



PROPRIETARY NOTE

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TITLE : NS080WUM-LX1

Product Specification

Rev. D

BOE Optoelectronics Technology Co., Ltd

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DBG-RD-NB-20240513-F	TFT-LCD	D	2021.10.21	1 OF 65

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1.0 GENERAL DESCRIPTION

1.1 Introduction

NS080WUM-LX1 is a color active matrix TFT LCD module using LTPS TFT's (Thin Film Transistors) as an active switching devices. This module has a 8.0 inch diagonally measured active area with Full-HD resolutions (1920 horizontal by 1200 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.7M(8bit) colors and color gamut 100% SRGB. The TFT-LCD panel used On Cell Touch Structure and used for this module is a low reflection and higher color type. Therefore, this module is suitable for Notebook PC. The LED driver for back-light driving is built in this model. All input signals are eDP1.4 interface compatible.

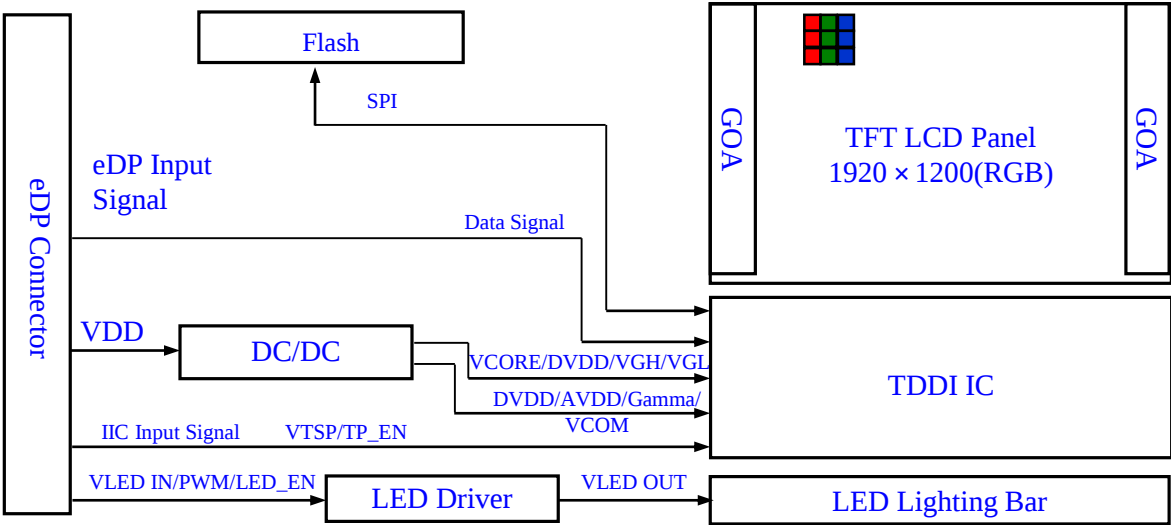


Figure 1. Drive Architecture

1.2 Features

- 2 lane eDP interface with 2.7Gbps link rates
- Thin and light weight
- 16.7M(8bit) color depth, color gamut 100% sRGB
- Single LED lighting bar (Bottom side/Horizontal Direction)
- Data enable signal mode
- Side mounting frame
- Green product (RoHS & Halogen free product)
- On board LED driving circuit
- Low driving voltage and low power consumption
- On board EDID chip
- DPCD Version 1.4
- Function : BIST/SDRRS/DMRRS/VRR/DSC/Freesync
- Adjust backlight brightness with DC mode

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1.0 GENERAL DESCRIPTION

1.2 Features

DPCD Ver.	sDRRS	DCR	DMRRS	PSR	LRR	MBO
1.4	on	off	on	off	off	on
VESA DSC	MSO	AMD Free-sync	HDR	Dimming	OD	BIST
on	off	on	off	PWM in DC out	off	yes
FRC	DDS	G-sync				
off	off	off				

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1.3 Application

- Notebook PC (Wide type)

1.4 General Specification

The followings are general specifications at the model NS080WUM-LX1. (listed in Table 1)

<Table 1. General Specifications>

Parameter	Specification	Unit	Remarks
Active area	172.224(H) ×107.64(V)	mm	
Number of pixels	1920 (H) ×1200 (V)	pixels	
Pixel pitch	89.7(H) ×89.7(V)	um	
Pixel arrangement	RGB Vertical stripe		
Display colors	16.7M(8bit)		
Color gamut	sRGB Typ.100% , Min.98% (CIE1976)		
Display mode	Normally Black		
Dimensional outline	180.2±0.08 *121.9±0.08*2.35(Max)(Body)@TLCM 180.2±0.08*121.9±0.08*4.35(Max)(PCBA)@TLC M	mm	
Weight	92(max)@TLCM	g	
Surface treatment	HC		
Surface hardness	3H		
Back-light	Bottom edge side, 1-LED lighting bar type		Note 1
Power consumption	P _D : 0.65(Max.)	W	@Mosaic
	P _{Touch} : 0.25(Max.)		
	P _{BL} : 2.35(Max.)	W	@VLED=12V
	P _{Total} : 3.25(Max.)	W	@Mosaic

