow Chart**

1534 **Figure 79 soft_reset Flow Chart**
 1535
 1536

1537 **6.39 write_LUT**1538 **Interface** All1539 **Command** 2Dh1540 **Parameters** See below1541 **Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	0	1	1	0	1	2Dh

1542 **Parameter 1**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	R7	R6	R5	R4	R3	R2	R1	R0	XXh

1543 .

1544 .

1545 .

1546 **Parameter N**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	R7	R6	R5	R4	R3	R2	R1	R0	XXh

1547 **Parameter N + 1**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	G7	G6	G5	G4	G3	G2	G1	G0	XXh

1548 .

1549 .

1550 .

1551 **Parameter N + M**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	G7	G6	G5	G4	G3	G2	G1	G0	XXh

1552 **Parameter N + M + 1**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	B7	B6	B5	B4	B3	B2	B1	B0	XXh

1553 .

1554 .

1555 .

1556 **Parameter 2*N + M**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	B7	B6	B5	B4	B3	B2	B1	B0	XXh

1557 **Description**

1558 This command sets the LUT for pixel color depth conversions. Six conversions are supported as indicated
 1559 in Table 8.

1560

Table 8 LUT Color Depth Conversions

Convert from Color Depth	Convert to Color Depth		
	24	18	16
18	Yes	N/A	N/A
16	Yes	Yes	N/A
12	Yes	Yes	Yes

1561 The LUT size depends on the pixel format of the display module. In the list below, N is the number of red
1562 or blue components and M is the number of green components in the LUT.

1563 16-bit color display modules: N = M = 16; Total LUT Size = 2*N + M = 48 bytes.

1564 18-bit color display modules: N = 32, M = 64; Total LUT Size = 2*N + M = 128 bytes.

1565 24-bit color display modules: N = M = 64; Total LUT Size = 2*N + M = 192 bytes.

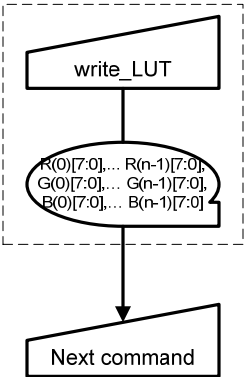
1566 Regardless of host processor color depth, the defined size of the LUT shall be written according to the
1567 number of colors supported by the display module. See Annex A.

1568 This command has no effect on other commands or the contents of frame memory. Visible changes take
1569 effect the next time the frame memory is written.

1570 **Restrictions**

1571 None

1572 **Flow Chart**



1573

1574

Figure 80 write_LUT Flow Chart

1575

6.40 write_memory_continue

Interface All
Command 3Ch
Parameters See below

Command

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	1	1	1	0	0	3Ch

Pixel Data 1

Direction	D15	D14	D13	D12	D11	D10	D9	D8	Hex Code
H→D	P15	P14	P13	P12	P11	P10	P9	P8	XXh

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	P7	P6	P5	P4	P3	P2	P1	P0	XXh

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·
·

Pixel Data N

Direction	D15	D14	D13	D12	D11	D10	D9	D8	Hex Code
H→D	P7	P6	P5	P4	P3	P2	P1	P0	XXh

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	P7	P6	P5	P4	P3	P2	P1	P0	XXh

Description

This command transfers image data from the host processor to the display module's frame memory continuing from the pixel location following the previous write_memory_continue or write_memory_start command.

If set_address_mode B5 = 0:

Data is written continuing from the pixel location after the write range of the previous write_memory_start or write_memory_continue. The column register is then incremented and pixels are written to the frame memory until the column register equals the End Column (EC) value. The column register is then reset to SC and the page register is incremented. Pixels are written to the frame memory until the page register equals the End Page (EP) value and the column register equals the EC value, or the host processor sends another command. If the number of pixels exceeds $(EC - SC + 1) * (EP - SP + 1)$ the extra pixels are ignored.

If set_address_mode B5 = 1:

Data is written continuing from the pixel location after the write range of the previous write_memory_start or write_memory_continue. The page register is then incremented and pixels are written to the frame memory until the page register equals the End Page (EP) value. The page register is then reset to SP and the column register is incremented. Pixels are written to the frame memory until the column register equals the

1605 End column (EC) value and the page register equals the EP value, or the host processor sends another
 1606 command. If the number of pixels exceeds $(EC - SC + 1) * (EP - SP + 1)$ the extra pixels are ignored.

1607 See section 6.25 for descriptions of the Start Column and End Column values.

1608 See section 6.29 for descriptions of the Start Page and End Page values.

1609 See section 8 in [MIPI01] and section 10 in [MIPI02] for color encoding for 8 or 9 data bit image data.

1610 Note the command description above shows 16-bit pixel data transferred over a 16-bit bus. Other
 1611 possibilities not illustrated here would show 9-bit pixel data transferred over a 9-bit bus, and 8-bit pixel
 1612 data transferred over an 8-bit bus. See Annex A for details on pixel to byte mapping.

1613 The relationship between some common colors and the corresponding image data are shown in the
 1614 following table.

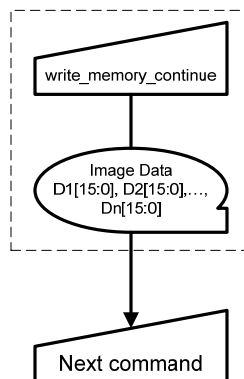
1615 **Table 9 Common Color Encoding**

Color	Red Component	Green Component	Blue Component
Black	All bits = 0	All bits = 0	All bits = 0
Red	All bits = 1	All bits = 0	All bits = 0
Green	All bits = 0	All bits = 1	All bits = 0
Blue	All bits = 0	All bits = 0	All bits = 1
Cyan	All bits = 0	All bits = 1	All bits = 1
Yellow	All bits = 1	All bits = 1	All bits = 0
Magenta	All bits = 1	All bits = 0	All bits = 1
White	All bits = 1	All bits = 1	All bits = 1

1616 Restrictions

1617 A write_memory_start should follow a set_column_address, set_page_address or set_address_mode to
 1618 define the write address. Otherwise, data written with write_memory_continue is written to undefined
 1619 addresses.

1620 Flow Chart



1621

1622

Figure 81 write_memory_continue Flow Chart

1623

1624 **6.41 write_memory_start**

1625 **Interface** All
 1626 **Command** 2Ch
 1627 **Parameters** See below

1628 **Command**

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	0	0	1	0	1	1	0	0	2Ch

1629 **Pixel Data 1**

Direction	D15	D14	D13	D12	D11	D10	D9	D8	Hex Code
H→D	P15	P14	P13	P12	P11	P10	P9	P8	XXh

1630

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	P7	P6	P5	P4	P3	P2	P1	P0	XXh

1631

1632

1633

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1634 **Pixel Data N**

Direction	D15	D14	D13	D12	D11	D10	D9	D8	Hex Code
H→D	P15	P14	P13	P12	P11	P10	P9	P8	XXh

1635

Direction	D7	D6	D5	D4	D3	D2	D1	D0	Hex Code
H→D	P7	P6	P5	P4	P3	P2	P1	P0	XXh

1636 **Description**

1637 This command transfers image data from the host processor to the display module's frame memory starting
 1638 at the pixel location specified by preceding set_column_address and set_page_address commands.

1639 If set_address_mode B5 = 0:

1640 The column and page registers are reset to the Start Column (SC) and Start Page (SP), respectively.

1641 Pixel Data 1 is stored in frame memory at (SC, SP). The column register is then incremented and pixels are
 1642 written to the frame memory until the column register equals the End Column (EC) value. The column
 1643 register is then reset to SC and the page register is incremented. Pixels are written to the frame memory
 1644 until the page register equals the End Page (EP) value and the column register equals the EC value, or the
 1645 host processor sends another command. If the number of pixels exceeds (EC – SC + 1) * (EP – SP + 1) the
 1646 extra pixels are ignored.

1647 If set_address_mode B5 = 1:

1648 The column and page registers are reset to the Start Column (SC) and Start Page (SP), respectively.

1649 Pixel Data 1 is stored in frame memory at (SC, SP). The page register is then incremented and pixels are
 1650 written to the frame memory until the page register equals the End Page (EP) value. The page register is
 1651 then reset to SP and the column register is incremented. Pixels are written to the frame memory until the

column register equals the End column (EC) value and the page register equals the EP value, or the host processor sends another command. If the number of pixels exceeds $(EC - SC + 1) * (EP - SP + 1)$ the extra pixels are ignored.

See section 6.25 for descriptions of the Start Column and End Column values.

See section 6.29 for descriptions of the Start Page and End Page values.

See section 8 in [MIPI01] and section 10 in [MIPI02] for color encoding for 8 or 9 data bit image data.

Note the command description above shows 16-bit pixel data transferred over a 16-bit bus. Other possibilities not illustrated here would show 9-bit pixel data transferred over a 9-bit bus, and 8-bit pixel data transferred over an 8-bit bus. See Annex A for details on pixel to byte mapping.

The relationship between some common colors and the corresponding image data are shown in the following table.

Table 10 Common Color Encoding

Color	Red Component	Green Component	Blue Component
Black	All bits = 0	All bits = 0	All bits = 0
Red	All bits = 1	All bits = 0	All bits = 0
Green	All bits = 0	All bits = 1	All bits = 0
Blue	All bits = 0	All bits = 0	All bits = 1
Cyan	All bits = 0	All bits = 1	All bits = 1
Yellow	All bits = 1	All bits = 1	All bits = 0
Magenta	All bits = 1	All bits = 0	All bits = 1
White	All bits = 1	All bits = 1	All bits = 1

Restrictions

A write_memory_start should follow a set_column_address, set_page_address or set_address_mode to define the write location. Otherwise, data written with write_memory_start and any following write_memory_continue commands is written to undefined locations.

Flow Chart

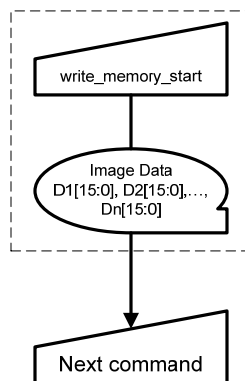


Figure 82 write_memory_start Flow Chart

Annex A Pixel-to-Byte Mapping

Many of the commands in this specification utilize display panel properties and therefore refer to pixels and scan lines. However, numerous components of a display system are inherently byte oriented. Therefore, a consistent method should be used to convert pixel formats to bytes to ensure interoperability among all components. This section defines the pixel-to-byte mapping used by this specification.

Note the `set_address_mode` command (section 6.24) affects the bit ordering within a pixel, red and blue components may be swapped, and the order pixels are transferred across the interface. The figures in this section are shown with `set_address_mode B4=B5=B6=B7=0`.

A.1 Three Bits per Pixel Format

Three bits per pixel formats do not map directly to byte boundaries and therefore require special handling. In this pixel format, each byte holds two pixels. Two bits in each byte convey no color information. The organization of bits is shown in Figure 83.

