SPECIFICATION
FOR
APPROVAL

( ) **Preliminary Specification**
(◆) **Final Specification**

Title	8.0” UXGA TFT LCD

Customer	HP
MODEL	Fig

SUPPLIER	LG Display Co., Ltd.
*MODEL	LD080UX1
Suffix	SMA2

*When you obtain standard approval,
please use the above model name without suffix

APPROVED BY	SIGNATURE
/	
/	
/	

Please return 1 copy for your confirmation with your signature and comments.

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Products Engineering Dept.
LG Display Co., Ltd

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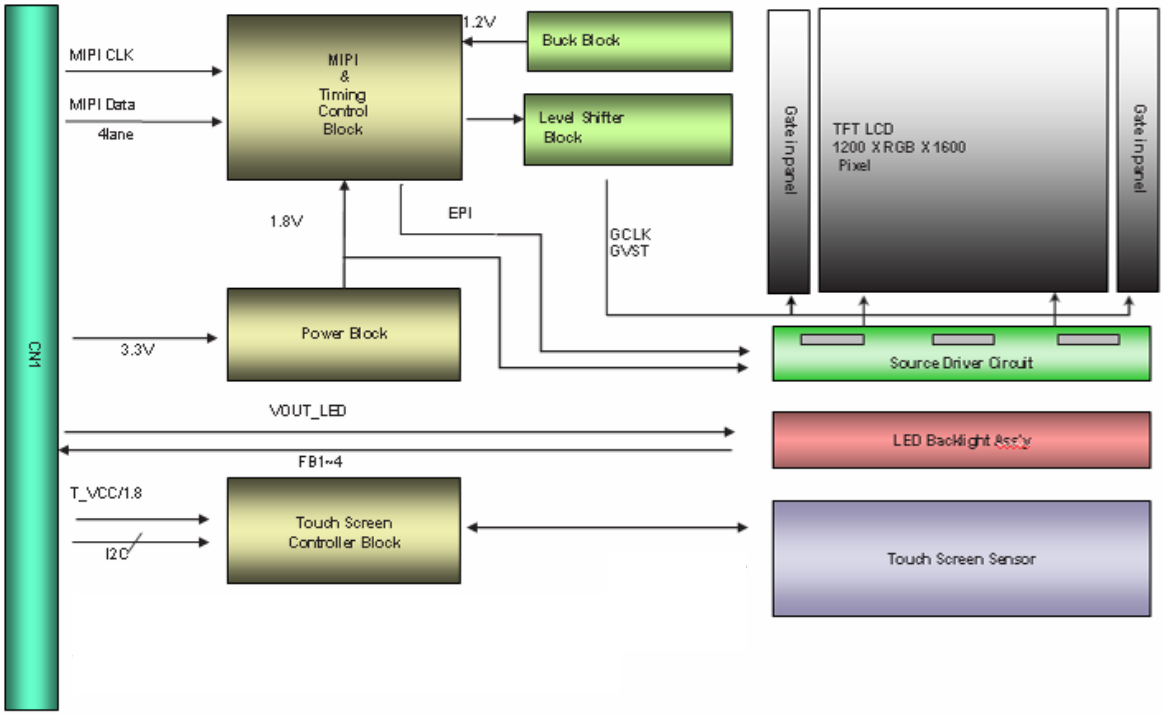
RECORD OF REVISIONS

Revision No	Revision Date	Page	Description
0.0	Jun. 19. 2013	All	First Draft (Preliminary Specification)
0.1	Aug. 22. 2013	5, 26	Modification of LCM Outline Dimension (H : 127.2 → 127.3)
		5, 7,8	Modification of LED Current : 19mA → 20mA
		5,7,20	Modification of Power Consumption Logic : 0.85W → 0.75W B/L : 1.32W → 1.38W Touch : 0.5W → 0.2W
		17	Addition of Timing Table (min. max)
		22	Modification of Color coordinate Modification of Response time (max.) : 40ms → 30ms
		23	Addition of Gray Scale Specification
		27, 28	Modification of 2D Drawing
		31~33	Modification of of Packing Form, Packing, Pallet Assembly
1.0	Oct. 24.2013	5,20,21	Modification of Touch Sensor Pitch Modification of Touch Resolution Modification of Touch Power Sequence
		22	Modification of Response Time : max. 30ms → 35ms
		27, 28	Modification of 2D Drawing
		36~38	Modification of EDID (v0.0 → v1.0) (Product Cord, Color Coordination, BL Power)
1.1	Nov. 19. 2013	36~38	Back to EDID v1.0 → v0.0, requested by Customer

1. General Description

The LD080UX1 is a Color Active Matrix Liquid Crystal Display with an integral LED backlight system and Touch Screen Panel. The matrix employs a-Si Thin Film Transistor as the active element. It is a transmissive type display operating in the normally black mode. This TFT-LCD has 8.0 inches diagonally measured active display area with UXGA resolution (1200 horizontal by 1600 vertical pixel array). Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the brightness of the sub-pixel color is determined with a 8-bit gray scale signal for each dot, thus, presenting a palette of more than 16,777,216 colors. The LD080UX1 has been designed to apply the interface method that enables low power, high speed, low EMI. The LD080UX1 is intended to support applications where thin thickness, low power are critical factors and graphic displays are important. In combination with the vertical arrangement of the sub-pixels, the LD080UX1 characteristics provide an excellent flat display.

LD080UX1 is the 'Total solution' model. It means it includes LCM & TSP
(TSP is assembled by 'Direct Bonding' method)



General Features

LCM

Active Screen Size	8.0 inches diagonal	
Outline Dimension	LCM	127.2±0.3 (H) × 173.85±0.3 (V) × 2.35 mm (D, max. w/o PCB)
Pixel Pitch	0.10134 mm × 0.10134 mm	
Pixel Format	1600 vert. by 1200 horiz. Pixels RGB stripe arrangement	
Color Depth	8-bit 16,777,216colors	
Luminance, White	360cd/m2(w/TSP Typ., @ILED=20mA)	
Power Consumption	Logic	0.75W (typ.@Mosaic)
	B/L	1.38W (typ.@ ILED= 20mA)
Weight	LCM	115.0g (Max.)
Display Operating Mode	Transmissive mode, normally Black	
Surface Treatment	Clear treatment of the front polarizer	

TSP

Active Screen Size	8.0 inches diagonal	
Cover Glass Outline Dimension	137.75(H) × 216.25(V) × 0.5(D) mm (typ.)	
Sensor Film Outline Dimension	137.0(H) × 174.14(V) X 0.2(D) mm (typ.)	
Sensor Active area	121.608(H) × 162.642(V) mm	
Cover View Area	122.61(H) × 163.14(V) mm (typ.)	
Sensor Chanel Pitch	4.18mm (Rx) x 4.16mm (Tx), Bar	
Number of Sensor Chanel	30ea(H, Tx) x 40ea(V, Rx)	
Power Consumption	0.2W(Typ.)	
Weight	56.0g (max. w/ OCR)	
Surface Treatment	AF Coating(8H)	
Substrate	Type	Projected Capacitive Add-on Touch Sensor Film, GF2
	Input Method	Single / Multi Finger
Cover Glass	Gorilla3 0.5t (Corning)	

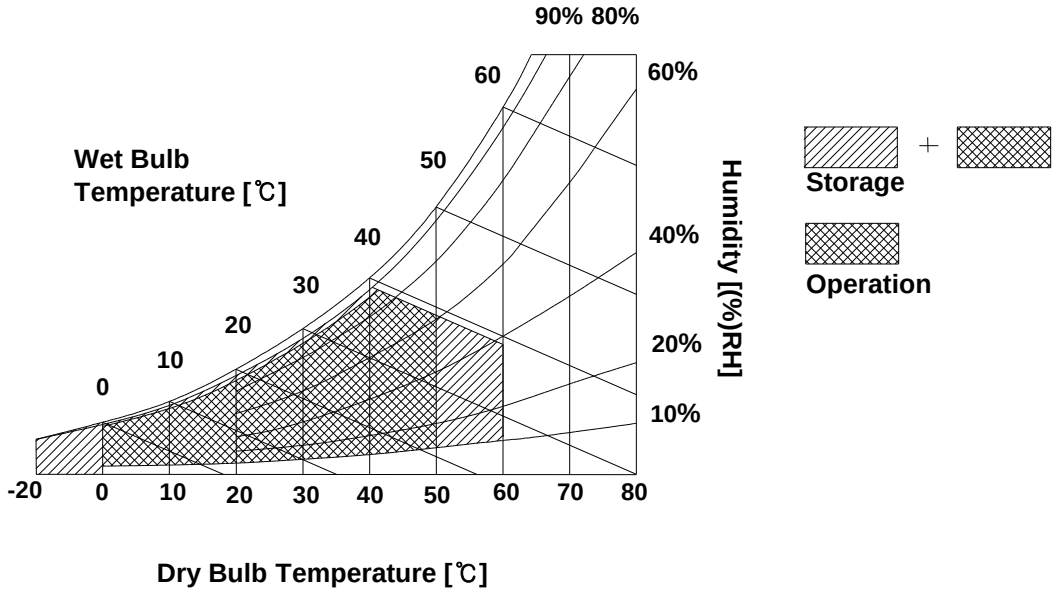
2. Absolute Maximum Ratings

The following are maximum values which, if exceeded, may cause faulty operation or damage to the unit.

Table 1. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Values		Units	Notes
		Min	Max		
Power Input Voltage	VCC	-0.3	4.0	Vdc	at 25 ± 5°C
Operating Temperature	TOP	0	50	°C	1
Storage Temperature	HST	-20	60	°C	1
Operating Ambient Humidity	HOP	10	90	%RH	1
Storage Humidity	HST	10	90	%RH	1

Note : 1. Temperature and relative humidity range are shown in the figure below.
Wet bulb temperature should be 39°C Max, and no condensation of water.



3. Electrical Specifications

3-1. Electrical Characteristics

The LD080UX1 requires two power inputs. One is employed to power the LCD electronics and to drive the TFT array and liquid crystal.

Table 2. ELECTRICAL CHARACTERISTICS

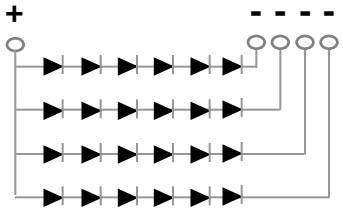
Parameter	Symbol		Values			Unit	Notes
			Min	Typ	Max		
LOGIC :							
Power Supply Input Voltage	VCC		3.0	3.3	3.6	V_{DC}	1
Power Supply Input Current	I_{CC}			227	261	mA	
Power Consumption	Pc	Black	-	0.75	0.87	Watt	
		White		0.75	0.87	Watt	
		Mosaic		0.75	0.87	Watt	2
Power Supply Inrush Current	I_{CC_P}		-	-	2000	mA	3
Differential Impedance	Zm		90	100	110	Ohm	4
EDID Input Voltage	V_{EDID}		1.7	1.8	3.6	V	
EDID Input Current	I_{EDID}				10	mA	

Table 3. Backlight Unit

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
LED forward Current	I_f	-	20		mA	Ta=25℃ (per chain)
LED forward Voltage	V_f	-	17.1	17.4	V	Ta=25℃ (@ Typ. Current, per chain)
Power Consumption	P_{BL}	-	1.38	1.40	Watt	Ta=25℃ (@ Typ. Current, per chain)

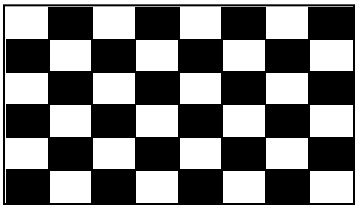
[Note 1] The permissible forward current of LED vary with environmental temperature.