Notes : 1. LED Lighting Bar (40*LED Array)

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1.5 Touch General Specification

The followings are touch general specifications at the model NT140WHM-T01. (listed in Table 1-2)

<Table1-2. General Specifications>

Parameter	Specification	Unit	Remarks
Type of Touch Sensor	Self Capacitance		
Touch Structure	In Cell		
Panel Size	8.0”		
TP Active Area	172.224(H) ×107.64(V)	mm	
Surface treatment	HC		
Surface Hardness	3H	H	
Interface	IIC		
Report Rate	Follow win8/100	Hz	
Multi-Touch Point	10 points		
Input method	Finger		
Touch panel sensor IC	NT56810		TDDI
Channel	1596		
Support OS	Win8.x and Win10 compliant		
TP Power Consumption	0.25	W	@ 5 finger
VID	0x0603		
PID	0xF200		

2.0 ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2.

< Table 2. Absolute Maximum Ratings> Ta=25+/-2°C

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	V _{DD}	-0.3	4.0	V	Note 1
eDP input Voltage	V _{eDP}	0	2.0	V	
Logic Supply Voltage	V _{IN}	V _{SS} -0.3	V _{DD} +0.3	V	
Operating Temperature	T _{OP}	0	+50	°C	Note 2
Storage Temperature	T _{ST}	-20	+60	°C	

Notes :

1. Permanent damage to the device may occur if maximum values are exceeded functional operation should be restricted to the condition described under normal operating conditions.

2. Temperature and relative humidity range are shown in the figure below.

95 % RH Max. (40 °C ≥ Ta) Maximum wet - bulb temperature at 39 °C or less. (Ta > 40 °C) No condensation.

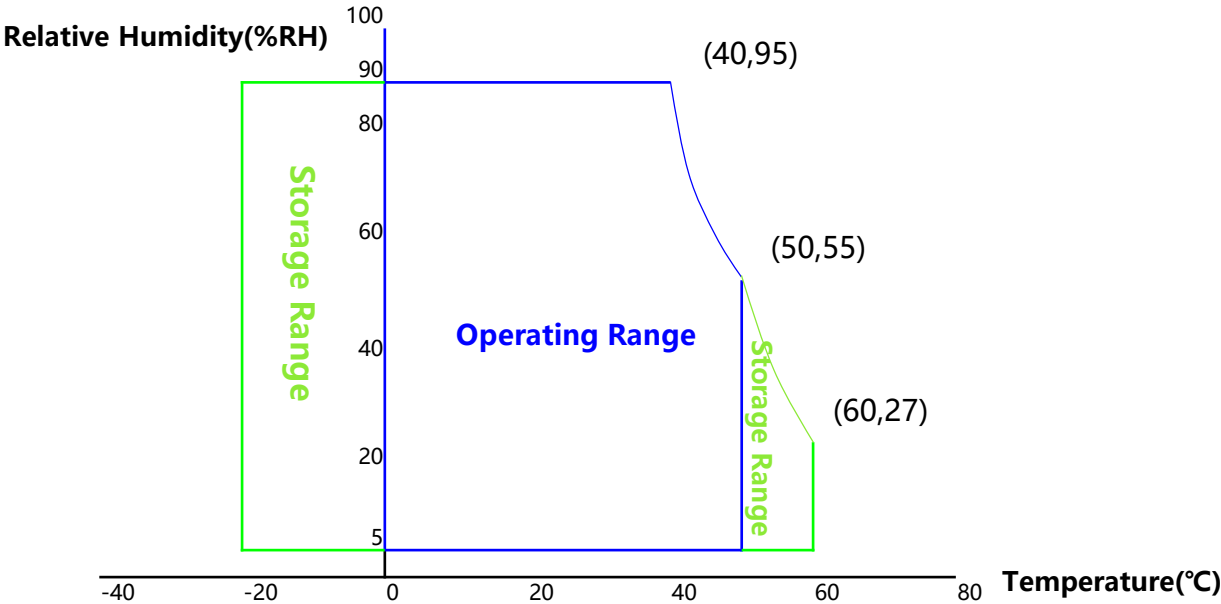


Figure 2. Temperature and Relative Humidity Range

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3.0 ELECTRICAL SPECIFICATIONS