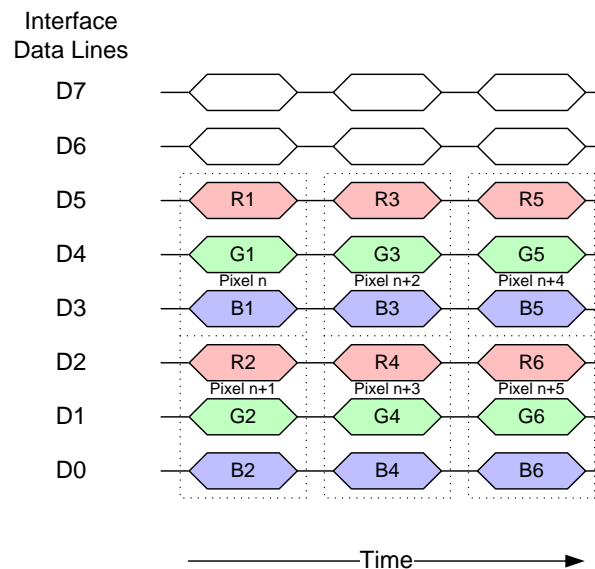


Figure 83 Three Bits per Pixel Format to Byte Mapping

A.2 Eight Bits per Pixel Format

Eight bits per pixel formats map directly to byte boundaries and therefore require no special handling. Figure 84 shows the mapping of pixels to bytes.

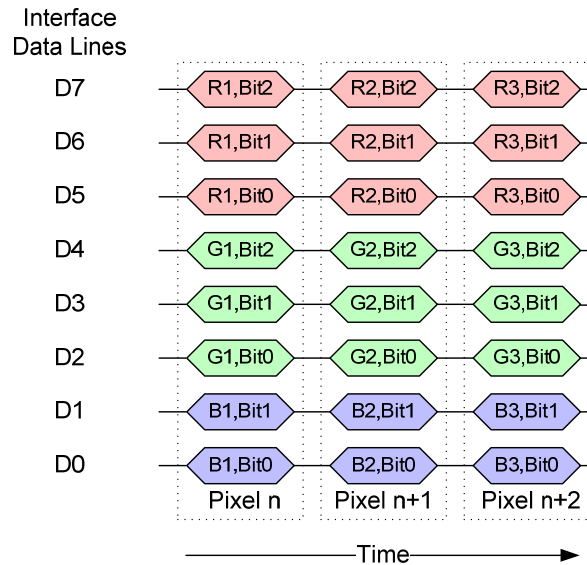


Figure 84 Eight Bits per Pixel Format to Byte Mapping

A.3 Twelve Bits per Pixel Format

Twelve bits per pixel formats do not map directly to byte boundaries and therefore require special handling. In this pixel format, three bytes hold two pixels. Figure 85 shows the mapping of pixels to bytes.

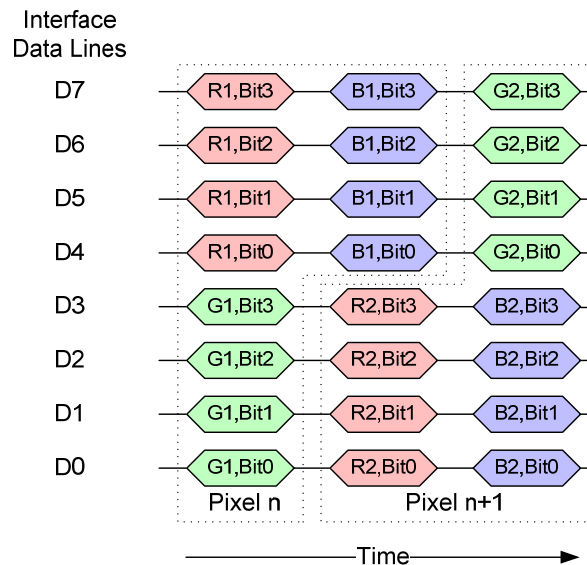


Figure 85 Twelve Bits per Pixel Format to Byte Mapping

A.4 Sixteen Bits per Pixel Format

Sixteen bits per pixel formats do not map directly to byte boundaries and therefore require special handling. However, this format is simpler than twelve bit formats since one pixel occupies two bytes. Figure 86 shows the mapping of pixels to bytes.

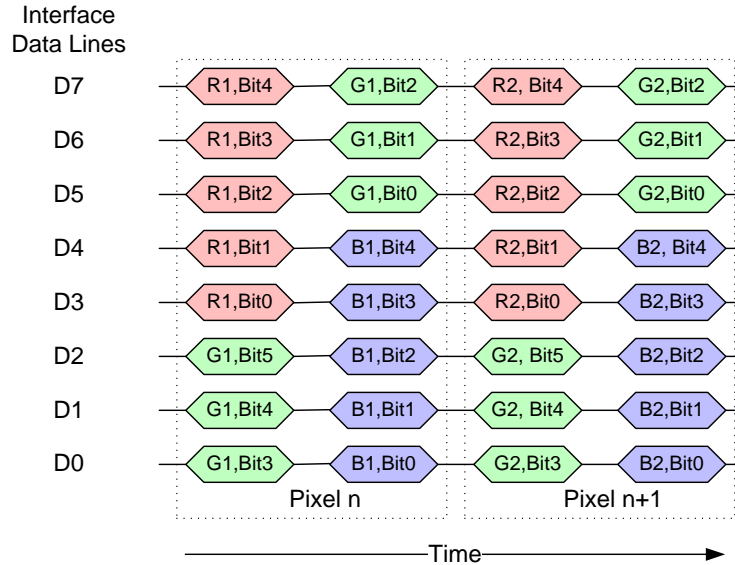


Figure 86 Sixteen Bits per Pixel Format to Byte Mapping

A.5 Eighteen Bits per Pixel Format

Eighteen bits per pixel formats do not map directly to byte boundaries and therefore require special handling. In this pixel format, each pixel occupies three bytes (24-bits), one for each color component. Two bits in each byte convey no color information. Figure 87 shows the mapping of pixels to bytes.

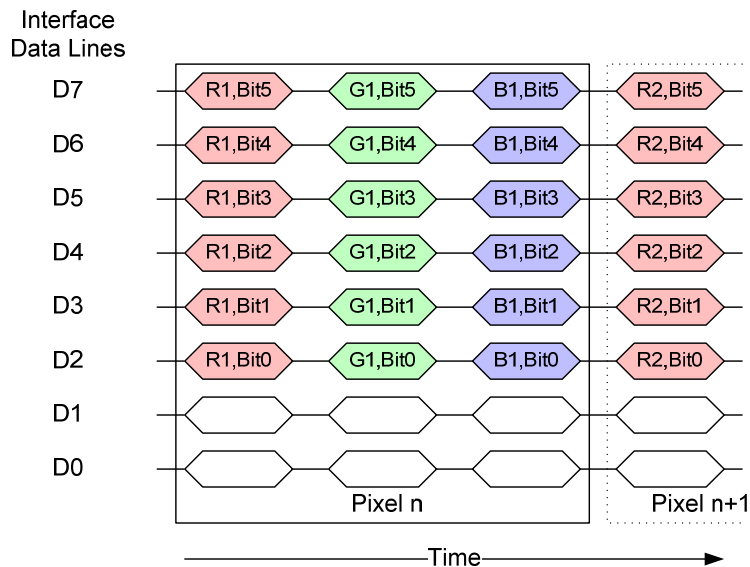


Figure 87 Eighteen Bits per Pixel Format to Byte Mapping

A.6 Twenty-four Bits per Pixel Format

Twenty-four bits per pixel formats do not map directly to byte boundaries and therefore require special handling. This format is similar to the eighteen bits per pixel format since one pixel occupies three bytes. However, all bits in this format convey color information. Figure 88 shows the mapping of pixels to bytes.

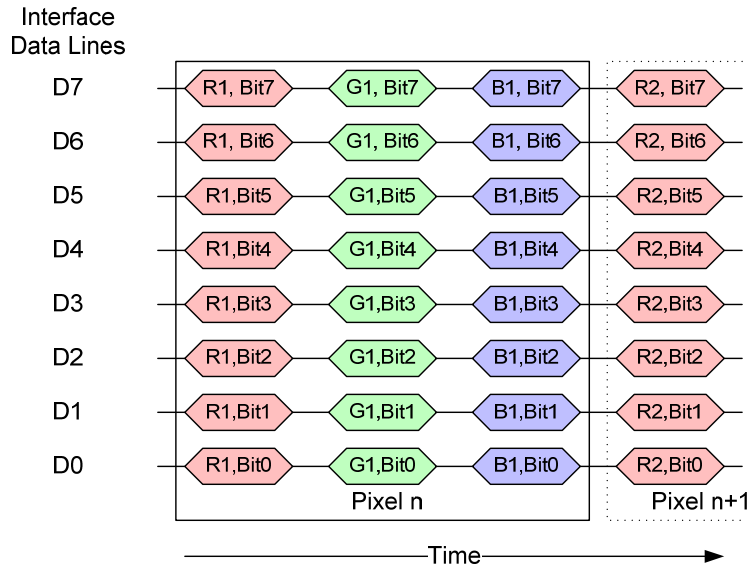


Figure 88 Twenty-four Bits per Pixel Format to Byte Mapping

Annex B Color Depth Conversion Look-up Tables (informative)

B.1 Color Depth Conversion LUT – 12-bit Color to 16-bit Color

Table 11 12-bit to 16-bit LUT Red Component Values

R input (4-bit) 12-bits/pixel 4,096 colors	R output (5-bit) 16-bits/pixel 65,536 colors	write_LUT Parameter
0000	R ₀₀₄ R ₀₀₃ R ₀₀₂ R ₀₀₁ R ₀₀₀	1
0001	R ₀₁₄ R ₀₁₃ R ₀₁₂ R ₀₁₁ R ₀₁₀	2
0010	R ₀₂₄ R ₀₂₃ R ₀₂₂ R ₀₂₁ R ₀₂₀	3
0011	R ₀₃₄ R ₀₃₃ R ₀₃₂ R ₀₃₁ R ₀₃₀	4
0100	R ₀₄₄ R ₀₄₃ R ₀₄₂ R ₀₄₁ R ₀₄₀	5
0101	R ₀₅₄ R ₀₅₃ R ₀₅₂ R ₀₅₁ R ₀₅₀	6
0110	R ₀₆₄ R ₀₆₃ R ₀₆₂ R ₀₆₁ R ₀₆₀	7
0111	R ₀₇₄ R ₀₇₃ R ₀₇₂ R ₀₇₁ R ₀₇₀	8
1000	R ₀₈₄ R ₀₈₃ R ₀₈₂ R ₀₈₁ R ₀₈₀	9
1001	R ₀₉₄ R ₀₉₃ R ₀₉₂ R ₀₉₁ R ₀₉₀	10
1010	R ₁₀₄ R ₁₀₃ R ₁₀₂ R ₁₀₁ R ₁₀₀	11
1011	R ₁₁₄ R ₁₁₃ R ₁₁₂ R ₁₁₁ R ₁₁₀	12
1100	R ₁₂₄ R ₁₂₃ R ₁₂₂ R ₁₂₁ R ₁₂₀	13
1101	R ₁₃₄ R ₁₃₃ R ₁₃₂ R ₁₃₁ R ₁₃₀	14
1110	R ₁₄₄ R ₁₄₃ R ₁₄₂ R ₁₄₁ R ₁₄₀	15
1111	R ₁₅₄ R ₁₅₃ R ₁₅₂ R ₁₅₁ R ₁₅₀	16

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Table 12 12-bit to 16-bit LUT Green Component Values