[LED Array Structure]

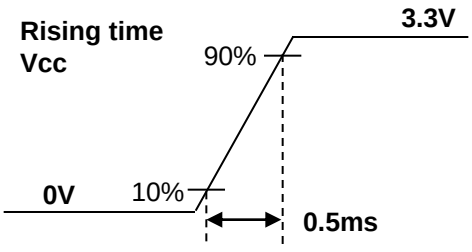


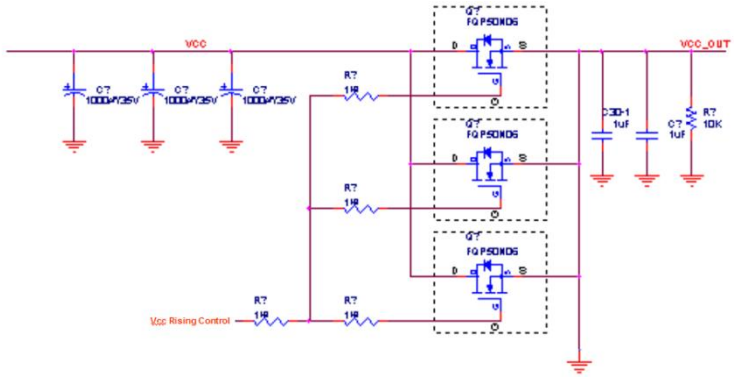
Note)

1. The measuring position is the connector of LCM and the test conditions are under 25℃, fv = 60Hz, White pattern.
2. The specified Icc current and power consumption are under the Vcc = 3.3V , 25℃, fv = 60Hz condition whereas Mosaic pattern is displayed and fv is the frame frequency.



3. The below figures are the measuring Vcc condition and the Vcc control block LGD used. The Vcc condition is same the minimum of T1 at Power on sequence.





4. This impedance value is needed to proper display and measured form LVDS Tx to the mating connector.
5. The typical operating current is for the typical surface luminance (LWH) in optical characteristics. ILED is the current of each LEDs' string, LED backlight has strings on it.
6. The LED power consumption shown above does not include power of external LED driver circuit for typical current condition.
7. The life time is determined as the time at which the typical brightness of LCD is 50% compare to that of minimum value at the typical LED current. These LED backlight has 4 strings on it and the typical current of LED's string is base on 20mA.

3-2. Interface Connections

This LCD employs two interface connections, a 45 pin connector used for the module electronics interface and the other connector used for the integral backlight system.

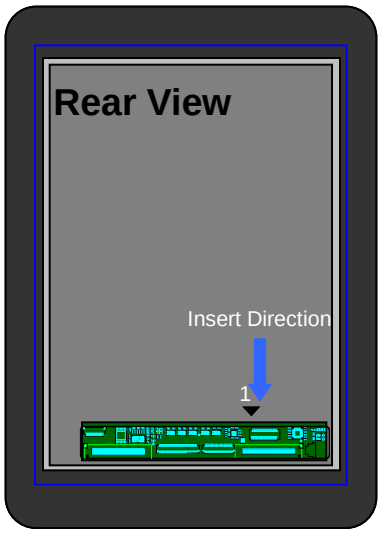
Pin	Symbol	Description
1	GND	Ground
2	BIST	NC-Reserved LCD Self Test Enable
3	VCC	LCD Logic Power Supply (3.3V)
4	VCC	LCD Logic Power Supply (3.3V)
5	VCC	LCD Logic Power Supply (3.3V)
6	GND	High Speed Ground
7	MIPI_0N	MIPI data negative signal
8	MIPI_0P	MIPI data positive signal
9	GND	High Speed Ground
10	MIPI_1N	MIPI data negative signal
11	MIPI_1P	MIPI data positive signal
12	GND	High Speed Ground
13	MIPI_2N	MIPI data negative signal
14	MIPI_2P	MIPI data positive signal
15	GND	High Speed Ground
16	MIPI_3N	MIPI data negative signal
17	MIPI_3P	MIPI data positive signal
18	GND	High Speed Ground
19	MIPI_CLKN	MIPI CLK negative signal
20	MIPI_CLKP	MIPI CLK positive signal
21	GND	High Speed Ground
22	CLK_EDID	EDID I2C CLK
23	DATA_EDID	EDID I2C DATA
24	V_EDID	EDID VCC(1.8V)
25	FB4	LED Cathode
26	FB3	LED Cathode
27	FB2	LED Cathode
28	FB1	LED Cathode
29	NC	No Connection
30	LED_Vout	LED Anode
31	LED_Vout	LED Anode
32	NC	No Connection
33	GND	Ground
34	GND	Ground
35	NC	No Connection
36	NC	No Connection
37	VDD_KEY	Home Key VDD
38	I2C_MODE	I2C Mode
39	CHG	Touch change line
40	T_SDA	Touch I2C Data
41	T_SCL	Touch I2C Clock
42	T_GPIO_0	Touch GPIO_0
43	T_RESET	Touch_Reset
44	T_VDDIO	Touch VDDIO (1.8V)
45	T_VDD	Touch VDD (3.3V)

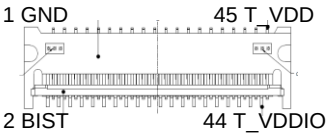
Notes

[Connector]

FH35C-45S-0.3SHW(HIROSE)

[Connector pin arrangement]





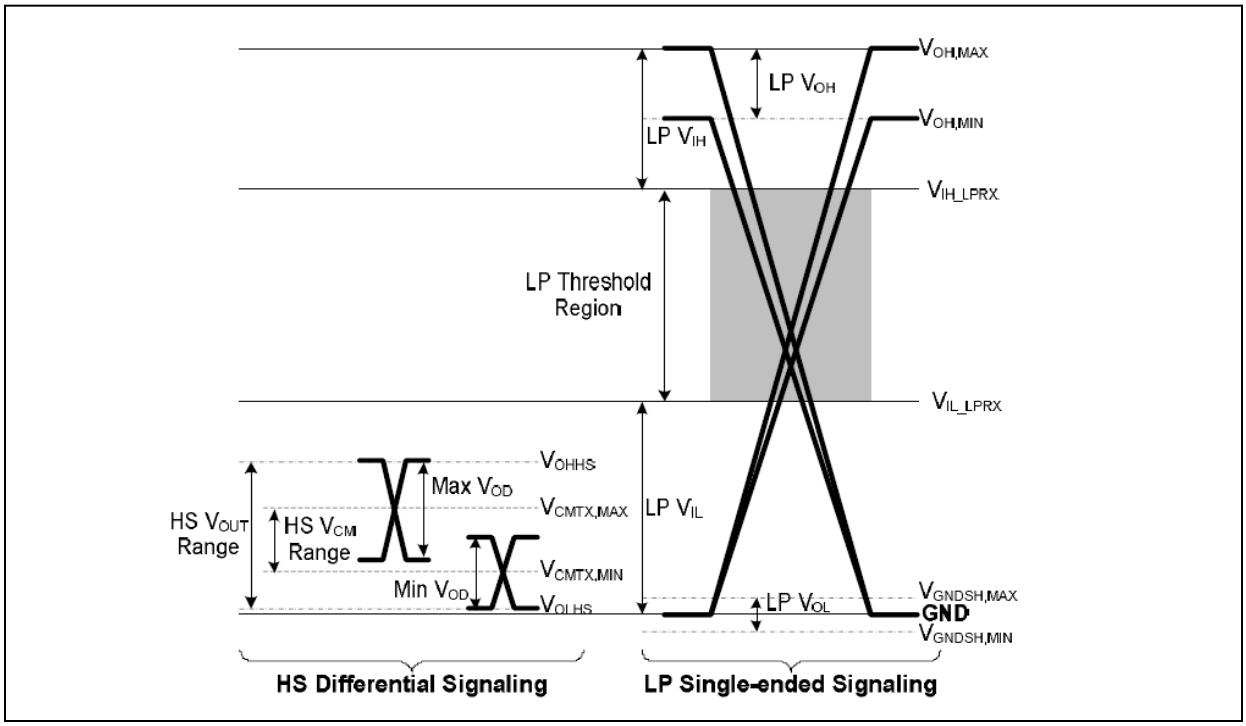
3-3. MIPI Signal Timing Specifications

This is the signal timing required at the input of the User connector. All of the interface signal timing should be satisfied with the following specifications and specifications of MIPI Tx/Rx for its proper operation

3-3-1. MIPI Receiver (T-con) Differential Input (DC Characteristics)

Description	Symbol	Min	Typ	Max	Unit	Notes
Logic 1 input voltage (LP Rx mode)	V_{IH_LPRX}	880	-	VDD	mV	
Logic 0 input voltage (LP Rx mode, Not in ULPS)	V_{IL_LPRX}	0.0	-	550	mV	
Logic 0 input voltage (LP Rx mode, ULPS)	V_{IL_ULPS}	0.0	-	300	mV	
Logic 1 contention threshold for LP-CD	V_{IHCD}	450		VDD	mV	
Logic 0 contention threshold for LP-CD	V_{ILCD}	0.0		200	mV	
Logic 1 Output voltage (LP Tx mode)	V_{OH_LPTX}	1.1	1.2	1.3	V	
Logic 0 Output low level (LP Tx mode)	V_{OL_LPTX}	-50	-	50	mV	
Common-mode voltage (HS Rx mode) (Note1,2)	$V_{CMRX(DC)}$	70	-	330	mV	1, 2
Differential input high threshold (HS Rx mode)	V_{IDTH}	-	-	70	mV	
Differential input low threshold (HS Rx mode)	V_{IDTL}	-70	-	-	mV	
Single-ended input high voltage for HS Rx (Note1)	V_{IHHS}	-	-	460	mV	1
Single-ended input low voltage for HS Rx (Note2)	V_{ILHS}	-40	-	-	mV	1
Differential input impedance	Z_{ID}	80	100	125	Ω	

Note : 1. Excluding possible additional RF interference of 100mV peak sine wave beyond 450MHz.
2. This table value includes a ground difference of 50mV between the transmitter and the receiver, the static common-mode level tolerance and variations below 450MHz.



3-3-2. MIPI Alliance specification for D-PHY (Version 1.1 – 7 November 2011)

3-3-2-1. HS Receiver AC Characteristics

Parameter	Symbol	Specification			unit
		Min	Typ	Max	
Common-mode interference beyond 450 MHz (Note 2)	$DV_{CMRX(HF)}$			100	mV
Common-mode interference beyond 50-450 MHz (Note 1,4)	$DV_{CMRX(LF)}$	-50		50	mV
Common-mode termination (Note 3)	C_{CM}			60	pF

Note 1: Excluding 'static' ground shift of 50mV

Note 2: $DV_{CMRX(HF)}$ is the peak amplitude of a sine wave superimposed on the receiver inputs.

Note 3: For higher bit rates a 14pF capacitor will be needed to meet the common-mode return loss specification.