3.1 Electrical Specifications

< Table 3-1. Electrical Specifications > Ta=25+/-2°C

Parameter		Min.	Typ.	Max.	Unit	Remarks	
Power Supply Voltage		V _{DD}	3.0	3.3	3.6	V	Note 1
Permissible Input Ripple Voltage		V _{RF}	-10% VDD	-	+10% VDD	V	@ V _{DD} = 3.3V , note4
BIST Control Level		High Level	0.8 VDDIO	-	3.3	V	@V _{DDIO} = 1.8V
		Low Level	0	-	0.15 VDDIO	V	
Power Supply Inrush Current		Inrush	-	-	2	A	Note3
Power Supply Current	Mosaic	I _{DD}	-	-	196	mA	Note 1
	RGB		-	-	272	mA	
Power Consumption	Mosaic	P _M	-	-	0.65	W	
	RGB	P _{RGB}	-	-	0.9	W	
	BLU	P _{BL}	-	2.1	2.35	W	Note 2
	Total	P _{Total}	-	-	3.0	W	@Mosaic

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3.0 ELECTRICAL SPECIFICATIONS

3.1 Electrical Specifications

Notes :

- The supply voltage is measured and specified at the interface connector of LCM.
The current draw and power consumption specified is for 3.3V at 25 °C.
 - Mosaic pattern 8*8
 - R/G/B patterns
 - Solid pattern(maximum logic power consumption) : sub v line

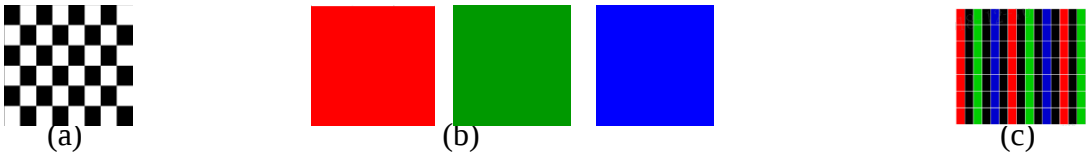


Figure 3. Power Measure Patterns

- Calculated value for reference ($V_{LED} \times I_{LED}$) , The power consumption with LED Driver are under the $V_{LED} = 12.0V$, 25°C, PWM Duty 100% .

- Measure condition (Figure 4)

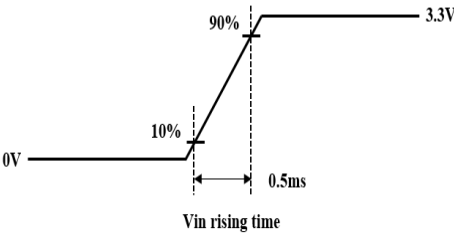


Figure 4. Inrush Measure Condition

- Input voltage range:3.0~3.6V.Test condition: Oscilloscope bandwidth 20MHz, AC coupling

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3.1 Touch Electrical Specifications

< Table 3-2 Electrical specifications >

Parameter		Min.	Typ.	Max.	Unit	Remarks	
Power Supply Voltage		V _{DD}	3.0	3.3	3.6	V	Note 1
Permissible Input Ripple Voltage		V _{RF}	-	-	100	mV	At V _{DD} = 3.3V
Power Supply Current		I _{DD}	-	-	75	mA	
Power Consumption	Active Mode	P _T	-	-	0.25	W	Note1
	Idle Mode		-	-	0.1	W	Note2
TP_EN	High Level		0.8* VTSP	-	-	V	@VTSP=3.3V
	Low Level		-	-	0.15* VTSP	V	

- Notes : 1. The supply voltage is measured and specified at the interface connector of TLCDM
The current draw and power consumption specified is for 3.3V at 25°C when touch function is active;
2. The supply voltage is measured and specified at the interface connector of TLCDM
The current draw and power consumption specified is for 3.3V at 25°C when touch function is Idle;

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3.2 Backlight Unit

< Table 4. LED Driving Guideline Specifications > Ta=25+/-2°C

Parameter		Min.	Typ.	Max.	Unit	Remarks	
LED Forward Voltage		V _F	-	-	3	V	
LED Forward Current		I _F	-	16.4	-	mA	
LED Power Input Voltage		V _{LED}	5	12	21	V	
LED Power Input Current		I _{LED}	-	-	196	mA	Note 1
LED Power Consumption		P _{LED}	-	2.1	2.35	W	
Power Supply Voltage for LED Driver Inrush		I _{led} inrush	-	-	1.5	A	Note 3
LED Life-Time		N/A	15,000	-	-	Hour	I _F = 17.4mA Note 2
EN Control Level	Backlight On	V _{BL_EN}	1.2	-	3.3	V	
	Backlight Off		0	-	0.6	V	
PWM Control Level	High Level	V _{BL_PWM}	1.2	-	3.3	V	
	Low Level		0	-	0.6	V	
PWM Control Frequency		F _{PWM}	200	-	2,000	Hz	
Duty Ratio			1	-	100	%	