G input (4bit) 12 bit/pixel -mode 4,096 colors	G output (6bit) 16 bit/pixel -mode 65,536 colors	write_LUT Parameter
0000	G ₀₀₅ G ₀₀₄ G ₀₀₃ G ₀₀₂ G ₀₀₁ G ₀₀₀	17
0001	G ₀₁₅ G ₀₁₄ G ₀₁₃ G ₀₁₂ G ₀₁₁ G ₀₁₀	18
0010	G ₀₂₅ G ₀₂₄ G ₀₂₃ G ₀₂₂ G ₀₂₁ G ₀₂₀	19
0011	G ₀₃₅ G ₀₃₄ G ₀₃₃ G ₀₃₂ G ₀₃₁ G ₀₃₀	20
0100	G ₀₄₅ G ₀₄₄ G ₀₄₃ G ₀₄₂ G ₀₄₁ G ₀₄₀	21
0101	G ₀₅₅ G ₀₅₄ G ₀₅₃ G ₀₅₂ G ₀₅₁ G ₀₅₀	22
0110	G ₀₆₅ G ₀₆₄ G ₀₆₃ G ₀₆₂ G ₀₆₁ G ₀₆₀	23
0111	G ₀₇₅ G ₀₇₄ G ₀₇₃ G ₀₇₂ G ₀₇₁ G ₀₇₀	24
1000	G ₀₈₅ G ₀₈₄ G ₀₈₃ G ₀₈₂ G ₀₈₁ G ₀₈₀	25
1001	G ₀₉₅ G ₀₉₄ G ₀₉₃ G ₀₉₂ G ₀₉₁ G ₀₉₀	26
1010	G ₁₀₅ G ₁₀₄ G ₁₀₃ G ₁₀₂ G ₁₀₁ G ₁₀₀	27
1011	G ₁₁₅ G ₁₁₄ G ₁₁₃ G ₁₁₂ G ₁₁₁ G ₁₁₀	28
1100	G ₁₂₅ G ₁₂₄ G ₁₂₃ G ₁₂₂ G ₁₂₁ G ₁₂₀	29
1101	G ₁₃₅ G ₁₃₄ G ₁₃₃ G ₁₃₂ G ₁₃₁ G ₁₃₀	30
1110	G ₁₄₅ G ₁₄₄ G ₁₄₃ G ₁₄₂ G ₁₄₁ G ₁₄₀	31
1111	G ₁₅₅ G ₁₅₄ G ₁₅₃ G ₁₅₂ G ₁₅₁ G ₁₅₀	32

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Table 13 12-bit to 16-bit LUT Blue Component Values

B input (4bit) 12 bit/pixel -mode 4,096 colors	B output (5bit) 16 bit/pixel -mode 65,536 colors	write_LUT Parameter
0000	B ₀₀₄ B ₀₀₃ B ₀₀₂ B ₀₀₁ B ₀₀₀	33
0001	B ₀₁₄ B ₀₁₃ B ₀₁₂ B ₀₁₁ B ₀₁₀	34
0010	B ₀₂₄ B ₀₂₃ B ₀₂₂ B ₀₂₁ B ₀₂₀	35
0011	B ₀₃₄ B ₀₃₃ B ₀₃₂ B ₀₃₁ B ₀₃₀	36
0100	B ₀₄₄ B ₀₄₃ B ₀₄₂ B ₀₄₁ B ₀₄₀	37
0101	B ₀₅₄ B ₀₅₃ B ₀₅₂ B ₀₅₁ B ₀₅₀	38
0110	B ₀₆₄ B ₀₆₃ B ₀₆₂ B ₀₆₁ B ₀₆₀	39
0111	B ₀₇₄ B ₀₇₃ B ₀₇₂ B ₀₇₁ B ₀₇₀	40
1000	B ₀₈₄ B ₀₈₃ B ₀₈₂ B ₀₈₁ B ₀₈₀	41
1001	B ₀₉₄ B ₀₉₃ B ₀₉₂ B ₀₉₁ B ₀₉₀	42
1010	B ₁₀₄ B ₁₀₃ B ₁₀₂ B ₁₀₁ B ₁₀₀	43
1011	B ₁₁₄ B ₁₁₃ B ₁₁₂ B ₁₁₁ B ₁₁₀	44
1100	B ₁₂₄ B ₁₂₃ B ₁₂₂ B ₁₂₁ B ₁₂₀	45
1101	B ₁₃₄ B ₁₃₃ B ₁₃₂ B ₁₃₁ B ₁₃₀	46
1110	B ₁₄₄ B ₁₄₃ B ₁₄₂ B ₁₄₁ B ₁₄₀	47
1111	B ₁₅₄ B ₁₅₃ B ₁₅₂ B ₁₅₁ B ₁₅₀	48

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B.2 Color Depth Conversion LUT – 12-bit and 16-bit Colors to 18-bit Color**Table 14 12-bit, 16-bit to 18-bit LUT Red Component Values**

R input (4bit) 12 bit/pixel -mode 4,096 colors	R input (5 bit) 16 bit/pixel -mode 65,536 colors	R output (6bit) 18 bit/pixel -mode 262,144 colors	write_LUT Parameter
0000	00000	R ₀₀₅ R ₀₀₄ R ₀₀₃ R ₀₀₂ R ₀₀₁ R ₀₀₀	1
0001	00001	R ₀₁₅ R ₀₁₄ R ₀₁₃ R ₀₁₂ R ₀₁₁ R ₀₁₀	2
0010	00010	R ₀₂₅ R ₀₂₄ R ₀₂₃ R ₀₂₂ R ₀₂₁ R ₀₂₀	3
0011	00011	R ₀₃₅ R ₀₃₄ R ₀₃₃ R ₀₃₂ R ₀₃₁ R ₀₃₀	4
0100	00100	R ₀₄₅ R ₀₄₄ R ₀₄₃ R ₀₄₂ R ₀₄₁ R ₀₄₀	5
0101	00101	R ₀₅₅ R ₀₅₄ R ₀₅₃ R ₀₅₂ R ₀₅₁ R ₀₅₀	6
0110	00110	R ₀₆₅ R ₀₆₄ R ₀₆₃ R ₀₆₂ R ₀₆₁ R ₀₆₀	7
0111	00111	R ₀₇₅ R ₀₇₄ R ₀₇₃ R ₀₇₂ R ₀₇₁ R ₀₇₀	8
1000	01000	R ₀₈₅ R ₀₈₄ R ₀₈₃ R ₀₈₂ R ₀₈₁ R ₀₈₀	9
1001	01001	R ₀₉₅ R ₀₉₄ R ₀₉₃ R ₀₉₂ R ₀₉₁ R ₀₉₀	10
1010	01010	R ₁₀₅ R ₁₀₄ R ₁₀₃ R ₁₀₂ R ₁₀₁ R ₁₀₀	11
1011	01011	R ₁₁₅ R ₁₁₄ R ₁₁₃ R ₁₁₂ R ₁₁₁ R ₁₁₀	12
1100	01100	R ₁₂₅ R ₁₂₄ R ₁₂₃ R ₁₂₂ R ₁₂₁ R ₁₂₀	13
1101	01101	R ₁₃₅ R ₁₃₄ R ₁₃₃ R ₁₃₂ R ₁₃₁ R ₁₃₀	14
1110	01110	R ₁₄₅ R ₁₄₄ R ₁₄₃ R ₁₄₂ R ₁₄₁ R ₁₄₀	15
1111	01111	R ₁₅₅ R ₁₅₄ R ₁₅₃ R ₁₅₂ R ₁₅₁ R ₁₅₀	16
No Input	10000	R ₁₆₅ R ₁₆₄ R ₁₆₃ R ₁₆₂ R ₁₆₁ R ₁₆₀	17
No Input	10001	R ₁₇₅ R ₁₇₄ R ₁₇₃ R ₁₇₂ R ₁₇₁ R ₁₇₀	18
No Input	10010	R ₁₈₅ R ₁₈₄ R ₁₈₃ R ₁₈₂ R ₁₈₁ R ₁₈₀	19
No Input	10011	R ₁₉₅ R ₁₉₄ R ₁₉₃ R ₁₉₂ R ₁₉₁ R ₁₉₀	20
No Input	10100	R ₂₀₅ R ₂₀₄ R ₂₀₃ R ₂₀₂ R ₂₀₁ R ₂₀₀	21
No Input	10101	R ₂₁₅ R ₂₁₄ R ₂₁₃ R ₂₁₂ R ₂₁₁ R ₂₁₀	22
No Input	10110	R ₂₂₅ R ₂₂₄ R ₂₂₃ R ₂₂₂ R ₂₂₁ R ₂₂₀	23
No Input	10111	R ₂₃₅ R ₂₃₄ R ₂₃₃ R ₂₃₂ R ₂₃₁ R ₂₃₀	24
No Input	11000	R ₂₄₅ R ₂₄₄ R ₂₄₃ R ₂₄₂ R ₂₄₁ R ₂₄₀	25
No Input	11001	R ₂₅₅ R ₂₅₄ R ₂₅₃ R ₂₅₂ R ₂₅₁ R ₂₅₀	26
No Input	11010	R ₂₆₅ R ₂₆₄ R ₂₆₃ R ₂₆₂ R ₂₆₁ R ₂₆₀	27
No Input	11011	R ₂₇₅ R ₂₇₄ R ₂₇₃ R ₂₇₂ R ₂₇₁ R ₂₇₀	28
No Input	11100	R ₂₈₅ R ₂₈₄ R ₂₈₃ R ₂₈₂ R ₂₈₁ R ₂₈₀	29
No Input	11101	R ₂₉₅ R ₂₉₄ R ₂₉₃ R ₂₉₂ R ₂₉₁ R ₂₉₀	30

R input (4bit) 12 bit/pixel -mode 4,096 colors	R input (5 bit) 16 bit/pixel -mode 65,536 colors	R output (6bit) 18 bit/pixel -mode 262,144 colors	write_LUT Parameter
No Input	11110	R ₃₀₅ R ₃₀₄ R ₃₀₃ R ₃₀₂ R ₃₀₁ R ₃₀₀	31
No Input	11111	R ₃₁₅ R ₃₁₄ R ₃₁₃ R ₃₁₂ R ₃₁₁ R ₃₁₀	32

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Table 15 12-bit, 16-bit to 18-bit LUT Green Component Values