Note 4: Voltage difference compared to the DC average common-mode potential

3-3-2-2. LP Receiver AC Characteristics

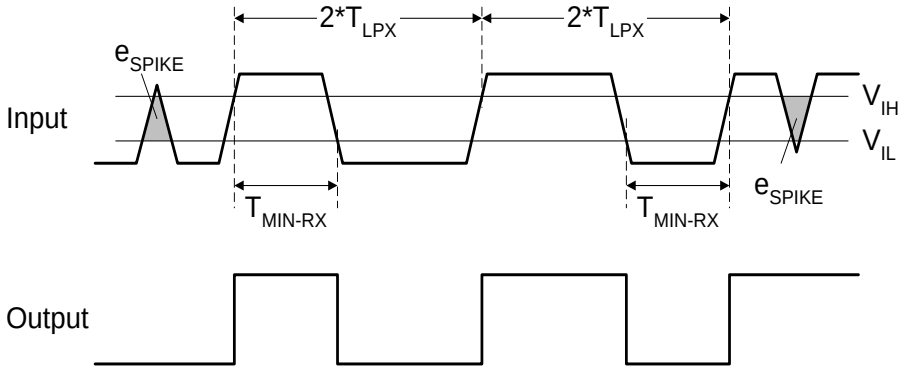
Parameter	Symbol	Specification			unit
		Min	Typ	Max	
Input pulse rejection (Note 1,2,3)	e_{SPIKE}			300	V·ps
Minimum pulse width response (Note 4)	T_{MIN-RX}	20			ns
Peak interference amplitude	V_{INT}			200	mV
Interference frequency	f_{INT}	450			MHz

Note 1: Time-voltage integration of a spike above V_{IL} when being in LP-0 state or below V_{IH} when being in LP-1 state.

Note 2: Am impulse less than this will not change the receiver state.

Note 3: In addition to the required glitch rejection, implementers shall ensure rejection of known RF-interferers.

Note 4: An input pulse grater than this shall toggle the output.

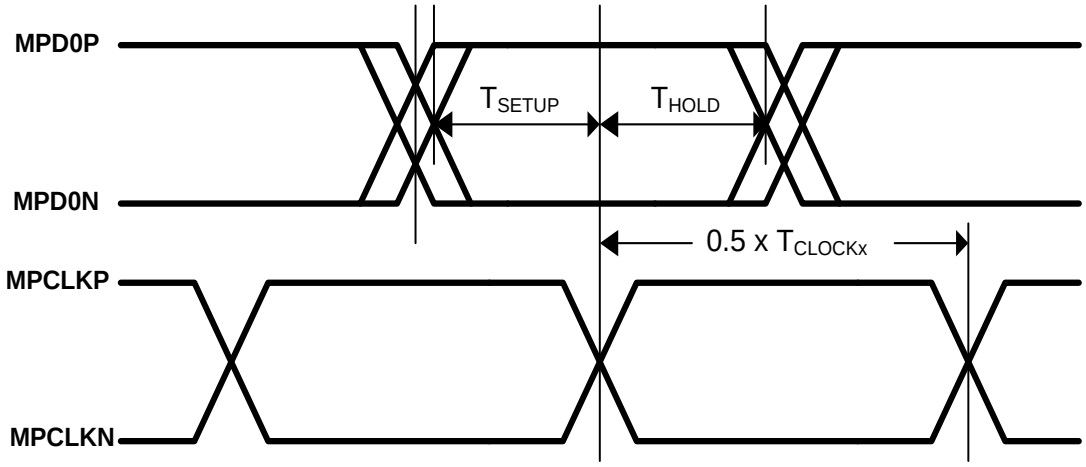


< Input Glitch Rejection of Low-Power Receivers >

3-3-2-3. High Speed Clock and Data Timings

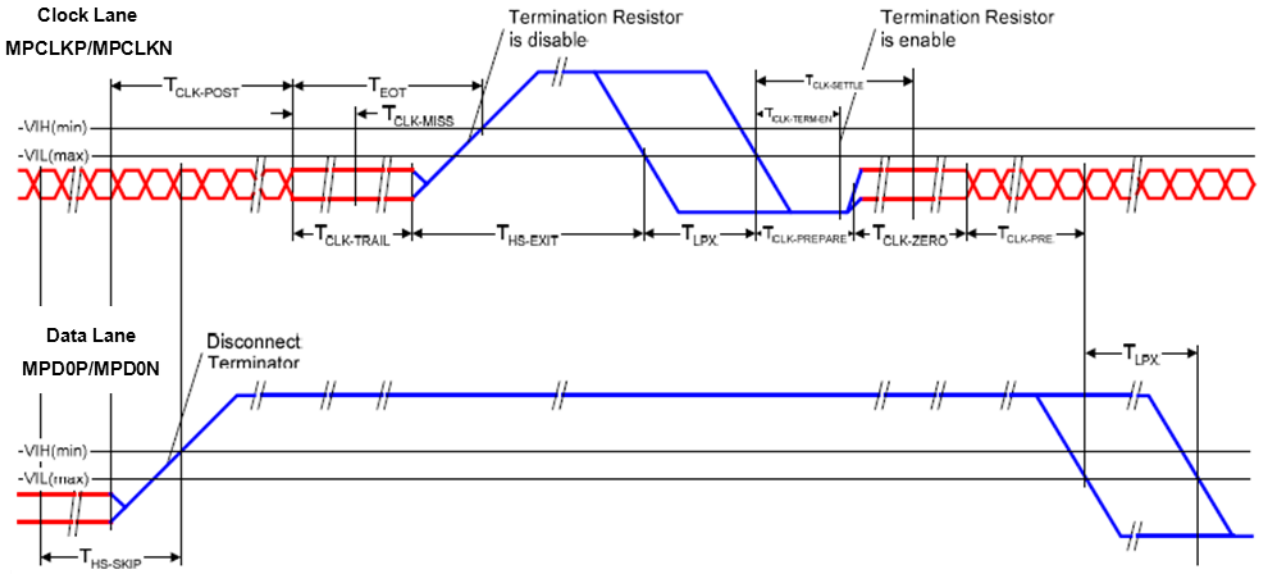
Parameter	Symbol	Specification			unit
		Min	Typ	Max	
DSI Data Transfer Rate for 24-bit video mode (4-lane)	DR_{24BPP}	2400		3840	Mbps
DSI Clock to DSI data setup time NOTE1	T_{SETUP}	0.15			UI
DSI Clock to DSI data hold time NOTE1	T_{HOLD}	0.15			UI

Note1. The value is meaningful at the input of IC, and can be affected by the variation of the parasitic on the IC to glass contact, FPC(Flexible Printed Circuit) and the module connector

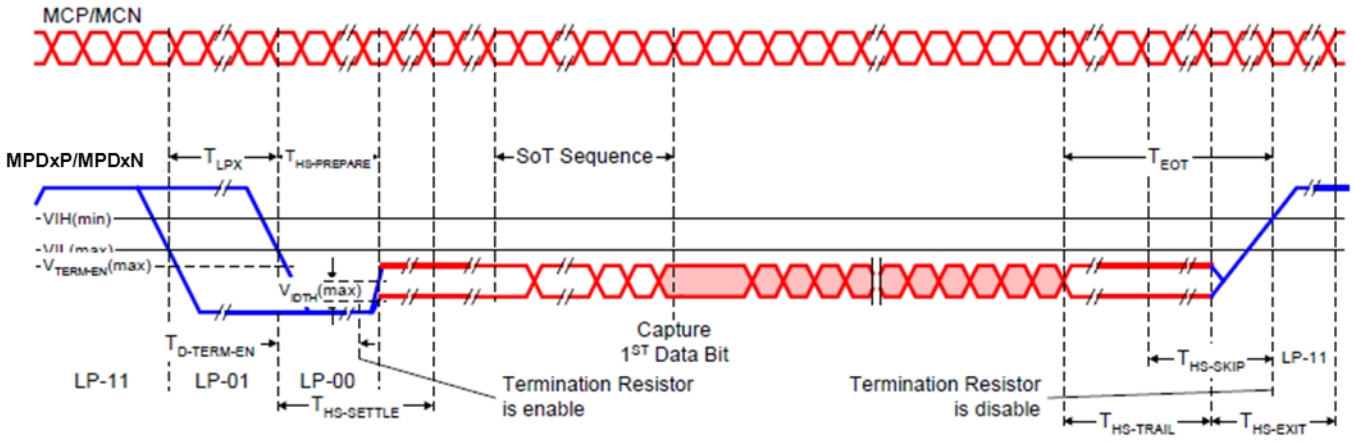


< Data to Clock Timing Definitions >

3-3-2. MIPI Alliance specification for D-PHY (Version 1.1 – 7 November 2011)



< Switching the Clock Lane between Clock Transmission and Low-Power Mode >



< High-Speed Data Transmission in Bursts >

3-3-2. MIPI Alliance specification for D-PHY (Version 1.1 – 7 November 2011)

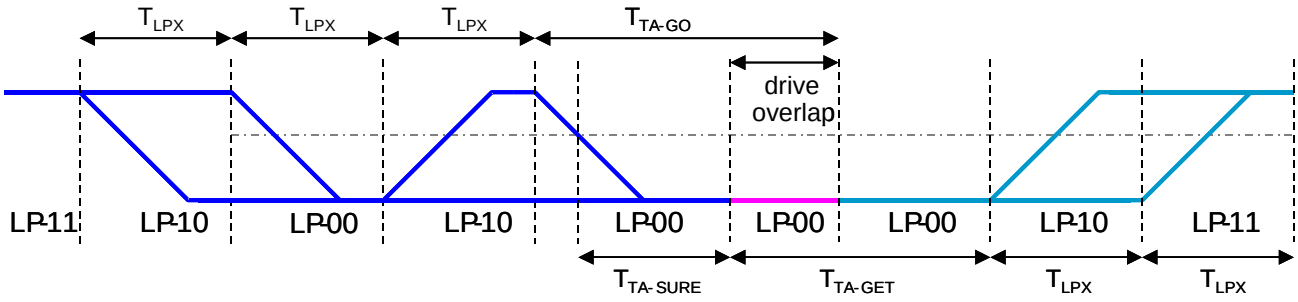
Table 4. Clock Lane Timing

Parameter	Description	Specification		unit
		Min	Max	
$T_{CLK-POST}$	Time that the MCU shall continue sending HS clock after the last associated Data Lane has transitioned to LP mode	60ns + 52*UI	-	ns
$T_{CLK-TRAIL}$	Time to drive HS differential state after last payload clock bit of a HS transmission burst	60	-	ns
$T_{CLK-PREPARE}$	Time to drive LP-00 to prepare for HS transmission (Min.value recommended)	38	95	ns
$T_{CLK-TERM-EN}$	Time at Clock Lane to enable HS termination	20	50	ns
$T_{CLK-SETTLE}$	Time interval during which the HS receiver ignores Clock Lane HS transitions	100	150	ns
$T_{CLK-PREPARE}$ +$T_{CLK-ZERO}$	Minimum lead HS-0 drive period before starting clock	300	-	ns
$T_{CLK-PRE}$	Time that the HS clock shall be driven prior to any associated Data Lane beginning the transition from LP to HS mode	8	-	UI
T_{LPX}	Length of any Low-Power state period	75	-	ns