Notes :

- Power supply voltage12V for LED driver.
 Calculator value for reference $I_F \times V_F \times 40$ /driver efficiency = PLED
- The LED life-time define as the estimated time to 50% degradation of initial luminous.
- Measure condition (Figure 5)

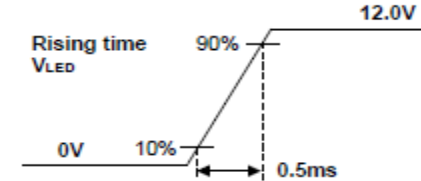
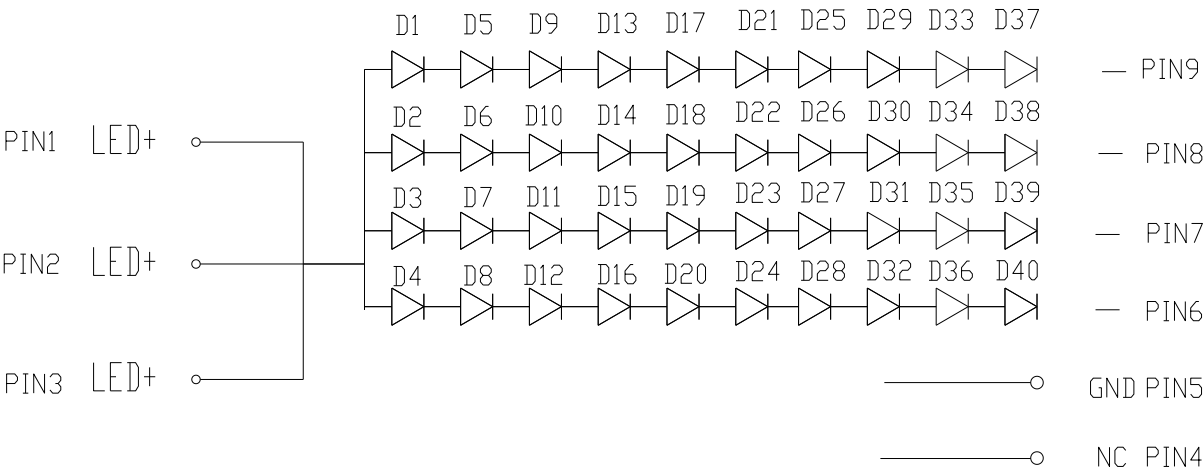


Figure 5. Inrush Measure Condition

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3.3 LED Structure



40(4P10S) WHITE LED DIAGRAM

Figure 6. LED Structure

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4.0 OPTICAL SPECIFICATION

4.1 Overview

The test of optical specifications shall be measured in a dark room (ambient luminance ≤ 1 lux and temperature = 25±2°C) with the equipment of luminance meter system (PR730&PR810) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0°. We refer to θØ=0 (=θ3) as the 3 o’clock direction (the “right”), θØ=90 (= θ12) as the 12 o’clock direction (“upward”), θØ=180 (= θ9) as the 9 o’clock direction (“left”) and θØ=270(= θ6) as the 6 o’clock direction (“bottom”). While scanning θand/or Ø, the center of the measuring spot on the display surface shall stay fixed. The backlight should be operating for 30 minutes prior to measurement. VDD shall be 3.3+/- 0.3V at 25°C. Optimum viewing angle direction is 6 ’clock.