G input (4bit) 12 bit/pixel -mode 4,096 colors	G input (6 bit) 16 bit/pixel -mode 65,536 colors	G output (6bit) 18 bit/pixel -mode 262,144 colors	write_LUT Parameter
0000	000000	G ₀₀₅ G ₀₀₄ G ₀₀₃ G ₀₀₂ G ₀₀₁ G ₀₀₀	33
0001	000001	G ₀₁₅ G ₀₁₄ G ₀₁₃ G ₀₁₂ G ₀₁₁ G ₀₁₀	34
0010	000010	G ₀₂₅ G ₀₂₄ G ₀₂₃ G ₀₂₂ G ₀₂₁ G ₀₂₀	35
0011	000011	G ₀₃₅ G ₀₃₄ G ₀₃₃ G ₀₃₂ G ₀₃₁ G ₀₃₀	36
0100	000100	G ₀₄₅ G ₀₄₄ G ₀₄₃ G ₀₄₂ G ₀₄₁ G ₀₄₀	37
0101	000101	G ₀₅₅ G ₀₅₄ G ₀₅₃ G ₀₅₂ G ₀₅₁ G ₀₅₀	38
0110	000110	G ₀₆₅ G ₀₆₄ G ₀₆₃ G ₀₆₂ G ₀₆₁ G ₀₆₀	39
0111	000111	G ₀₇₅ G ₀₇₄ G ₀₇₃ G ₀₇₂ G ₀₇₁ G ₀₇₀	40
1000	001000	G ₀₈₅ G ₀₈₄ G ₀₈₃ G ₀₈₂ G ₀₈₁ G ₀₈₀	41
1001	001001	G ₀₉₅ G ₀₉₄ G ₀₉₃ G ₀₉₂ G ₀₉₁ G ₀₉₀	42
1010	001010	G ₁₀₅ G ₁₀₄ G ₁₀₃ G ₁₀₂ G ₁₀₁ G ₁₀₀	43
1011	001011	G ₁₁₅ G ₁₁₄ G ₁₁₃ G ₁₁₂ G ₁₁₁ G ₁₁₀	44
1100	001100	G ₁₂₅ G ₁₂₄ G ₁₂₃ G ₁₂₂ G ₁₂₁ G ₁₂₀	45
1101	001101	G ₁₃₅ G ₁₃₄ G ₁₃₃ G ₁₃₂ G ₁₃₁ G ₁₃₀	46
1110	001110	G ₁₄₅ G ₁₄₄ G ₁₄₃ G ₁₄₂ G ₁₄₁ G ₁₄₀	47
1111	001111	G ₁₅₅ G ₁₅₄ G ₁₅₃ G ₁₅₂ G ₁₅₁ G ₁₅₀	48
No Input	010000	G ₁₆₅ G ₁₆₄ G ₁₆₃ G ₁₆₂ G ₁₆₁ G ₁₆₀	49
No Input	010001	G ₁₇₅ G ₁₇₄ G ₁₇₃ G ₁₇₂ G ₁₇₁ G ₁₇₀	50
No Input	010010	G ₁₈₅ G ₁₈₄ G ₁₈₃ G ₁₈₂ G ₁₈₁ G ₁₈₀	51
No Input	010011	G ₁₉₅ G ₁₉₄ G ₁₉₃ G ₁₉₂ G ₁₉₁ G ₁₉₀	52
No Input	010100	G ₂₀₅ G ₂₀₄ G ₂₀₃ G ₂₀₂ G ₂₀₁ G ₂₀₀	53
No Input	010101	G ₂₁₅ G ₂₁₄ G ₂₁₃ G ₂₁₂ G ₂₁₁ G ₂₁₀	54
No Input	010110	G ₂₂₅ G ₂₂₄ G ₂₂₃ G ₂₂₂ G ₂₂₁ G ₂₂₀	55
No Input	010111	G ₂₃₅ G ₂₃₄ G ₂₃₃ G ₂₃₂ G ₂₃₁ G ₂₃₀	56
No Input	011000	G ₂₄₅ G ₂₄₄ G ₂₄₃ G ₂₄₂ G ₂₄₁ G ₂₄₀	57
No Input	011001	G ₂₅₅ G ₂₅₄ G ₂₅₃ G ₂₅₂ G ₂₅₁ G ₂₅₀	58
No Input	011010	G ₂₆₅ G ₂₆₄ G ₂₆₃ G ₂₆₂ G ₂₆₁ G ₂₆₀	59
No Input	011011	G ₂₇₅ G ₂₇₄ G ₂₇₃ G ₂₇₂ G ₂₇₁ G ₂₇₀	60
No Input	011100	G ₂₈₅ G ₂₈₄ G ₂₈₃ G ₂₈₂ G ₂₈₁ G ₂₈₀	61
No Input	011101	G ₂₉₅ G ₂₉₄ G ₂₉₃ G ₂₉₂ G ₂₉₁ G ₂₉₀	62
No Input	011110	G ₃₀₅ G ₃₀₄ G ₃₀₃ G ₃₀₂ G ₃₀₁ G ₃₀₀	63
No Input	011111	G ₃₁₅ G ₃₁₄ G ₃₁₃ G ₃₁₂ G ₃₁₁ G ₃₁₀	64

G input (4bit) 12 bit/pixel -mode 4,096 colors	G input (6 bit) 16 bit/pixel -mode 65,536 colors	G output (6bit) 18 bit/pixel -mode 262,144 colors	write_LUT Parameter
No Input	100000	G ₃₂₅ G ₃₂₄ G ₃₂₃ G ₃₂₂ G ₃₂₁ G ₃₂₀	65
No Input	100001	G ₃₃₅ G ₃₃₄ G ₃₃₃ G ₃₃₂ G ₃₃₁ G ₃₃₀	66
No Input	100010	G ₃₄₅ G ₃₄₄ G ₃₄₃ G ₃₄₂ G ₃₄₁ G ₃₄₀	67
No Input	100011	G ₃₅₅ G ₃₅₄ G ₃₅₃ G ₃₅₂ G ₃₅₁ G ₃₅₀	68
No Input	100100	G ₃₆₅ G ₃₆₄ G ₃₆₃ G ₃₆₂ G ₃₆₁ G ₃₆₀	69
No Input	100101	G ₃₇₅ G ₃₇₄ G ₃₇₃ G ₃₇₂ G ₃₇₁ G ₃₇₀	70
No Input	100110	G ₃₈₅ G ₃₈₄ G ₃₈₃ G ₃₈₂ G ₃₈₁ G ₃₈₀	71
No Input	100111	G ₃₉₅ G ₃₉₄ G ₃₉₃ G ₃₉₂ G ₃₉₁ G ₃₉₀	72
No Input	101000	G ₄₀₅ G ₄₀₄ G ₄₀₃ G ₄₀₂ G ₄₀₁ G ₄₀₀	73
No Input	101001	G ₄₁₅ G ₄₁₄ G ₄₁₃ G ₄₁₂ G ₄₁₁ G ₄₁₀	74
No Input	101010	G ₄₂₅ G ₄₂₄ G ₄₂₃ G ₄₂₂ G ₄₂₁ G ₄₂₀	75
No Input	101011	G ₄₃₅ G ₄₃₄ G ₄₃₃ G ₄₃₂ G ₄₃₁ G ₄₃₀	76
No Input	101100	G ₄₄₅ G ₄₄₄ G ₄₄₃ G ₄₄₂ G ₄₄₁ G ₄₄₀	77
No Input	101101	G ₄₅₅ G ₄₅₄ G ₄₅₃ G ₄₅₂ G ₄₅₁ G ₄₅₀	78
No Input	101110	G ₄₆₅ G ₄₆₄ G ₄₆₃ G ₄₆₂ G ₄₆₁ G ₄₆₀	79
No Input	101111	G ₄₇₅ G ₄₇₄ G ₄₇₃ G ₄₇₂ G ₄₇₁ G ₄₇₀	80
No Input	110000	G ₄₈₅ G ₄₈₄ G ₄₈₃ G ₄₈₂ G ₄₈₁ G ₄₈₀	81
No Input	110001	G ₄₉₅ G ₄₉₄ G ₄₉₃ G ₄₉₂ G ₄₉₁ G ₄₉₀	82
No Input	110010	G ₅₀₅ G ₅₀₄ G ₅₀₃ G ₅₀₂ G ₅₀₁ G ₅₀₀	83
No Input	110011	G ₅₁₅ G ₅₁₄ G ₅₁₃ G ₅₁₂ G ₅₁₁ G ₅₁₀	84
No Input	110100	G ₅₂₅ G ₅₂₄ G ₅₂₃ G ₅₂₂ G ₅₂₁ G ₅₂₀	85
No Input	110101	G ₅₃₅ G ₅₃₄ G ₅₃₃ G ₅₃₂ G ₅₃₁ G ₅₃₀	86
No Input	110110	G ₅₄₅ G ₅₄₄ G ₅₄₃ G ₅₄₂ G ₅₄₁ G ₅₄₀	87
No Input	110111	G ₅₅₅ G ₅₅₄ G ₅₅₃ G ₅₅₂ G ₅₅₁ G ₅₅₀	88
No Input	111000	G ₅₆₅ G ₅₆₄ G ₅₆₃ G ₅₆₂ G ₅₆₁ G ₅₆₀	89
No Input	111001	G ₅₇₅ G ₅₇₄ G ₅₇₃ G ₅₇₂ G ₅₇₁ G ₅₇₀	90
No Input	111010	G ₅₈₅ G ₅₈₄ G ₅₈₃ G ₅₈₂ G ₅₈₁ G ₅₈₀	91
No Input	111011	G ₅₉₅ G ₅₉₄ G ₅₉₃ G ₅₉₂ G ₅₉₁ G ₅₉₀	92
No Input	111100	G ₆₀₅ G ₆₀₄ G ₆₀₃ G ₆₀₂ G ₆₀₁ G ₆₀₀	93
No Input	111101	G ₆₁₅ G ₆₁₄ G ₆₁₃ G ₆₁₂ G ₆₁₁ G ₆₁₀	94
No Input	111110	G ₆₂₅ G ₆₂₄ G ₆₂₃ G ₆₂₂ G ₆₂₁ G ₆₂₀	95
No Input	111111	G ₆₃₅ G ₆₃₄ G ₆₃₃ G ₆₃₂ G ₆₃₁ G ₆₃₀	96