Table 5. HS Data Transmission timing parameter

Parameter	Description	Specification			unit
		Min	Typ	Max	
$T_{HS-PREPARE}$	Time to drive LP-00 to prepare for HS transmission (Min. value is recommended)	48		85ns +6*UI	ns
$T_{HS-PREPARE}$ +$T_{HS-ZERO}$	Time to drive LP-00 to prepare for HS transmission (Typ. value is recommended)	300ns + 10*UI	315ns + 10*UI		ns
$T_{HS-SETTLE}$	Time-out at the display module to Ignore Transition Period SoT	100		150	ns
$T_{D-TERM-EN}$	Time at Data Lane to enable HS termination	20		50	ns
T_{EOT}	Time from start of $T_{HS-TRAIL}$ period to start LP-state	-		105ns + 12*UI	ns
$T_{HS-TRAIL}$	Time to drive flipped differential state after last payload data bit of a HS transmission burst	60 + 4*UI		-	ns
$T_{HS-SKIP}$	Time-Out at the display module to Ignore Transition Period of EoT	40		-	ns
$T_{HS-EXIT}$	Time to drive LP-11 after HS burst	100		-	ns
T_{LPX}	Length of any Low-Power state period	75		-	ns

3-3-2. MIPI Alliance specification for D-PHY (Version 1.1 – 7 November 2011)



< BTA sequential >

Table 6. BTA Timing

Parameter	Description	Specification		unit
		Min	Max	
T_{LPX}	Length of any Low-Power state period	50		ns
T_{TA-GET}	Time to drive LP-00 by new TX	$5 * T_{LPX}$		ns
T_{TA-GO}	Time to drive LP-00 after Turnaround Request	$4 * T_{LPX}$		ns
$T_{TA-SURE}$	Time-out before new TX side start driving	T_{LPX}	$2 * T_{LPX}$	ns
T_{WAKEUP}	Recovery time from Ultra-Low Power State	1	-	ms

3-3-3. MIPI Command Registers

ENTER_SLEEP_MODE

	write/read	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]	HEX
command	write	0	0	0	1	0	0	0	0	10
parameter	NO PARAMETER									

command : 10h
parameter : None
description This command causes the display module to enter the Sleep mode
In this mode, all unnecessary blocks inside the display module are disabled
except interface communication. This is the lowest power mode the display module supports.
restrictions : This command has no effect when the display module is already in Sleep mode.
After execute this command, VCC of Display module should be turn off.

EXIT_SLEEP_MODE

	write/read	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]	HEX
command	write	0	0	0	1	0	0	0	1	11
parameter	NO PARAMETER									

command : 11h
parameter : None
Description This command causes the display module to exit Sleep mode. All blocks inside the display module are enabled
restrictions This command shall not cause any visible effect on the display device when the display module is not in Sleep mode

DISPLAY OFF

	write/read	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]	HEX
command	write	0	0	1	0	1	0	0	0	28
parameter	NO PARAMETER									

command : 28h
parameter : None
description This command causes the display module to stop displaying the image data on the display device
restrictions This command has no effect when the display panel is already off.

DISPLAY ON

	write/read	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]	HEX
command	write	0	0	1	0	1	0	0	1	29
parameter	NO PARAMETER									

command : 29h
parameter : None
description This command causes the display module to start displaying the image data on the display device
restrictions This command has no effect when the display panel is already on.

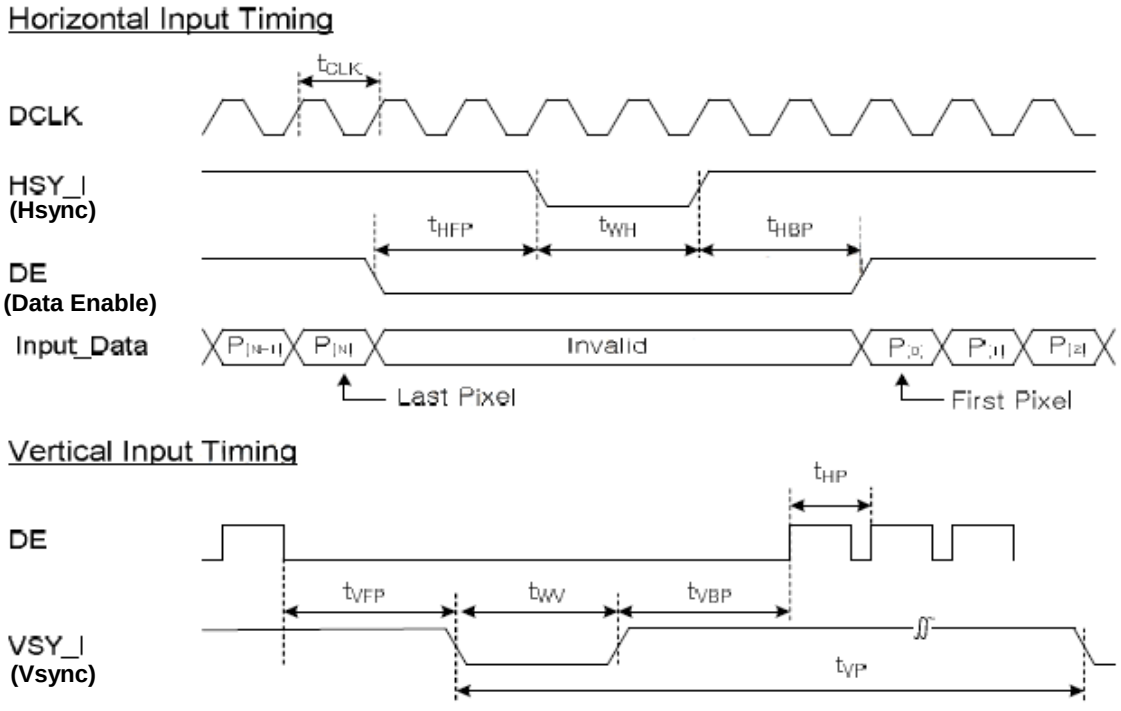
3-4. Signal Timing Specifications

This is the signal timing required at the input of the User connector. All of the interface signal timing should be satisfied with the following specifications and specifications of MIPI Tx/Rx for its proper operation.

Table 7. Timing Table

ITEM	Symbol		Min	Typ	Max	Unit	Note
DCLK	Frequency	f_{CLK}	134.9	137.06	139.2	MHz	
Hsync	Period	T_{hp}	1388	1410	1432	tCLK	
	Width	t_{WH}	32	32	32		
	Width-Active	t_{WHA}	1200	1200	1200		
Vsync	Period	t_{VP}	1620	1620	1620	tHP	
	Width	t_{WV}	5	5	5		
	Width-Active	t_{WVA}	1600	1600	1600		
Data Enable	Horizontal back porch	t_{HBP}	78	78	78	tCLK	
	Horizontal front porch	t_{HFP}	78	100	122		
	Vertical back porch	t_{VBP}	10	10	10	tHP	
	Vertical front porch	t_{VFP}	5	5	5		

3-5. Signal Timing Waveforms



3-6. Color Input Data Reference

The brightness of each primary color (red,green and blue) is based on the 8-bit gray scale data input for the color ; the higher the binary input, the brighter the color. The table below provides a reference for color versus data input.

Table 8. COLOR DATA REFERENCE

Color		Input Color Data																							
		RED								GREEN								BLUE							
		MSB							LSB	MSB							LSB	MSB							LSB
		R7	R6	R5	R4	R3	R2	R1	R0	R7	R6	R5	R4	R3	R2	R1	R0	R7	R6	R5	R4	R3	R2	R1	R0
Basic Color	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED (01)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	…					…								…								…			
	RED (254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED (255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN (01)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	...					…								…								…			
	GREEN (254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	GREEN (255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
BLUE	BLUE (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE (01)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	…					…								…								…			
	BLUE (254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	BLUE (255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

3-7. Power Sequence

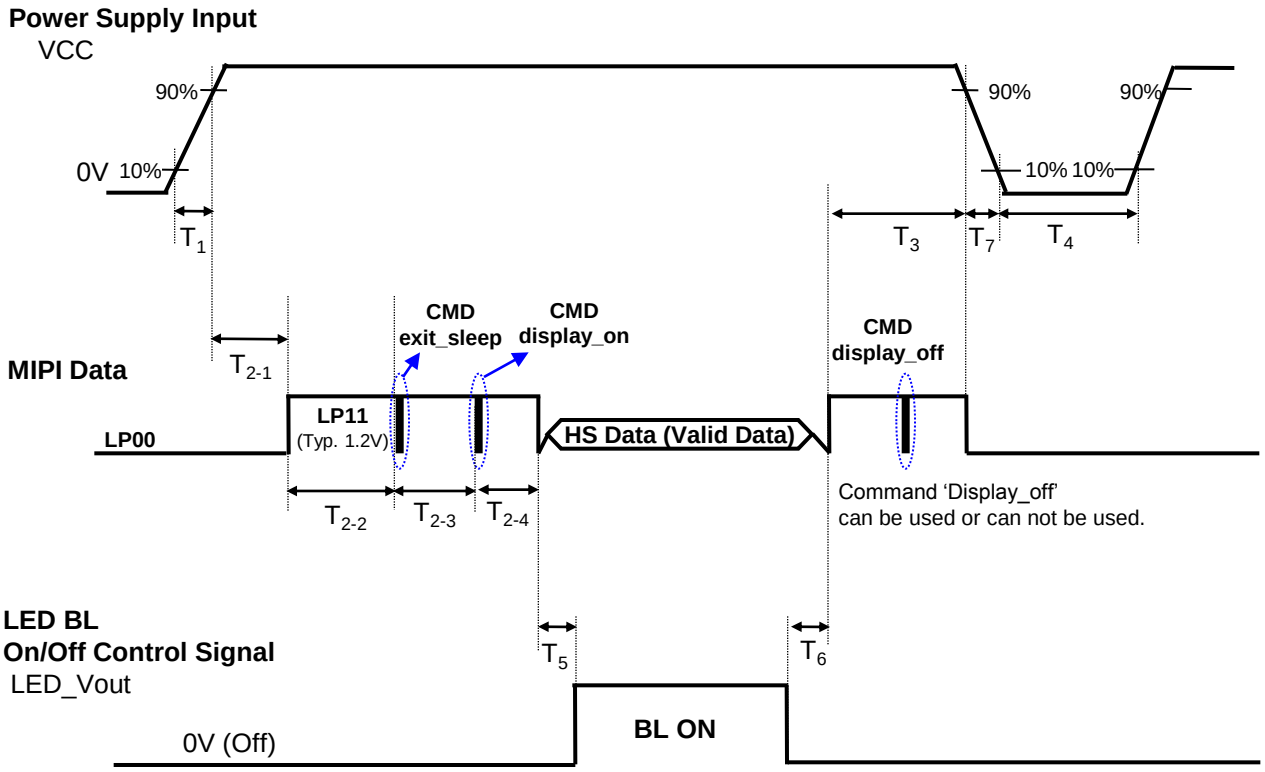


Table 9. Power Sequence Table

Logic Parameter	Value			Units
	Min.	Typ.	Max.	
T_1	0.5	-	10	ms
T_{2-1}	58	-	-	ms
T_{2-2}	75	-	-	ms
T_{2-3}	10			Ms
T_{2-4}	0			ms
T_3	0	-	50	ms
T_4	400	-	-	ms
T_5	150	-	-	ms
T_6	150	-	-	ms
T_7	3	-	10	ms

Note)
1. Do not insert the mating cable when system turn on.
2. Valid Data have to meet "3-3. MIPI Signal Timing Specifications"
3. LED_EN and PWM need to be on pull-down condition on invalid status.
4. LGD recommend the rising sequence of VLED after the Vcc and valid status of MIPI turn on.