1729

Table 16 12-bit, 16-bit to 18-bit LUT Blue Component Values

B input (4bit) 12 bit/pixel -mode 4,096 colors	B input (5 bit) 16 bit/pixel -mode 65,536 colors	B output (6bit) 18 bit/pixel -mode 262,144 colors	write_LUT Parameter
0000	00000	B ₀₀₅ B ₀₀₄ B ₀₀₃ B ₀₀₂ B ₀₀₁ B ₀₀₀	97
0001	00001	B ₀₁₅ B ₀₁₄ B ₀₁₃ B ₀₁₂ B ₀₁₁ B ₀₁₀	98
0010	00010	B ₀₂₅ B ₀₂₄ B ₀₂₃ B ₀₂₂ B ₀₂₁ B ₀₂₀	99
0011	00011	B ₀₃₅ B ₀₃₄ B ₀₃₃ B ₀₃₂ B ₀₃₁ B ₀₃₀	100
0100	00100	B ₀₄₅ B ₀₄₄ B ₀₄₃ B ₀₄₂ B ₀₄₁ B ₀₄₀	101
0101	00101	B ₀₅₅ B ₀₅₄ B ₀₅₃ B ₀₅₂ B ₀₅₁ B ₀₅₀	102
0110	00110	B ₀₆₅ B ₀₆₄ B ₀₆₃ B ₀₆₂ B ₀₆₁ B ₀₆₀	103
0111	00111	B ₀₇₅ B ₀₇₄ B ₀₇₃ B ₀₇₂ B ₀₇₁ B ₀₇₀	104
1000	01000	B ₀₈₅ B ₀₈₄ B ₀₈₃ B ₀₈₂ B ₀₈₁ B ₀₈₀	105
1001	01001	B ₀₉₅ B ₀₉₄ B ₀₉₃ B ₀₉₂ B ₀₉₁ B ₀₉₀	106
1010	01010	B ₁₀₅ B ₁₀₄ B ₁₀₃ B ₁₀₂ B ₁₀₁ B ₁₀₀	107
1011	01011	B ₁₁₅ B ₁₁₄ B ₁₁₃ B ₁₁₂ B ₁₁₁ B ₁₁₀	108
1100	01100	B ₁₂₅ B ₁₂₄ B ₁₂₃ B ₁₂₂ B ₁₂₁ B ₁₂₀	109
1101	01101	B ₁₃₅ B ₁₃₄ B ₁₃₃ B ₁₃₂ B ₁₃₁ B ₁₃₀	110
1110	01110	B ₁₄₅ B ₁₄₄ B ₁₄₃ B ₁₄₂ B ₁₄₁ B ₁₄₀	111
1111	01111	B ₁₅₅ B ₁₅₄ B ₁₅₃ B ₁₅₂ B ₁₅₁ B ₁₅₀	112
No Input	10000	B ₁₆₅ B ₁₆₄ B ₁₆₃ B ₁₆₂ B ₁₆₁ B ₁₆₀	113
No Input	10001	B ₁₇₅ B ₁₇₄ B ₁₇₃ B ₁₇₂ B ₁₇₁ B ₁₇₀	114
No Input	10010	B ₁₈₅ B ₁₈₄ B ₁₈₃ B ₁₈₂ B ₁₈₁ B ₁₈₀	115
No Input	10011	B ₁₉₅ B ₁₉₄ B ₁₉₃ B ₁₉₂ B ₁₉₁ B ₁₉₀	116
No Input	10100	B ₂₀₅ B ₂₀₄ B ₂₀₃ B ₂₀₂ B ₂₀₁ B ₂₀₀	117
No Input	10101	B ₂₁₅ B ₂₁₄ B ₂₁₃ B ₂₁₂ B ₂₁₁ B ₂₁₀	118
No Input	10110	B ₂₂₅ B ₂₂₄ B ₂₂₃ B ₂₂₂ B ₂₂₁ B ₂₂₀	119
No Input	10111	B ₂₃₅ B ₂₃₄ B ₂₃₃ B ₂₃₂ B ₂₃₁ B ₂₃₀	120
No Input	11000	B ₂₄₅ B ₂₄₄ B ₂₄₃ B ₂₄₂ B ₂₄₁ B ₂₄₀	121
No Input	11001	B ₂₅₅ B ₂₅₄ B ₂₅₃ B ₂₅₂ B ₂₅₁ B ₂₅₀	122
No Input	11010	B ₂₆₅ B ₂₆₄ B ₂₆₃ B ₂₆₂ B ₂₆₁ B ₂₆₀	123
No Input	11011	B ₂₇₅ B ₂₇₄ B ₂₇₃ B ₂₇₂ B ₂₇₁ B ₂₇₀	124
No Input	11100	B ₂₈₅ B ₂₈₄ B ₂₈₃ B ₂₈₂ B ₂₈₁ B ₂₈₀	125
No Input	11101	B ₂₉₅ B ₂₉₄ B ₂₉₃ B ₂₉₂ B ₂₉₁ B ₂₉₀	126
No Input	11110	B ₃₀₅ B ₃₀₄ B ₃₀₃ B ₃₀₂ B ₃₀₁ B ₃₀₀	127
No Input	11111	B ₃₁₅ B ₃₁₄ B ₃₁₃ B ₃₁₂ B ₃₁₁ B ₃₁₀	128

1730

B.3 Color Depth Conversion LUT – 12-bit, 16-bit and 18-bit Colors to 24-bit Color

Table 17 12-bit, 16-bit and 18-bit Colors to 24-bit Color LUT Red Component Values

R input (4bit) 12 bit/pixel - mode 4,096 colors	R input (5 bit) 16 bit/pixel - mode 65,536 colors	R input (6 bit) 18 bit/pixel - mode 262,144 colors	R output (8bit) 24 bit/pixel -mode 16,777,216 colors	write_LUT Parameter
0000	00000	000000	R ₀₀₇ R ₀₀₆ R ₀₀₅ R ₀₀₄ R ₀₀₃ R ₀₀₂ R ₀₀₁ R ₀₀₀	1
0001	00001	000001	R ₀₁₇ R ₀₁₆ R ₀₁₅ R ₀₁₄ R ₀₁₃ R ₀₁₂ R ₀₁₁ R ₀₁₀	2
0010	00010	000010	R ₀₂₇ R ₀₂₆ R ₀₂₅ R ₀₂₄ R ₀₂₃ R ₀₂₂ R ₀₂₁ R ₀₂₀	3
0011	00011	000011	R ₀₃₇ R ₀₃₆ R ₀₃₅ R ₀₃₄ R ₀₃₃ R ₀₃₂ R ₀₃₁ R ₀₃₀	4
0100	00100	000100	R ₀₄₇ R ₀₄₆ R ₀₄₅ R ₀₄₄ R ₀₄₃ R ₀₄₂ R ₀₄₁ R ₀₄₀	5
0101	00101	000101	R ₀₅₇ R ₀₅₆ R ₀₅₅ R ₀₅₄ R ₀₅₃ R ₀₅₂ R ₀₅₁ R ₀₅₀	6
0110	00110	000110	R ₀₆₇ R ₀₆₆ R ₀₆₅ R ₀₆₄ R ₀₆₃ R ₀₆₂ R ₀₆₁ R ₀₆₀	7
0111	00111	000111	R ₀₇₇ R ₀₇₆ R ₀₇₅ R ₀₇₄ R ₀₇₃ R ₀₇₂ R ₀₇₁ R ₀₇₀	8
1000	01000	001000	R ₀₈₇ R ₀₈₆ R ₀₈₅ R ₀₈₄ R ₀₈₃ R ₀₈₂ R ₀₈₁ R ₀₈₀	9
1001	01001	001001	R ₀₉₇ R ₀₉₆ R ₀₉₅ R ₀₉₄ R ₀₉₃ R ₀₉₂ R ₀₉₁ R ₀₉₀	10
1010	01010	001010	R ₁₀₇ R ₁₀₆ R ₁₀₅ R ₁₀₄ R ₁₀₃ R ₁₀₂ R ₁₀₁ R ₁₀₀	11
1011	01011	001011	R ₁₁₇ R ₁₁₆ R ₁₁₅ R ₁₁₄ R ₁₁₃ R ₁₁₂ R ₁₁₁ R ₁₁₀	12
1100	01100	001100	R ₁₂₇ R ₁₂₆ R ₁₂₅ R ₁₂₄ R ₁₂₃ R ₁₂₂ R ₁₂₁ R ₁₂₀	13
1101	01101	001101	R ₁₃₇ R ₁₃₆ R ₁₃₅ R ₁₃₄ R ₁₃₃ R ₁₃₂ R ₁₃₁ R ₁₃₀	14
1110	01110	001110	R ₁₄₇ R ₁₄₆ R ₁₄₅ R ₁₄₄ R ₁₄₃ R ₁₄₂ R ₁₄₁ R ₁₄₀	15
1111	01111	001111	R ₁₅₇ R ₁₅₆ R ₁₅₅ R ₁₅₄ R ₁₅₃ R ₁₅₂ R ₁₅₁ R ₁₅₀	16
No Input	10000	010000	R ₁₆₇ R ₁₆₆ R ₁₆₅ R ₁₆₄ R ₁₆₃ R ₁₆₂ R ₁₆₁ R ₁₆₀	17
No Input	10001	010001	R ₁₇₇ R ₁₇₆ R ₁₇₅ R ₁₇₄ R ₁₇₃ R ₁₇₂ R ₁₇₁ R ₁₇₀	18
No Input	10010	010010	R ₁₈₇ R ₁₈₆ R ₁₈₅ R ₁₈₄ R ₁₈₃ R ₁₈₂ R ₁₈₁ R ₁₈₀	19
No Input	10011	010011	R ₁₉₇ R ₁₉₆ R ₁₉₅ R ₁₉₄ R ₁₉₃ R ₁₉₂ R ₁₉₁ R ₁₉₀	20
No Input	10100	010100	R ₂₀₇ R ₂₀₆ R ₂₀₅ R ₂₀₄ R ₂₀₃ R ₂₀₂ R ₂₀₁ R ₂₀₀	21
No Input	10101	010101	R ₂₁₇ R ₂₁₆ R ₂₁₅ R ₂₁₄ R ₂₁₃ R ₂₁₂ R ₂₁₁ R ₂₁₀	22
No Input	10110	010110	R ₂₂₇ R ₂₂₆ R ₂₂₅ R ₂₂₄ R ₂₂₃ R ₂₂₂ R ₂₂₁ R ₂₂₀	23
No Input	10111	010111	R ₂₃₇ R ₂₃₆ R ₂₃₅ R ₂₃₄ R ₂₃₃ R ₂₃₂ R ₂₃₁ R ₂₃₀	24
No Input	11000	011000	R ₂₄₇ R ₂₄₆ R ₂₄₅ R ₂₄₄ R ₂₄₃ R ₂₄₂ R ₂₄₁ R ₂₄₀	25
No Input	11001	011001	R ₂₅₇ R ₂₅₆ R ₂₅₅ R ₂₅₄ R ₂₅₃ R ₂₅₂ R ₂₅₁ R ₂₅₀	26
No Input	11010	011010	R ₂₆₇ R ₂₆₆ R ₂₆₅ R ₂₆₄ R ₂₆₃ R ₂₆₂ R ₂₆₁ R ₂₆₀	27
No Input	11011	011011	R ₂₇₇ R ₂₇₆ R ₂₇₅ R ₂₇₄ R ₂₇₃ R ₂₇₂ R ₂₇₁ R ₂₇₀	28
No Input	11100	011100	R ₂₈₇ R ₂₈₆ R ₂₈₅ R ₂₈₄ R ₂₈₃ R ₂₈₂ R ₂₈₁ R ₂₈₀	29

R input (4bit) 12 bit/pixel - mode 4,096 colors	R input (5 bit) 16 bit/pixel - mode 65,536 colors	R input (6 bit) 18 bit/pixel - mode 262,144 colors	R output (8bit) 24 bit/pixel -mode 16,777,216 colors	write_LUT Parameter
No Input	11101	011101	R ₂₉₇ R ₂₉₆ R ₂₉₅ R ₂₉₄ R ₂₉₃ R ₂₉₂ R ₂₉₁ R ₂₉₀	30
No Input	11110	011110	R ₃₀₇ R ₃₀₆ R ₃₀₅ R ₃₀₄ R ₃₀₃ R ₃₀₂ R ₃₀₁ R ₃₀₀	31
No Input	11111	011111	R ₃₁₇ R ₃₁₆ R ₃₁₅ R ₃₁₄ R ₃₁₃ R ₃₁₂ R ₃₁₁ R ₃₁₀	32
No Input	No Input	100000	R ₃₂₇ R ₃₂₆ R ₃₂₅ R ₃₂₄ R ₃₂₃ R ₃₂₂ R ₃₂₁ R ₃₂₀	33
No Input	No Input	100001	R ₃₃₇ R ₃₃₆ R ₃₃₅ R ₃₃₄ R ₃₃₃ R ₃₃₂ R ₃₃₁ R ₃₃₀	34
No Input	No Input	100010	R ₃₄₇ R ₃₄₆ R ₃₄₅ R ₃₄₄ R ₃₄₃ R ₃₄₂ R ₃₄₁ R ₃₄₀	35
No Input	No Input	100011	R ₃₅₇ R ₃₅₆ R ₃₅₅ R ₃₅₄ R ₃₅₃ R ₃₅₂ R ₃₅₁ R ₃₅₀	36
No Input	No Input	100100	R ₃₆₇ R ₃₆₆ R ₃₆₅ R ₃₆₄ R ₃₆₃ R ₃₆₂ R ₃₆₁ R ₃₆₀	37
No Input	No Input	100101	R ₃₇₇ R ₃₇₆ R ₃₇₅ R ₃₇₄ R ₃₇₃ R ₃₇₂ R ₃₇₁ R ₃₇₀	38
No Input	No Input	100110	R ₃₈₇ R ₃₈₆ R ₃₈₅ R ₃₈₄ R ₃₈₃ R ₃₈₂ R ₃₈₁ R ₃₈₀	39
No Input	No Input	100111	R ₃₉₇ R ₃₉₆ R ₃₉₅ R ₃₉₄ R ₃₉₃ R ₃₉₂ R ₃₉₁ R ₃₉₀	40
No Input	No Input	101000	R ₄₀₇ R ₄₀₆ R ₄₀₅ R ₄₀₄ R ₄₀₃ R ₄₀₂ R ₄₀₁ R ₄₀₀	41
No Input	No Input	101001	R ₄₁₇ R ₄₁₆ R ₄₁₅ R ₄₁₄ R ₄₁₃ R ₄₁₂ R ₄₁₁ R ₄₁₀	42
No Input	No Input	101010	R ₄₂₇ R ₄₂₆ R ₄₂₅ R ₄₂₄ R ₄₂₃ R ₄₂₂ R ₄₂₁ R ₄₂₀	43
No Input	No Input	101011	R ₄₃₇ R ₄₃₆ R ₄₃₅ R ₄₃₄ R ₄₃₃ R ₄₃₂ R ₄₃₁ R ₄₃₀	44
No Input	No Input	101100	R ₄₄₇ R ₄₄₆ R ₄₄₅ R ₄₄₄ R ₄₄₃ R ₄₄₂ R ₄₄₁ R ₄₄₀	45
No Input	No Input	101101	R ₄₅₇ R ₄₅₆ R ₄₅₅ R ₄₅₄ R ₄₅₃ R ₄₅₂ R ₄₅₁ R ₄₅₀	46
No Input	No Input	101110	R ₄₆₇ R ₄₆₆ R ₄₆₅ R ₄₆₄ R ₄₆₃ R ₄₆₂ R ₄₆₁ R ₄₆₀	47
No Input	No Input	101111	R ₄₇₇ R ₄₇₆ R ₄₇₅ R ₄₇₄ R ₄₇₃ R ₄₇₂ R ₄₇₁ R ₄₇₀	48
No Input	No Input	110000	R ₄₈₇ R ₄₈₆ R ₄₈₅ R ₄₈₄ R ₄₈₃ R ₄₈₂ R ₄₈₁ R ₄₈₀	49
No Input	No Input	110001	R ₄₉₇ R ₄₉₆ R ₄₉₅ R ₄₉₄ R ₄₉₃ R ₄₉₂ R ₄₉₁ R ₄₉₀	50
No Input	No Input	110010	R ₅₀₇ R ₅₀₆ R ₅₀₅ R ₅₀₄ R ₅₀₃ R ₅₀₂ R ₅₀₁ R ₅₀₀	51
No Input	No Input	110011	R ₅₁₇ R ₅₁₆ R ₅₁₅ R ₅₁₄ R ₅₁₃ R ₅₁₂ R ₅₁₁ R ₅₁₀	52
No Input	No Input	110100	R ₅₂₇ R ₅₂₆ R ₅₂₅ R ₅₂₄ R ₅₂₃ R ₅₂₂ R ₅₂₁ R ₅₂₀	53
No Input	No Input	110101	R ₅₃₇ R ₅₃₆ R ₅₃₅ R ₅₃₄ R ₅₃₃ R ₅₃₂ R ₅₃₁ R ₅₃₀	54
No Input	No Input	110110	R ₅₄₇ R ₅₄₆ R ₅₄₅ R ₅₄₄ R ₅₄₃ R ₅₄₂ R ₅₄₁ R ₅₄₀	55
No Input	No Input	110111	R ₅₅₇ R ₅₅₆ R ₅₅₅ R ₅₅₄ R ₅₅₃ R ₅₅₂ R ₅₅₁ R ₅₅₀	56
No Input	No Input	111000	R ₅₆₇ R ₅₆₆ R ₅₆₅ R ₅₆₄ R ₅₆₃ R ₅₆₂ R ₅₆₁ R ₅₆₀	57
No Input	No Input	111001	R ₅₇₇ R ₅₇₆ R ₅₇₅ R ₅₇₄ R ₅₇₃ R ₅₇₂ R ₅₇₁ R ₅₇₀	58
No Input	No Input	111010	R ₅₈₇ R ₅₈₆ R ₅₈₅ R ₅₈₄ R ₅₈₃ R ₅₈₂ R ₅₈₁ R ₅₈₀	59
No Input	No Input	111011	R ₅₉₇ R ₅₉₆ R ₅₉₅ R ₅₉₄ R ₅₉₃ R ₅₉₂ R ₅₉₁ R ₅₉₀	60
No Input	No Input	111100	R ₆₀₇ R ₆₀₆ R ₆₀₅ R ₆₀₄ R ₆₀₃ R ₆₀₂ R ₆₀₁ R ₆₀₀	61

R input (4bit) 12 bit/pixel - mode 4,096 colors	R input (5 bit) 16 bit/pixel - mode 65,536 colors	R input (6 bit) 18 bit/pixel - mode 262,144 colors	R output (8bit) 24 bit/pixel -mode 16,777,216 colors	write_LUT Parameter
No Input	No Input	111101	R ₆₁₇ R ₆₁₆ R ₆₁₅ R ₆₁₄ R ₆₁₃ R ₆₁₂ R ₆₁₁ R ₆₁₀	62
No Input	No Input	111110	R ₆₂₇ R ₆₂₆ R ₆₂₅ R ₆₂₄ R ₆₂₃ R ₆₂₂ R ₆₂₁ R ₆₂₀	63
No Input	No Input	111111	R ₆₃₇ R ₆₃₆ R ₆₃₅ R ₆₃₄ R ₆₃₃ R ₆₃₂ R ₆₃₁ R ₆₃₀	64

1734

1735

Table 18 12-bit, 16-bit and 18-bit Colors to 24-bit Color LUT Green Component Values

G input (4bit) 12 bit/pixel - mode 4,096 colors	G input (6 bit) 16 bit/pixel - mode 65,536 colors	G input (6 bit) 18 bit/pixel - mode 262,144 colors	G output (8bit) 24 bit/pixel -mode 16,777,216 colors	write_LUT Parameter
0000	000000	000000	G ₀₀₇ G ₀₀₆ G ₀₀₅ G ₀₀₄ G ₀₀₃ G ₀₀₂ G ₀₀₁ G ₀₀₀	65
0001	000001	000001	G ₀₁₇ G ₀₁₆ G ₀₁₅ G ₀₁₄ G ₀₁₃ G ₀₁₂ G ₀₁₁ G ₀₁₀	66
0010	000010	000010	G ₀₂₇ G ₀₂₆ G ₀₂₅ G ₀₂₄ G ₀₂₃ G ₀₂₂ G ₀₂₁ G ₀₂₀	67
0011	000011	000011	G ₀₃₇ G ₀₃₆ G ₀₃₅ G ₀₃₄ G ₀₃₃ G ₀₃₂ G ₀₃₁ G ₀₃₀	68
0100	000100	000100	G ₀₄₇ G ₀₄₆ G ₀₄₅ G ₀₄₄ G ₀₄₃ G ₀₄₂ G ₀₄₁ G ₀₄₀	69
0101	000101	000101	G ₀₅₇ G ₀₅₆ G ₀₅₅ G ₀₅₄ G ₀₅₃ G ₀₅₂ G ₀₅₁ G ₀₅₀	70
0110	000110	000110	G ₀₆₇ G ₀₆₆ G ₀₆₅ G ₀₆₄ G ₀₆₃ G ₀₆₂ G ₀₆₁ G ₀₆₀	71
0111	000111	000111	G ₀₇₇ G ₀₇₆ G ₀₇₅ G ₀₇₄ G ₀₇₃ G ₀₇₂ G ₀₇₁ G ₀₇₀	72
1000	001000	001000	G ₀₈₇ G ₀₈₆ G ₀₈₅ G ₀₈₄ G ₀₈₃ G ₀₈₂ G ₀₈₁ G ₀₈₀	73
1001	001001	001001	G ₀₉₇ G ₀₉₆ G ₀₉₅ G ₀₉₄ G ₀₉₃ G ₀₉₂ G ₀₉₁ G ₀₉₀	74
1010	001010	001010	G ₁₀₇ G ₁₀₆ G ₁₀₅ G ₁₀₄ G ₁₀₃ G ₁₀₂ G ₁₀₁ G ₁₀₀	75
1011	001011	001011	G ₁₁₇ G ₁₁₆ G ₁₁₅ G ₁₁₄ G ₁₁₃ G ₁₁₂ G ₁₁₁ G ₁₁₀	76
1100	001100	001100	G ₁₂₇ G ₁₂₆ G ₁₂₅ G ₁₂₄ G ₁₂₃ G ₁₂₂ G ₁₂₁ G ₁₂₀	77
1101	001101	001101	G ₁₃₇ G ₁₃₆ G ₁₃₅ G ₁₃₄ G ₁₃₃ G ₁₃₂ G ₁₃₁ G ₁₃₀	78
1110	001110	001110	G ₁₄₇ G ₁₄₆ G ₁₄₅ G ₁₄₄ G ₁₄₃ G ₁₄₂ G ₁₄₁ G ₁₄₀	79
1111	001111	001111	G ₁₅₇ G ₁₅₆ G ₁₅₅ G ₁₅₄ G ₁₅₃ G ₁₅₂ G ₁₅₁ G ₁₅₀	80
No Input	010000	010000	G ₁₆₇ G ₁₆₆ G ₁₆₅ G ₁₆₄ G ₁₆₃ G ₁₆₂ G ₁₆₁ G ₁₆₀	81
No Input	010001	010001	G ₁₇₇ G ₁₇₆ G ₁₇₅ G ₁₇₄ G ₁₇₃ G ₁₇₂ G ₁₇₁ G ₁₇₀	82
No Input	010010	010010	G ₁₈₇ G ₁₈₆ G ₁₈₅ G ₁₈₄ G ₁₈₃ G ₁₈₂ G ₁₈₁ G ₁₈₀	83
No Input	010011	010011	G ₁₉₇ G ₁₉₆ G ₁₉₅ G ₁₉₄ G ₁₉₃ G ₁₉₂ G ₁₉₁ G ₁₉₀	84
No Input	010100	010100	G ₂₀₇ G ₂₀₆ G ₂₀₅ G ₂₀₄ G ₂₀₃ G ₂₀₂ G ₂₀₁ G ₂₀₀	85
No Input	010101	010101	G ₂₁₇ G ₂₁₆ G ₂₁₅ G ₂₁₄ G ₂₁₃ G ₂₁₂ G ₂₁₁ G ₂₁₀	86
No Input	010110	010110	G ₂₂₇ G ₂₂₆ G ₂₂₅ G ₂₂₄ G ₂₂₃ G ₂₂₂ G ₂₂₁ G ₂₂₀	87
No Input	010111	010111	G ₂₃₇ G ₂₃₆ G ₂₃₅ G ₂₃₄ G ₂₃₃ G ₂₃₂ G ₂₃₁ G ₂₃₀	88
No Input	011000	011000	G ₂₄₇ G ₂₄₆ G ₂₄₅ G ₂₄₄ G ₂₄₃ G ₂₄₂ G ₂₄₁ G ₂₄₀	89
No Input	011001	011001	G ₂₅₇ G ₂₅₆ G ₂₅₅ G ₂₅₄ G ₂₅₃ G ₂₅₂ G ₂₅₁ G ₂₅₀	90
No Input	011010	011010	G ₂₆₇ G ₂₆₆ G ₂₆₅ G ₂₆₄ G ₂₆₃ G ₂₆₂ G ₂₆₁ G ₂₆₀	91
No Input	011011	011011	G ₂₇₇ G ₂₇₆ G ₂₇₅ G ₂₇₄ G ₂₇₃ G ₂₇₂ G ₂₇₁ G ₂₇₀	92
No Input	011100	011100	G ₂₈₇ G ₂₈₆ G ₂₈₅ G ₂₈₄ G ₂₈₃ G ₂₈₂ G ₂₈₁ G ₂₈₀	93
No Input	011101	011101	G ₂₉₇ G ₂₉₆ G ₂₉₅ G ₂₉₄ G ₂₉₃ G ₂₉₂ G ₂₉₁ G ₂₉₀	94
No Input	011110	011110	G ₃₀₇ G ₃₀₆ G ₃₀₅ G ₃₀₄ G ₃₀₃ G ₃₀₂ G ₃₀₁ G ₃₀₀	95