4. Touch Specifications

4-1. General Specifications

The contents provide general characteristics for the model LD080UX1

Item			Spec.
General Specification	Multi touch points		10 points
	Active touch area		121.608 × 162.144 [mm]
	Cover Lens	Outline	137.75 × 216.25 [mm]
		Type / Thickness	Gorilla3 / 0.5 [mm]
	Sensor Film	Outline	137.0 × 174.144 [mm]
		Type / Thickness	GF2 / 0.2 [mm]
	Resolution		1600 x 1200
	Interface		I2C
	System OS		Android

4-2. Touch Performance

The contents provide general performance characteristics for the model LD080UX1

Item		Spec.	Notes
Touch Performance	Report Rate	≥ 100Hz	@ 1finger
	Point Accuracy	≤ 1mm	Non Border Area
	Linearity	≤ 1mm	Non Border Area
	Two Finger Separation	≥ 10mm	
	Touch Detection Area	≥ Φ2	

4-3. Touch Electrical Characteristics

The contents provide general Electrical characteristics for the model LD080UX1

Parameter	Symbol		Values			Units	Notes
			Min.	Typ.	Max.		
Power Supply Input Voltage	T_VCC18		1.7V	1.8V	1.9V	V	
	TVCC,VDD_KEY		3.15V	3.3V	3.45V		
	I_{TVCC,VDD_KEY}	Idle	-	10	12	mA	No Touch
		Active	-	55	65		1-Finger Touch
Power Consumption	P_{Total}	Idle	-	0.04	0.06	W	No Touch
		Active	-	0.2	0.21		1-Finger Touch

4-4. Touch Power Sequence

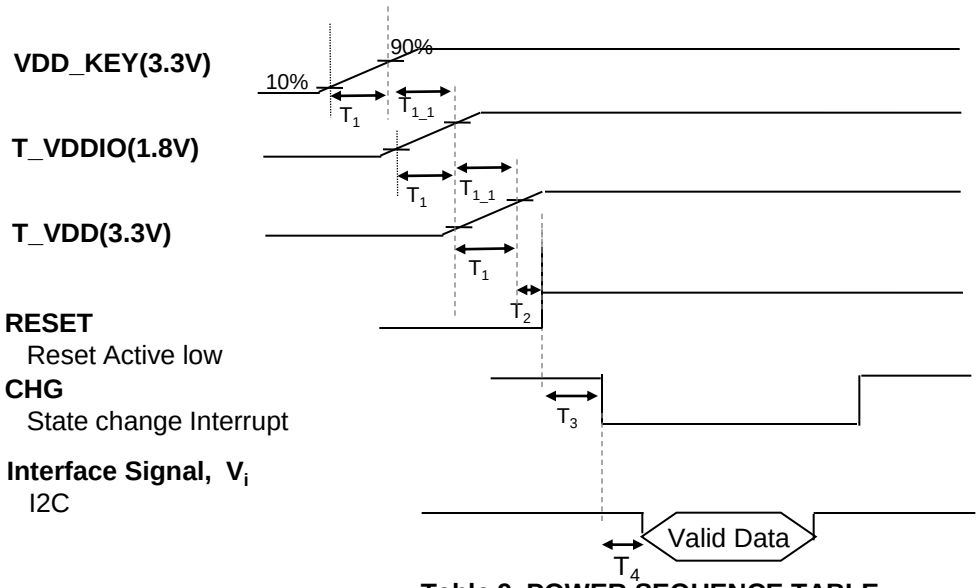


Table 9. POWER SEQUENCE TABLE

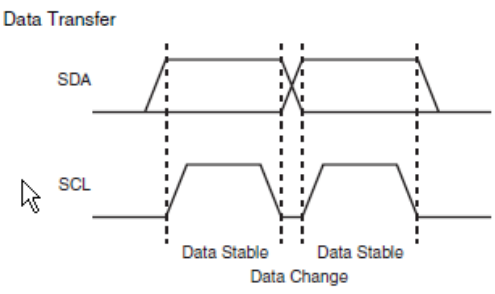
Parameter	Value			Units
	Min.	Typ.	Max.	
T_1	0.5	-	10	ms
T_{1_1}	0	-	1	ms
T_2	90	-	-	ns
T_3	-	100	-	ms
T_4	0.1	-	-	ms

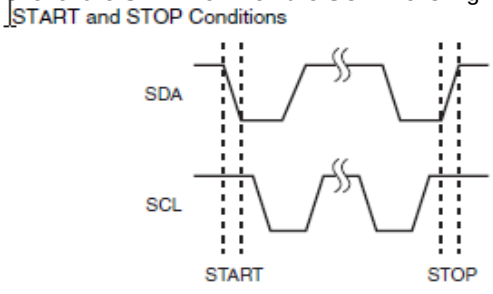
Transferring Data Bits

Each data bit transferred on the bus is accompanied by a pulse on the clock line. The level of the data line must be stable when the clock line is high ; the only exception to this rule is for generating START and STOP conditions.

START and STOP conditions

START and STOP conditions are signaled by changing the level of the SDA line when the SCL line is high.





5. Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 30 minutes in a dark environment at 25°C. The values specified are at an approximate distance 50cm from the LCD surface at a viewing angle of Φ and Θ equal to 0°.
FIG. 1 presents additional information concerning the measurement equipment and method.

Table 6. OPTICAL CHARACTERISTICS

Ta=25°C, VCC=3.3V, f_V=60Hz, I_{BL} = 20 mA

Parameter		Symbol	Values			Units	Notes
			Min	Typ	Max		
Contrast Ratio		CR	500	800	-		1
Surface Luminance (White)	w/Touch	L_{WH}	300	360	-	cd/m^2	2
Luminance Variation		δ_{WHITE}	-	1.4	1.6		3
Response Time		Tr_R+ Tr_D	-	25	35	ms	4
Color Coordinates							
	RED	RX	0.660	0.630	0.660		
		RY	0.325	0.355	0.385		
	GREEN	GX	0.305	0.335	0.365		
		GY	0.555	0.585	0.615		
	BLUE	BX	0.125	0.155	0.185		
		BY	0.040	0.070	0.100		
	WHITE	WX	0.283	0.313	0.343		
		WY	0.299	0.329	0.359		
Viewing Angle							5
	x axis, right(Φ=0°)	Θr	80			degree	
	x axis, left (Φ=180°)	Θl	80			degree	
	y axis, up (Φ=90°)	Θu	80			degree	
	y axis, down (Φ=270°)	Θd	80			degree	
Gray Scale							6

Note)

1. Contrast Ratio(CR) is defined mathematically as

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

2. Surface luminance is the average of 5 point across the LCD surface 50cm from the surface with all pixels displaying white. For more information see FIG 1.

LWH = Average(L1,L2, … L5)

3. The variation in surface luminance , The panel total variation (δ_{WHITE}) is determined by measuring L_N at each test position 1 through 13 and then defined as followed numerical formula. For more information see FIG 2.

$$\delta_{WHITE\_13[\%]} = \frac{\text{Minimum}(L_1, L_2, \ldots L_{13})}{\text{Maximum}(L_1, L_2, \ldots L_{13})} \times 100$$

4. Response time is the time required for the display to transition from white to black (rise time, Tr_R) and from black to white (Decay Time, Tr_D). For additional information see FIG 3.

5. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG 4.

6. Gray scale specification * f_V = 60Hz

Gray Level	Luminance [%] (Typ)
G255	100.0%
G239	89.9%
G223	78.1%
G207	67.4%
G191	57.6%
G175	48.6%
G159	40.2%
G143	32.4%
G127	25.3%
G111	18.8%
G95	13.2%
G79	8.5%
G63	4.7%
G47	2.2%
G31	0.7%
G15	0.2%
G0	0.1%

FIG. 1 Optical Characteristic Measurement Equipment and Method

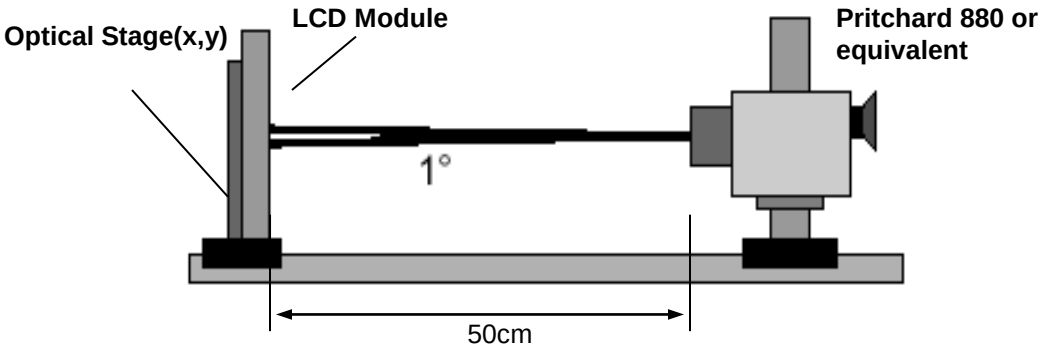
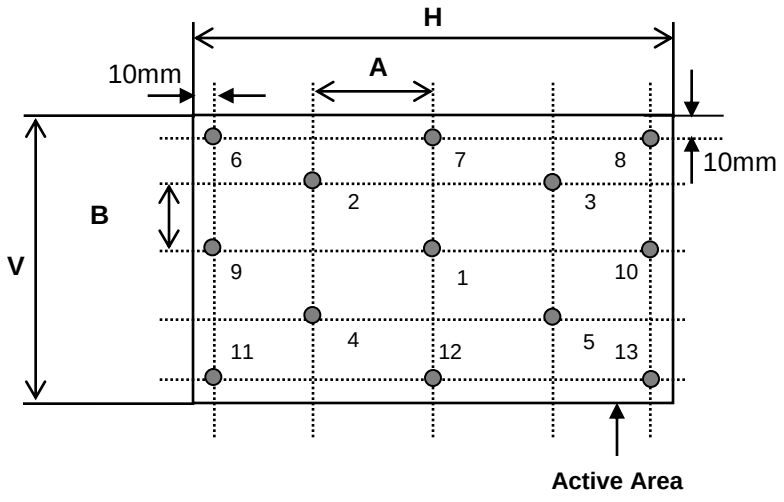


FIG. 2 Luminance

<measuring point for surface luminance & measuring point for luminance variation>



H,V : ACTIVE AREA
A : H/4 mm
B : V/4 mm
POINTS: 13 POINTS

FIG. 3 Response Time

The response time is defined as the following figure and shall be measured by switching the input signal for “black” and “white”.

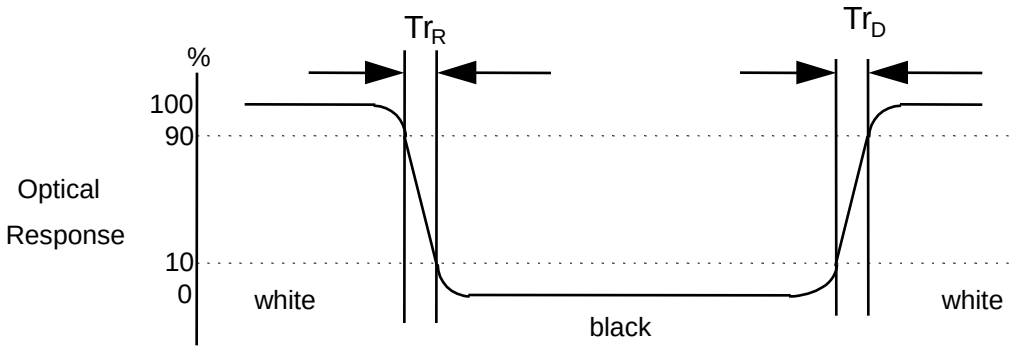
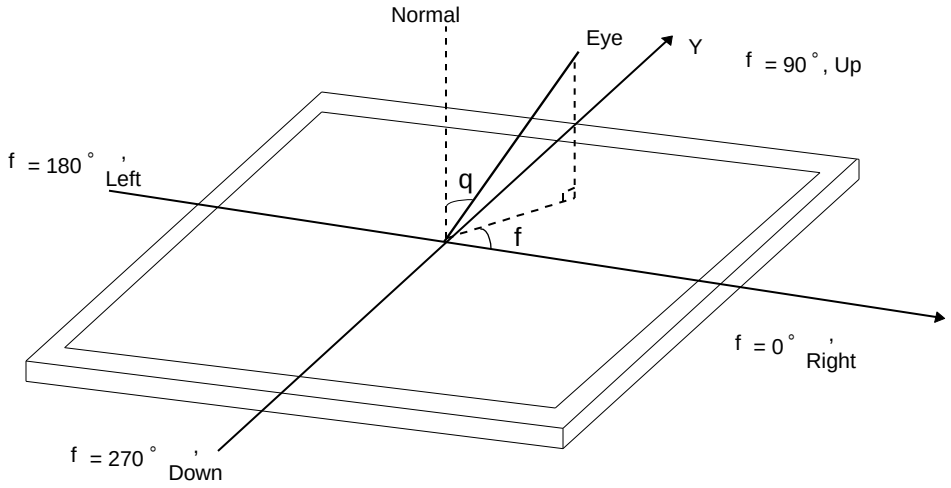


FIG. 4 Viewing angle



6. Mechanical Characteristics

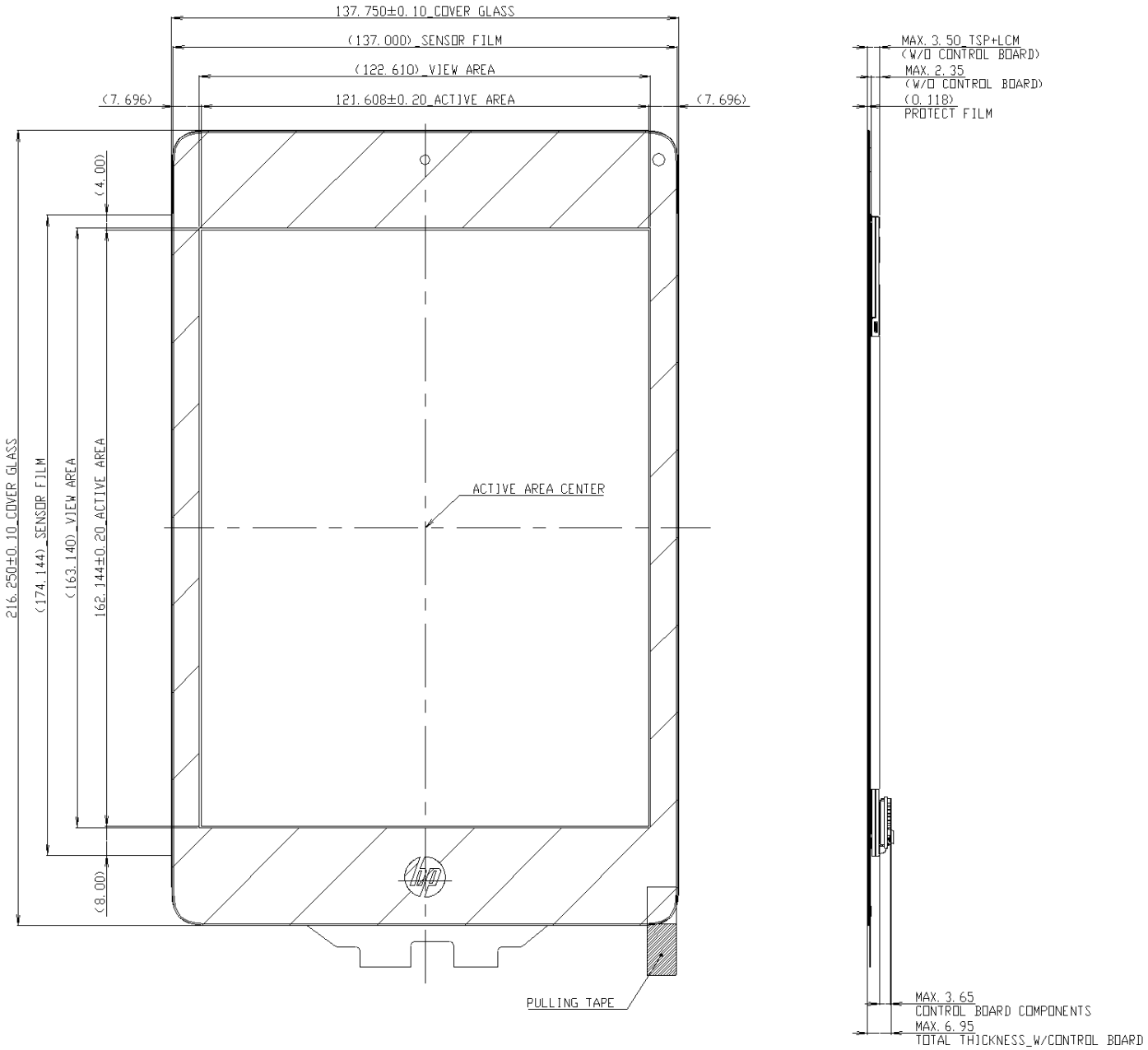
The contents provide general mechanical characteristics for the model LD080UX1. In addition the figures in the next page are detailed mechanical drawing of the LCD.

Outline Dimension (Touch screen panel)	Horizontal (Typ.)	137.75mm
	Vertical (Typ.)	216.25mm
Outline Dimension (Only LCM)	Horizontal (Typ.)	127.20mm
	Vertical (Typ.)	173.85mm
	Thickness (Max.)	2.35mm
Outline Dimension (Bezel Area)	Refer to the 2D drawing.	
Active Display Area	Horizontal	121.608mm
	Vertical	162.144mm
Thickness	3.50mm (Max.) With Touch module+LCM (W/O PCB)	
Weight	171 g(Max.) w/Touch, 115g(Max.) w/o Touch	
Surface Treatment	LCD : Glare treatment of the front polarizer TSP : AF Coating	
Viewing Angle	Viewing Angle (When Active area can be seen) ≤ 30°	

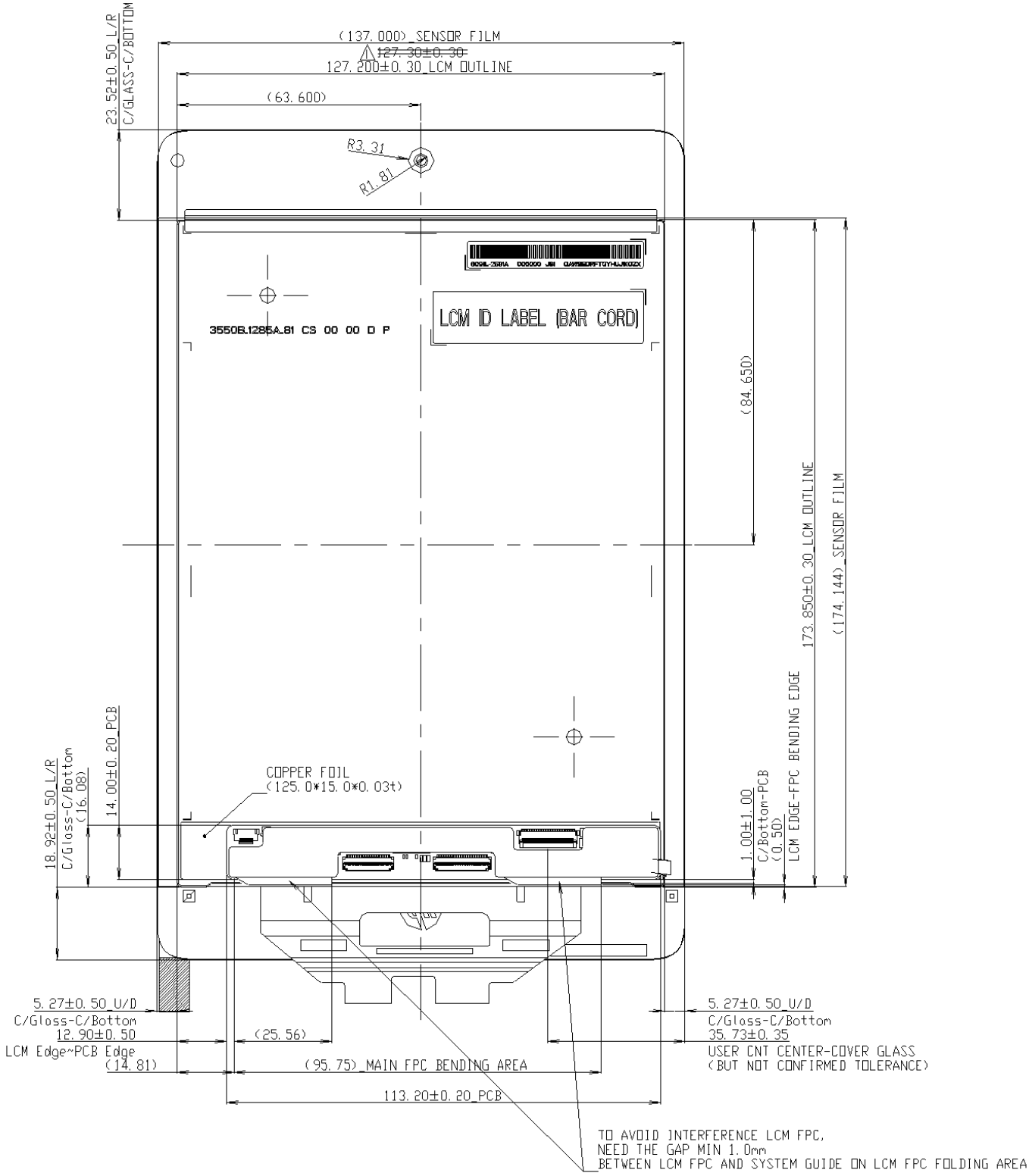
*** For more detail dimensions, refer to the 2D drawing in CAS**

<FRONT VIEW>

Note) Unit: [mm], General tolerance: ± 0.3mm



Note) Unit: [mm], General tolerance: ± 0.3mm



7. Reliability

Environment test condition

No.	Test Item	Conditions	Note
1	High temperature storage test	Ta= 60°C, 240h	1,2,3
2	Low temperature storage test	Ta= -20°C, 240h	1,2,3
3	High temperature operation test	Ta= 50°C, 50%RH, 240h	1,2,3
4	Low temperature operation test	Ta= 0°C, 240h	1,2,3
5	Vibration test (non-operating)	Random, 1.0Grms, X,Y,Z Direction Test time : each direction 1hour	
6	Shock test (non-operating)	Half sine wave, 180G, 2ms one shock of each six faces	
7	Altitude storage	0 ~ 40,000 feet (12,192m) 24Hr	

{ Result Evaluation Criteria }
There should be no change which might affect the practical display function when the display quality test is conducted under normal operating condition.

[Note 1] Ta = Ambient Temperature
[Note 2] After reliability test is finished, Confirm performance after leaving in room temp.
[Note 3] In the standard condition, there shall be no practical problems that may affect the display function 24 hours later after reliability test. After the reliability test is finished, we can guarantee the product only when the corrosion is causing its malfunction. The corrosion causing no functional defect can not be guaranteed.