G input (4bit) 12 bit/pixel - mode 4,096 colors	G input (6 bit) 16 bit/pixel - mode 65,536 colors	G input (6 bit) 18 bit/pixel - mode 262,144 colors	G output (8bit) 24 bit/pixel -mode 16,777,216 colors	write_LUT Parameter
No Input	011111	011111	G ₃₁₇ G ₃₁₆ G ₃₁₅ G ₃₁₄ G ₃₁₃ G ₃₁₂ G ₃₁₁ G ₃₁₀	96
No Input	100000	100000	G ₃₂₇ G ₃₂₆ G ₃₂₅ G ₃₂₄ G ₃₂₃ G ₃₂₂ G ₃₂₁ G ₃₂₀	97
No Input	100001	100001	G ₃₃₇ G ₃₃₆ G ₃₃₅ G ₃₃₄ G ₃₃₃ G ₃₃₂ G ₃₃₁ G ₃₃₀	98
No Input	100010	100010	G ₃₄₇ G ₃₄₆ G ₃₄₅ G ₃₄₄ G ₃₄₃ G ₃₄₂ G ₃₄₁ G ₃₄₀	99
No Input	100011	100011	G ₃₅₇ G ₃₅₆ G ₃₅₅ G ₃₅₄ G ₃₅₃ G ₃₅₂ G ₃₅₁ G ₃₅₀	100
No Input	100100	100100	G ₃₆₇ G ₃₆₆ G ₃₆₅ G ₃₆₄ G ₃₆₃ G ₃₆₂ G ₃₆₁ G ₃₆₀	101
No Input	100101	100101	G ₃₇₇ G ₃₇₆ G ₃₇₅ G ₃₇₄ G ₃₇₃ G ₃₇₂ G ₃₇₁ G ₃₇₀	102
No Input	100110	100110	G ₃₈₇ G ₃₈₆ G ₃₈₅ G ₃₈₄ G ₃₈₃ G ₃₈₂ G ₃₈₁ G ₃₈₀	103
No Input	100111	100111	G ₃₉₇ G ₃₉₆ G ₃₉₅ G ₃₉₄ G ₃₉₃ G ₃₉₂ G ₃₉₁ G ₃₉₀	104
No Input	101000	101000	G ₄₀₇ G ₄₀₆ G ₄₀₅ G ₄₀₄ G ₄₀₃ G ₄₀₂ G ₄₀₁ G ₄₀₀	105
No Input	101001	101001	G ₄₁₇ G ₄₁₆ G ₄₁₅ G ₄₁₄ G ₄₁₃ G ₄₁₂ G ₄₁₁ G ₄₁₀	106
No Input	101010	101010	G ₄₂₇ G ₄₂₆ G ₄₂₅ G ₄₂₄ G ₄₂₃ G ₄₂₂ G ₄₂₁ G ₄₂₀	107
No Input	101011	101011	G ₄₃₇ G ₄₃₆ G ₄₃₅ G ₄₃₄ G ₄₃₃ G ₄₃₂ G ₄₃₁ G ₄₃₀	108
No Input	101100	101100	G ₄₄₇ G ₄₄₆ G ₄₄₅ G ₄₄₄ G ₄₄₃ G ₄₄₂ G ₄₄₁ G ₄₄₀	109
No Input	101101	101101	G ₄₅₇ G ₄₅₆ G ₄₅₅ G ₄₅₄ G ₄₅₃ G ₄₅₂ G ₄₅₁ G ₄₅₀	110
No Input	101110	101110	G ₄₆₇ G ₄₆₆ G ₄₆₅ G ₄₆₄ G ₄₆₃ G ₄₆₂ G ₄₆₁ G ₄₆₀	111
No Input	101111	101111	G ₄₇₇ G ₄₇₆ G ₄₇₅ G ₄₇₄ G ₄₇₃ G ₄₇₂ G ₄₇₁ G ₄₇₀	112
No Input	110000	110000	G ₄₈₇ G ₄₈₆ G ₄₈₅ G ₄₈₄ G ₄₈₃ G ₄₈₂ G ₄₈₁ G ₄₈₀	113
No Input	110001	110001	G ₄₉₇ G ₄₉₆ G ₄₉₅ G ₄₉₄ G ₄₉₃ G ₄₉₂ G ₄₉₁ G ₄₉₀	114
No Input	110010	110010	G ₅₀₇ G ₅₀₆ G ₅₀₅ G ₅₀₄ G ₅₀₃ G ₅₀₂ G ₅₀₁ G ₅₀₀	115
No Input	110011	110011	G ₅₁₇ G ₅₁₆ G ₅₁₅ G ₅₁₄ G ₅₁₃ G ₅₁₂ G ₅₁₁ G ₅₁₀	116
No Input	110100	110100	G ₅₂₇ G ₅₂₆ G ₅₂₅ G ₅₂₄ G ₅₂₃ G ₅₂₂ G ₅₂₁ G ₅₂₀	117
No Input	110101	110101	G ₅₃₇ G ₅₃₆ G ₅₃₅ G ₅₃₄ G ₅₃₃ G ₅₃₂ G ₅₃₁ G ₅₃₀	118
No Input	110110	110110	G ₅₄₇ G ₅₄₆ G ₅₄₅ G ₅₄₄ G ₅₄₃ G ₅₄₂ G ₅₄₁ G ₅₄₀	119
No Input	110111	110111	G ₅₅₇ G ₅₅₆ G ₅₅₅ G ₅₅₄ G ₅₅₃ G ₅₅₂ G ₅₅₁ G ₅₅₀	120
No Input	111000	111000	G ₅₆₇ G ₅₆₆ G ₅₆₅ G ₅₆₄ G ₅₆₃ G ₅₆₂ G ₅₆₁ G ₅₆₀	121
No Input	111001	111001	G ₅₇₇ G ₅₇₆ G ₅₇₅ G ₅₇₄ G ₅₇₃ G ₅₇₂ G ₅₇₁ G ₅₇₀	122
No Input	111010	111010	G ₅₈₇ G ₅₈₆ G ₅₈₅ G ₅₈₄ G ₅₈₃ G ₅₈₂ G ₅₈₁ G ₅₈₀	123
No Input	111011	111011	G ₅₉₇ G ₅₉₆ G ₅₉₅ G ₅₉₄ G ₅₉₃ G ₅₉₂ G ₅₉₁ G ₅₉₀	124
No Input	111100	111100	G ₆₀₇ G ₆₀₆ G ₆₀₅ G ₆₀₄ G ₆₀₃ G ₆₀₂ G ₆₀₁ G ₆₀₀	125
No Input	111101	111101	G ₆₁₇ G ₆₁₆ G ₆₁₅ G ₆₁₄ G ₆₁₃ G ₆₁₂ G ₆₁₁ G ₆₁₀	126
No Input	111110	111110	G ₆₂₇ G ₆₂₆ G ₆₂₅ G ₆₂₄ G ₆₂₃ G ₆₂₂ G ₆₂₁ G ₆₂₀	127

G input (4bit) 12 bit/pixel - mode 4,096 colors	G input (6 bit) 16 bit/pixel - mode 65,536 colors	G input (6 bit) 18 bit/pixel - mode 262,144 colors	G output (8bit) 24 bit/pixel -mode 16,777,216 colors	write_LUT Parameter
No Input	111111	111111	G ₆₃₇ G ₆₃₆ G ₆₃₅ G ₆₃₄ G ₆₃₃ G ₆₃₂ G ₆₃₁ G ₆₃₀	128

1736

1737

Table 19 12-bit, 16-bit and 18-bit Colors to 24-bit Color LUT Blue Component Values