※ Ta= Ambient Temperature

8. International Standards

8-1. Safety

a) UL 60950-1, Underwriters Laboratories Inc.
Information Technology Equipment - Safety - Part 1 : General Requirements.

b) CAN/CSA C22.2 No.60950-1-07, Canadian Standards Association.
Information Technology Equipment - Safety - Part 1 : General Requirements.

c) EN 60950-1, European Committee for Electrotechnical Standardization (CENELEC).
Information Technology Equipment - Safety - Part 1 : General Requirements.

d) IEC 60950-1, The International Electrotechnical Commission (IEC).
Information Technology Equipment - Safety - Part 1 : General Requirements.

8-2. EMC

a) ANSI C63.4 “American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.” American National Standards Institute (ANSI), 2003.

b) CISPR 22 “Information technology equipment – Radio disturbance characteristics – Limit and methods of measurement." International Special Committee on Radio Interference (CISPR), 2005.

c) CISPR 13 “Sound and television broadcast receivers and associated equipment – Radio disturbance characteristics – Limits and method of measurement." International Special Committee on Radio Interference (CISPR), 2006.

8-3. Environment

a) RoHS, Directive 2002/95/EC of the European Parliament and of the council of 27 January 2003

9. Packing

9-1. Designation of Lot Mark

a) Lot Mark

A	B	C	D	E	F	G	H	I	J	K	L	M

A,B,C : SIZE(INCH)
D : YEAR
E : MONTH
F ~ M : SERIAL NO.

Note

1. YEAR

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Mark	A	B	C	D	E	F	G	H	J	K

2. MONTH

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mark	1	2	3	4	5	6	7	8	9	A	B	C

b) Location of Lot Mark

Serial No. is printed on the label. The label is attached to the backside of the LCD module.
This is subject to change without prior notice.

9-2. Packing Form

a) Package quantity in one box : 30 pcs

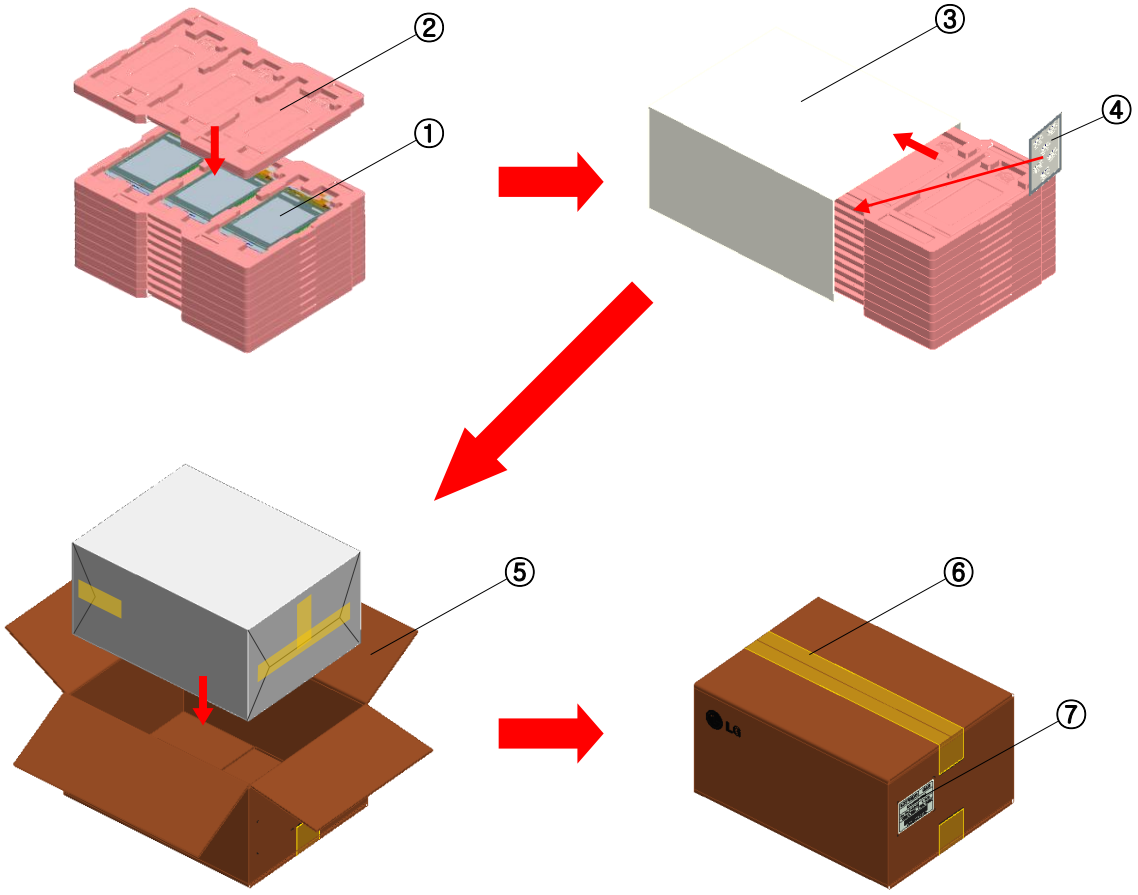
b) Box Size : 478mm(L) x 365mm(W) x 244mm(H)

c) Package quantity in one pallet : 720 pcs

d) Palletized Size : 1,140(L) x 990(W) x 1,105(H)

APPENDIX-2

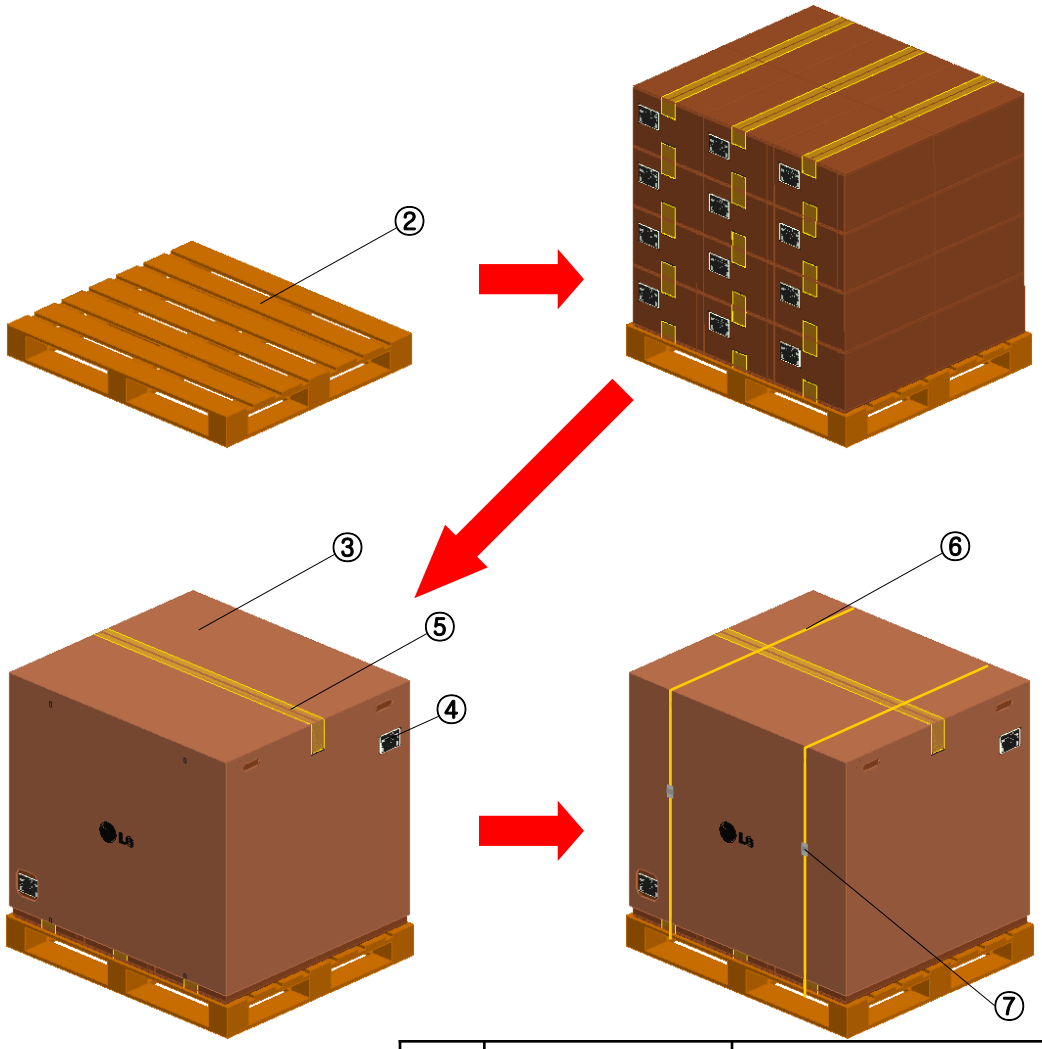
■ Packing Assembly



NO.	DESCRIPTION	MATERIAL
1	LCD Module	
2	BAG	AL
3	TAPE	MASKING 20MMX50M
4	PACKING, TOP	EPS
5	PACKING, BOTTOM	EPS
6	BOX	SWR4
7	TAPE	OPP 70MMX300M
8	LABEL	ART 100X70

APPENDIX-3

■ Pallet Assembly



NO.	DESCRIPTION	MATERIAL
1	Packing AssY	
2	Pallet	Plywood
3	Angle Cover	SWR4
4	Label	ART 100X70
5	Band	PP
6	Wrap	LLDPE
7	CLIP	Steel

10. PRECAUTIONS

Please pay attention to the followings when you use this TFT LCD module.

10-1. MOUNTING PRECAUTIONS

(1) You must mount a module using holes arranged in four corners or four sides.
(2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
(3) Please attach the surface transparent protective plate to the surface in order to protect the polarizer. Transparent protective plate should have sufficient strength in order to the resist external force.
(4) You should adopt radiation structure to satisfy the temperature specification.
(5) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.
(6) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
Do not touch the surface of polarizer for bare hand or greasy cloth.(Some cosmetics are detrimental to the polarizer.)
(7) When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach front / rear polarizers. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.
(8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
(9) Do not open the case because inside circuits do not have sufficient strength.

10-2. OPERATING PRECAUTIONS

(1) The spike noise causes the mis-operation of circuits. It should be lower than following voltage :
V=± 200mV(Over and under shoot voltage)

(2) Response time depends on the temperature.(In lower temperature, it becomes longer.)
(3) Brightness depends on the temperature. (In lower temperature, it becomes lower.)
And in lower temperature, response time(required time that brightness is stable after turned on) becomes longer.
(4) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
(5) When fixed patterns are displayed for a long time, remnant image is likely to occur.
(6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimized the interference.

10-3. ELECTROSTATIC DISCHARGE CONTROL

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly.

10-4. PRECAUTIONS FOR STRONG LIGHT EXPOSURE

Strong light exposure causes degradation of polarizer and color filter.

10-5. STORAGE

When storing modules as spares for a long time, the following precautions are necessary.

(1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5°C and 35°C at normal humidity.
(2) The polarizer surface should not come in contact with any other object.
It is recommended that they be stored in the container in which they were shipped.

10-6. HANDLING PRECAUTIONS FOR PROTECTION FILM

(1) When the protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.
(2) The protection film is attached to the polarizer with a small amount of glue. If some stress is applied to rub the protection film against the polarizer during the time you peel off the film, the glue is apt to remain on the polarizer.
Please carefully peel off the protection film without rubbing it against the polarizer.
(3) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of glue still on the polarizer after the protection film is peeled off.
(4) You can remove the glue easily. When the glue remains on the polarizer surface or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.