B input (4bit) 12 bit/pixel - mode 4,096 colors	B input (5 bit) 16 bit/pixel - mode 65,536 colors	B input (6 bit) 18 bit/pixel - mode 262,144 colors	B output (8bit) 24 bit/pixel -mode 16,777,216 colors	write_LUT Parameter
0000	00000	000000	B ₀₀₇ B ₀₀₆ B ₀₀₅ B ₀₀₄ B ₀₀₃ B ₀₀₂ B ₀₀₁ B ₀₀₀	129
0001	00001	000001	B ₀₁₇ B ₀₁₆ B ₀₁₅ B ₀₁₄ B ₀₁₃ B ₀₁₂ B ₀₁₁ B ₀₁₀	130
0010	00010	000010	B ₀₂₇ B ₀₂₆ B ₀₂₅ B ₀₂₄ B ₀₂₃ B ₀₂₂ B ₀₂₁ B ₀₂₀	131
0011	00011	000011	B ₀₃₇ B ₀₃₆ B ₀₃₅ B ₀₃₄ B ₀₃₃ B ₀₃₂ B ₀₃₁ B ₀₃₀	132
0100	00100	000100	B ₀₄₇ B ₀₄₆ B ₀₄₅ B ₀₄₄ B ₀₄₃ B ₀₄₂ B ₀₄₁ B ₀₄₀	133
0101	00101	000101	B ₀₅₇ B ₀₅₆ B ₀₅₅ B ₀₅₄ B ₀₅₃ B ₀₅₂ B ₀₅₁ B ₀₅₀	134
0110	00110	000110	B ₀₆₇ B ₀₆₆ B ₀₆₅ B ₀₆₄ B ₀₆₃ B ₀₆₂ B ₀₆₁ B ₀₆₀	135
0111	00111	000111	B ₀₇₇ B ₀₇₆ B ₀₇₅ B ₀₇₄ B ₀₇₃ B ₀₇₂ B ₀₇₁ B ₀₇₀	136
1000	01000	001000	B ₀₈₇ B ₀₈₆ B ₀₈₅ B ₀₈₄ B ₀₈₃ B ₀₈₂ B ₀₈₁ B ₀₈₀	137
1001	01001	001001	B ₀₉₇ B ₀₉₆ B ₀₉₅ B ₀₉₄ B ₀₉₃ B ₀₉₂ B ₀₉₁ B ₀₉₀	138
1010	01010	001010	B ₁₀₇ B ₁₀₆ B ₁₀₅ B ₁₀₄ B ₁₀₃ B ₁₀₂ B ₁₀₁ B ₁₀₀	139
1011	01011	001011	B ₁₁₇ B ₁₁₆ B ₁₁₅ B ₁₁₄ B ₁₁₃ B ₁₁₂ B ₁₁₁ B ₁₁₀	140
1100	01100	001100	B ₁₂₇ B ₁₂₆ B ₁₂₅ B ₁₂₄ B ₁₂₃ B ₁₂₂ B ₁₂₁ B ₁₂₀	141
1101	01101	001101	B ₁₃₇ B ₁₃₆ B ₁₃₅ B ₁₃₄ B ₁₃₃ B ₁₃₂ B ₁₃₁ B ₁₃₀	142
1110	01110	001110	B ₁₄₇ B ₁₄₆ B ₁₄₅ B ₁₄₄ B ₁₄₃ B ₁₄₂ B ₁₄₁ B ₁₄₀	143
1111	01111	001111	B ₁₅₇ B ₁₅₆ B ₁₅₅ B ₁₅₄ B ₁₅₃ B ₁₅₂ B ₁₅₁ B ₁₅₀	144
No Input	10000	010000	B ₁₆₇ B ₁₆₆ B ₁₆₅ B ₁₆₄ B ₁₆₃ B ₁₆₂ B ₁₆₁ B ₁₆₀	145
No Input	10001	010001	B ₁₇₇ B ₁₇₆ B ₁₇₅ B ₁₇₄ B ₁₇₃ B ₁₇₂ B ₁₇₁ B ₁₇₀	146
No Input	10010	010010	B ₁₈₇ B ₁₈₆ B ₁₈₅ B ₁₈₄ B ₁₈₃ B ₁₈₂ B ₁₈₁ B ₁₈₀	147
No Input	10011	010011	B ₁₉₇ B ₁₉₆ B ₁₉₅ B ₁₉₄ B ₁₉₃ B ₁₉₂ B ₁₉₁ B ₁₉₀	148
No Input	10100	010100	B ₂₀₇ B ₂₀₆ B ₂₀₅ B ₂₀₄ B ₂₀₃ B ₂₀₂ B ₂₀₁ B ₂₀₀	149
No Input	10101	010101	B ₂₁₇ B ₂₁₆ B ₂₁₅ B ₂₁₄ B ₂₁₃ B ₂₁₂ B ₂₁₁ B ₂₁₀	150
No Input	10110	010110	B ₂₂₇ B ₂₂₆ B ₂₂₅ B ₂₂₄ B ₂₂₃ B ₂₂₂ B ₂₂₁ B ₂₂₀	151
No Input	10111	010111	B ₂₃₇ B ₂₃₆ B ₂₃₅ B ₂₃₄ B ₂₃₃ B ₂₃₂ B ₂₃₁ B ₂₃₀	152
No Input	11000	011000	B ₂₄₇ B ₂₄₆ B ₂₄₅ B ₂₄₄ B ₂₄₃ B ₂₄₂ B ₂₄₁ B ₂₄₀	153
No Input	11001	011001	B ₂₅₇ B ₂₅₆ B ₂₅₅ B ₂₅₄ B ₂₅₃ B ₂₅₂ B ₂₅₁ B ₂₅₀	154
No Input	11010	011010	B ₂₆₇ B ₂₆₆ B ₂₆₅ B ₂₆₄ B ₂₆₃ B ₂₆₂ B ₂₆₁ B ₂₆₀	155
No Input	11011	011011	B ₂₇₇ B ₂₇₆ B ₂₇₅ B ₂₇₄ B ₂₇₃ B ₂₇₂ B ₂₇₁ B ₂₇₀	156
No Input	11100	011100	B ₂₈₇ B ₂₈₆ B ₂₈₅ B ₂₈₄ B ₂₈₃ B ₂₈₂ B ₂₈₁ B ₂₈₀	157
No Input	11101	011101	B ₂₉₇ B ₂₉₆ B ₂₉₅ B ₂₉₄ B ₂₉₃ B ₂₉₂ B ₂₉₁ B ₂₉₀	158
No Input	11110	011110	B ₃₀₇ B ₃₀₆ B ₃₀₅ B ₃₀₄ B ₃₀₃ B ₃₀₂ B ₃₀₁ B ₃₀₀	159

B input (4bit) 12 bit/pixel - mode 4,096 colors	B input (5 bit) 16 bit/pixel - mode 65,536 colors	B input (6 bit) 18 bit/pixel - mode 262,144 colors	B output (8bit) 24 bit/pixel -mode 16,777,216 colors	write_LUT Parameter
No Input	11111	011111	B ₃₁₇ B ₃₁₆ B ₃₁₅ B ₃₁₄ B ₃₁₃ B ₃₁₂ B ₃₁₁ B ₃₁₀	160
No Input	No Input	100000	B ₃₂₇ B ₃₂₆ B ₃₂₅ B ₃₂₄ B ₃₂₃ B ₃₂₂ B ₃₂₁ B ₃₂₀	161
No Input	No Input	100001	B ₃₃₇ B ₃₃₆ B ₃₃₅ B ₃₃₄ B ₃₃₃ B ₃₃₂ B ₃₃₁ B ₃₃₀	162
No Input	No Input	100010	B ₃₄₇ B ₃₄₆ B ₃₄₅ B ₃₄₄ B ₃₄₃ B ₃₄₂ B ₃₄₁ B ₃₄₀	163
No Input	No Input	100011	B ₃₅₇ B ₃₅₆ B ₃₅₅ B ₃₅₄ B ₃₅₃ B ₃₅₂ B ₃₅₁ B ₃₅₀	164
No Input	No Input	100100	B ₃₆₇ B ₃₆₆ B ₃₆₅ B ₃₆₄ B ₃₆₃ B ₃₆₂ B ₃₆₁ B ₃₆₀	165
No Input	No Input	100101	B ₃₇₇ B ₃₇₆ B ₃₇₅ B ₃₇₄ B ₃₇₃ B ₃₇₂ B ₃₇₁ B ₃₇₀	166
No Input	No Input	100110	B ₃₈₇ B ₃₈₆ B ₃₈₅ B ₃₈₄ B ₃₈₃ B ₃₈₂ B ₃₈₁ B ₃₈₀	167
No Input	No Input	100111	B ₃₉₇ B ₃₉₆ B ₃₉₅ B ₃₉₄ B ₃₉₃ B ₃₉₂ B ₃₉₁ B ₃₉₀	168
No Input	No Input	101000	B ₄₀₇ B ₄₀₆ B ₄₀₅ B ₄₀₄ B ₄₀₃ B ₄₀₂ B ₄₀₁ B ₄₀₀	169
No Input	No Input	101001	B ₄₁₇ B ₄₁₆ B ₄₁₅ B ₄₁₄ B ₄₁₃ B ₄₁₂ B ₄₁₁ B ₄₁₀	170
No Input	No Input	101010	B ₄₂₇ B ₄₂₆ B ₄₂₅ B ₄₂₄ B ₄₂₃ B ₄₂₂ B ₄₂₁ B ₄₂₀	171
No Input	No Input	101011	B ₄₃₇ B ₄₃₆ B ₄₃₅ B ₄₃₄ B ₄₃₃ B ₄₃₂ B ₄₃₁ B ₄₃₀	172
No Input	No Input	101100	B ₄₄₇ B ₄₄₆ B ₄₄₅ B ₄₄₄ B ₄₄₃ B ₄₄₂ B ₄₄₁ B ₄₄₀	173
No Input	No Input	101101	B ₄₅₇ B ₄₅₆ B ₄₅₅ B ₄₅₄ B ₄₅₃ B ₄₅₂ B ₄₅₁ B ₄₅₀	174
No Input	No Input	101110	B ₄₆₇ B ₄₆₆ B ₄₆₅ B ₄₆₄ B ₄₆₃ B ₄₆₂ B ₄₆₁ B ₄₆₀	175
No Input	No Input	101111	B ₄₇₇ B ₄₇₆ B ₄₇₅ B ₄₇₄ B ₄₇₃ B ₄₇₂ B ₄₇₁ B ₄₇₀	176
No Input	No Input	110000	B ₄₈₇ B ₄₈₆ B ₄₈₅ B ₄₈₄ B ₄₈₃ B ₄₈₂ B ₄₈₁ B ₄₈₀	177
No Input	No Input	110001	B ₄₉₇ B ₄₉₆ B ₄₉₅ B ₄₉₄ B ₄₉₃ B ₄₉₂ B ₄₉₁ B ₄₉₀	178
No Input	No Input	110010	B ₅₀₇ B ₅₀₆ B ₅₀₅ B ₅₀₄ B ₅₀₃ B ₅₀₂ B ₅₀₁ B ₅₀₀	179
No Input	No Input	110011	B ₅₁₇ B ₅₁₆ B ₅₁₅ B ₅₁₄ B ₅₁₃ B ₅₁₂ B ₅₁₁ B ₅₁₀	180
No Input	No Input	110100	B ₅₂₇ B ₅₂₆ B ₅₂₅ B ₅₂₄ B ₅₂₃ B ₅₂₂ B ₅₂₁ B ₅₂₀	181
No Input	No Input	110101	B ₅₃₇ B ₅₃₆ B ₅₃₅ B ₅₃₄ B ₅₃₃ B ₅₃₂ B ₅₃₁ B ₅₃₀	182
No Input	No Input	110110	B ₅₄₇ B ₅₄₆ B ₅₄₅ B ₅₄₄ B ₅₄₃ B ₅₄₂ B ₅₄₁ B ₅₄₀	183
No Input	No Input	110111	B ₅₅₇ B ₅₅₆ B ₅₅₅ B ₅₅₄ B ₅₅₃ B ₅₅₂ B ₅₅₁ B ₅₅₀	184
No Input	No Input	111000	B ₅₆₇ B ₅₆₆ B ₅₆₅ B ₅₆₄ B ₅₆₃ B ₅₆₂ B ₅₆₁ B ₅₆₀	185
No Input	No Input	111001	B ₅₇₇ B ₅₇₆ B ₅₇₅ B ₅₇₄ B ₅₇₃ B ₅₇₂ B ₅₇₁ B ₅₇₀	186
No Input	No Input	111010	B ₅₈₇ B ₅₈₆ B ₅₈₅ B ₅₈₄ B ₅₈₃ B ₅₈₂ B ₅₈₁ B ₅₈₀	187
No Input	No Input	111011	B ₅₉₇ B ₅₉₆ B ₅₉₅ B ₅₉₄ B ₅₉₃ B ₅₉₂ B ₅₉₁ B ₅₉₀	188
No Input	No Input	111100	B ₆₀₇ B ₆₀₆ B ₆₀₅ B ₆₀₄ B ₆₀₃ B ₆₀₂ B ₆₀₁ B ₆₀₀	189
No Input	No Input	111101	B ₆₁₇ B ₆₁₆ B ₆₁₅ B ₆₁₄ B ₆₁₃ B ₆₁₂ B ₆₁₁ B ₆₁₀	190
No Input	No Input	111110	B ₆₂₇ B ₆₂₆ B ₆₂₅ B ₆₂₄ B ₆₂₃ B ₆₂₂ B ₆₂₁ B ₆₂₀	191

B input (4bit) 12 bit/pixel - mode 4,096 colors	B input (5 bit) 16 bit/pixel - mode 65,536 colors	B input (6 bit) 18 bit/pixel - mode 262,144 colors	B output (8bit) 24 bit/pixel -mode 16,777,216 colors	write_LUT Parameter
No Input	No Input	111111	B ₆₃₇ B ₆₃₆ B ₆₃₅ B ₆₃₄ B ₆₃₃ B ₆₃₂ B ₆₃₁ B ₆₃₀	192

1738