EDID Data for *HP* _ ver. 0.0

2013/5/29

	Byte (Dec)	Byte (Hex)	Field Name and Comments	Value (Hex)	Value (Bin)
Header	0	00	Header	00	00000000
	1	01	Header	FF	11111111
	2	02	Header	FF	11111111
	3	03	Header	FF	11111111
	4	04	Header	FF	11111111
	5	05	Header	FF	11111111
	6	06	Header	FF	11111111
	7	07	Header	00	00000000
Vendor / Product EDID Version	8	08	ID Manufacture Name LGD	30	00110000
	9	09	ID Manufacture Name	E4	11100100
	10	0A	ID Product Code 0000h	00	00000000
	11	0B	(Hex. LSB first)	00	00000000
	12	0C	ID Serial No. - Optional ("00h" if not used, Number Only and LSB First)	00	00000000
	13	0D	ID Serial No. - Optional ("00h" if not used, Number Only and LSB First)	00	00000000
	14	0E	ID Serial No. - Optional ("00h" if not used, Number Only and LSB First)	00	00000000
	15	0F	ID Serial No. - Optional ("00h" if not used, Number Only and LSB First)	00	00000000
	16	10	Week of Manufacture - Optinal 00 weeks	00	00000000
	17	11	Year of Manufacture 2013 years	17	00010111
	18	12	EDID structure version # = 1	01	00000001
	19	13	EDID revision # = 4	04	00000100
Display Parameters	20	14	Video input Definition = Input is a Digital Video signal Interface , Colo Bit Depth : 8 Bits per Primary Color , Digital Video Interface Standard Supported: Digital Interface is not defined	A0	10100000
	21	15	Aspect Ratio 'Portrait'	00	00000000
	22	16	Aspect Ratio 'Portrait' =	FA	11111010
	23	17	Display Transfer Characteristic (Gamma) = (gamma * 100) - 100 = Example:(2.2 * 100) - 100 = 120	78	01111000
	24	18	Feature Support [Display Power Management(DPM) : Standby Mode is not supported, Suspend Mode is not supported, Active Off = Very Low Power is not supported ,Supportted Color Encoding Formats : RGB 4:4:4 ,Other Feature Support Flags : No_sRGB, Preferred Timing Mode, No_Display is continuous frequency (Multi-mode_Base EDID and Extension Block).]	02	00000010
Panel Color Coordinates	25	19	Red/Green Low Bits (RxRy/GxGy)	AA	10101010
	26	1A	Blue/White Low Bits (BxBy/WxWy)	A5	10100101
	27	1B	Red X Rx = 0.10	19	00011001
	28	1C	Red Y Ry = 0.10	19	00011001
	29	1D	Green X Gx = 0.10	19	00011001
	30	1E	Green Y Gy = 0.10	19	00011001
	31	1F	Blue X Bx = 0.10	19	00011001
	32	20	Blue Y By = 0.10	19	00011001
	33	21	White X Wx = 0.313	50	01010000
	34	22	White Y Wy = 0.329	54	01010100
Established Timings	35	23	Established timing 1 (Optional_00h if not used)	00	00000000
	36	24	Established timing 2 (Optional_00h if not used)	00	00000000
	37	25	Manufacturer's timings (Optional_00h if not used)	00	00000000
Standard Timing ID	38	26	Standard timing ID 1 (Optional_01h if not used)	01	00000001
	39	27	Standard timing ID 1 (Optional_01h if not used)	01	00000001
	40	28	Standard timing ID 2 (Optional_01h if not used)	01	00000001
	41	29	Standard timing ID 2 (Optional_01h if not used)	01	00000001
	42	2A	Standard timing ID 3 (Optional_01h if not used)	01	00000001
	43	2B	Standard timing ID 3 (Optional_01h if not used)	01	00000001
	44	2C	Standard timing ID 4 (Optional_01h if not used)	01	00000001
	45	2D	Standard timing ID 4 (Optional_01h if not used)	01	00000001
	46	2E	Standard timing ID 5 (Optional_01h if not used)	01	00000001
	47	2F	Standard timing ID 5 (Optional_01h if not used)	01	00000001
	48	30	Standard timing ID 6 (Optional_01h if not used)	01	00000001
	49	31	Standard timing ID 6 (Optional_01h if not used)	01	00000001
	50	32	Standard timing ID 7 (Optional_01h if not used)	01	00000001
	51	33	Standard timing ID 7 (Optional_01h if not used)	01	00000001
	52	34	Standard timing ID 8 (Optional_01h if not used)	01	00000001
	53	35	Standard timing ID 8 (Optional_01h if not used)	01	00000001

	Byte (Dec)	Byte (Hex)	Field Name and Comments	Value (Hex)	Value (Bin)
Timing Descriptor #1	54	36	Pixel Clock/10,000 (LSB) 137.1 MHz @ 60 Hz	8A	10001010
	55	37	Pixel Clock/10,000 (MSB)	35	00110101
	56	38	Horizontal Active (HA) (lower 8 bits) 1200 pixels	B0	10110000
	57	39	Horizontal Blanking (HB) (lower 8 bits) 210 pixels	D2	11010010
	58	3A	Horizontal Active (HA) / Horizontal Blanking (HB) (upper 4:4bits)	40	01000000
	59	3B	Vertical Avrtive (VA) 1600 lines	40	01000000
	60	3C	Vertical Blanking (VB) (DE Blanking typ for DE only panels) 20 lines	14	00010100
	61	3D	Vertical Active (VA) / Vertical Blanking (VB) (upper 4:4bits)	60	01100000
	62	3E	Horizontal Front Porch in pixels (HF) (lower 8 bits) 100 pixels	64	01100100
	63	3F	Horizontal Sync Pulse Width in pixels (HS) (lower 8 bits) 32 pixels	20	00100000
	64	40	Vertical Front Porch in lines (VF) : Vertical Sync Phase Width in lines (VS) (lower 4 bits) 5 lines : 5 lines	55	01010101
	65	41	Horizontal Front Porch/ Sync Pulse Width/ Vertical Front Porch/ Sync Pulse Width (upper 2bits)	00	00000000
	66	42	Horizontal Vedio Image Size (mm) (lower 8 bits) 122 mm	7A	01111010
	67	43	Vertical Vedio Image Size (mm) (lower 8 bits) 162 mm	A2	10100010
	68	44	Horizontal Image Size / Vertical Image Size (upper 4 bits)	00	00000000
	69	45	Horizontal Border = 0 (Zero for Notebook LCD)	00	00000000
	70	46	Vertical Border = 0 (Zero for Notebook LCD)	00	00000000
	71	47	Non-Interlace, Normal display, no stereo, Digital Separate [Vsync_NEG, Hsync_POS (outside of V-sync)]	1B	00011011
Timing Descriptor #2	72	48	Pixel Clock/10,000 (LSB) 91.4 MHz @ 40 Hz	B1	10110001
	73	49	Pixel Clock/10,000 (MSB)	23	00100011
	74	4A	Horizontal Active (HA) (lower 8 bits) 1200 pixels	B0	10110000
	75	4B	Horizontal Blanking (HB) (lower 8 bits) 210 pixels	D2	11010010
	76	4C	Horizontal Active (HA) / Horizontal Blanking (HB) (upper 4:4bits)	40	01000000
	77	4D	Vertical Avrtive (VA) 1600 lines	40	01000000
	78	4E	Vertical Blanking (VB) (DE Blanking typ for DE only panels) 20 lines	14	00010100
	79	4F	Vertical Active (VA) / Vertical Blanking (VB) (upper 4:4bits)	60	01100000
	80	50	Horizontal Front Porch in pixels (HF) (lower 8 bits) 100 pixels	64	01100100
	81	51	Horizontal Sync Pulse Width in pixels (HS) (lower 8 bits) 32 pixels	20	00100000
	82	52	Vertical Front Porch in lines (VF) : Vertical Sync Phase Width in lines (VS) (lower 4 bits) 5 lines : 5 lines	55	01010101
	83	53	Horizontal Front Porch/ Sync Pulse Width/ Vertical Front Porch/ Sync Pulse Width (upper 2bits)	00	00000000
	84	54	Horizontal Vedio Image Size (mm) (lower 8 bits) 122 mm	7A	01111010
	85	55	Vertical Vedio Image Size (mm) (lower 8 bits) 162 mm	A2	10100010
	86	56	Horizontal Image Size / Vertical Image Size (upper 4 bits)	00	00000000
	87	57	Horizontal Border = 0 (Zero for Notebook LCD)	00	00000000
	88	58	Vertical Border = 0 (Zero for Notebook LCD)	00	00000000
	89	59	Non-Interlace, Normal display, no stereo, Digital Separate [Vsync_NEG, Hsync_POS (outside of V-sync)]	1B	00011011
Timing Descriptor #3	90	5A	Blank for nw DPS	00	00000000
	91	5B	Blank for nw DPS	00	00000000
	92	5C	Blank for nw DPS	00	00000000
	93	5D	Blank for nw DPS	00	00000000
	94	5E	Blank for nw DPS	00	00000000
	95	5F	Blank for nw DPS	00	00000000
	96	60	Blank for nw DPS	00	00000000
	97	61	Blank for nw DPS	00	00000000
	98	62	Blank for nw DPS	00	00000000
	99	63	Blank for nw DPS	00	00000000
	100	64	Blank for nw DPS	00	00000000
	101	65	Blank for nw DPS	00	00000000
	102	66	Blank for nw DPS	00	00000000
	103	67	Blank for nw DPS	00	00000000
	104	68	Blank for nw DPS	00	00000000
	105	69	Blank for nw DPS	00	00000000
	106	6A	Blank for nw DPS	00	00000000
	107	6B	Blank for nw DPS	00	00000000

	Byte (Dec)	Byte (Hex)	Field Name and Comments	Value (Hex)	Value (Bin)
Timing Descriptor #4	108	6C	Detailed Timing Descriptions #4	00	00000000
	109	6D	Flag	00	00000000
	110	6E	Reserved	00	00000000
	111	6F	For Brightness Table and Power consumption	02	00000010
	112	70	Flag	00	00000000
	113	71	PWM % [7:0] @ Step 0 5 % @ 10 nit	0C	00001100
	114	72	PWM % [7:0] @ Step 5 28 % @ 60 nit	47	01000111
	115	73	PWM % [7:0] @ Step 10 92 % @ 200 nit	EA	11101010
	116	74	Nits [7:0] @ Step 0	0A	00001010
	117	75	Nits [7:0] @ Step 5	3C	00111100
	118	76	Nits [7:0] @ Step 10	64	01100100
	119	77	Panel Electronics Power @ 32 x 32 Chess Pattern = 1250 mW	1F	00011111
	120	78	Backlight Power @ 60 nits = 1030 mW	1A	00011010
	121	79	Backlight Power @ Step 10 = 3160 mW	28	00101000
	122	7A	Nits @ 100% PWM Duty = 220 nit	6E	01101110
	123	7B	Flag	00	00000000
	124	7C	Flag	00	00000000
	125	7D	Flag	00	00000000
Checksum	126	7E	Extension flag (# of optional 128 panel ID extension block to follow, Typ = 0)	00	00000000
	127	7F	Check Sum (The 1-byte sum of all 128 bytes in this panel ID block shall = 0)	D2	11010010