4.2 Optical Specifications

<Table 5. Optical Specifications>

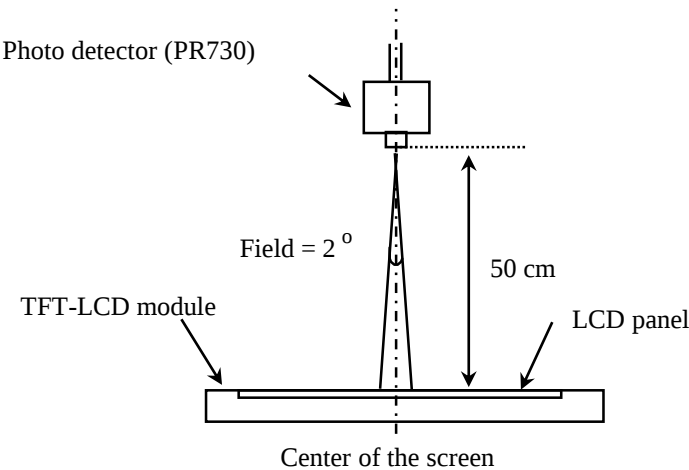
Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle Range	Horizontal	Θ ₃	CR > 10	80	89	-	Deg.	Note 1
		Θ ₉		80	89	-	Deg.	
	Vertical	Θ ₁₂		80	89	-	Deg.	
		Θ ₆		80	89	-	Deg.	
Luminance Contrast Ratio		CR	Θ = 0°	1000	1200	max		Note 2
Luminance of White	Center Points	Y _w	Θ = 0° I _{LED} = 16.4mA	425	500	575	cd/m²	Note 3
White Luminance Uniformity	5 Points	ΔY5		80	-	-	%	Note 4
	13 Points	ΔY13		67	-	-	%	
White Chromaticity		W _x	Θ = 0°	0.274	0.299	0.324		Note 5
		W _y		0.290	0.315	0.340		
Reproduction of Color	Red	R _x	Θ = 0°	Typ.-0.025	0.652	Typ.+0.025		
		R _y			0.341			
	Green	G _x			0.300			
		G _y			0.619			
	Blue	B _x			0.144			
		B _y			0.044			
Color Gamut				98	100	-	%	sRGB
Response Time (Rising + Falling)		T _{RT}	Ta= 25°C Θ = 0°	-	17	20	ms	Note 6
Response Time (GTG)		GTG	Ta= 25°C Θ = 0°	-	25	-	ms	
Cross Talk		CT	Θ = 0°	-	-	2.0	%	Note 7
Color Temperature		-	-	6000	-	9000	K	
Gamma		-	-	2.0	2.2	2.4	-	

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Notes : 1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see Figure 7). 2. Contrast measurements shall be made at viewing angle of $\Theta = 0$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state . (see Figure 7) Luminance Contrast Ratio (CR) is defined mathematically. $CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$ 3. Center Luminance of white is defined as luminance values of 5 point average across the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in Figure 8 for a total of the measurements per display. 4. The White luminance uniformity on LCD surface is then expressed as : $\Delta Y = \text{Minimum Luminance of 5(or 13) points} / \text{Maximum Luminance of 5(or 13) points.}$(see Figure 8 and Figure 9). 5. The color chromaticity coordinates specified in Table 5 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel. 6. The electro-optical response time measurements shall be made as Figure 10 by switching the “data” input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is T_i, and 90% to 10% is T_r. 7. Cross-Talk of one area of the LCD surface by another shall be measured by comparing the luminance (YA) of a 25mm diameter area, with all display pixels set to a gray level, to the luminance (YB) of that same area when any adjacent area is driven dark. (See Figure 11).			
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4.3 Optical Measurements



Optical characteristics measurement setup

Figure 7. Measurement Set Up

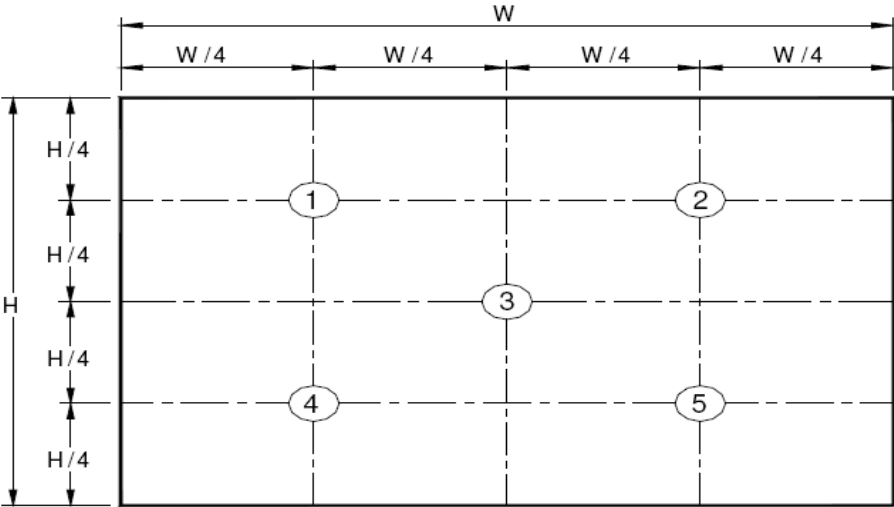
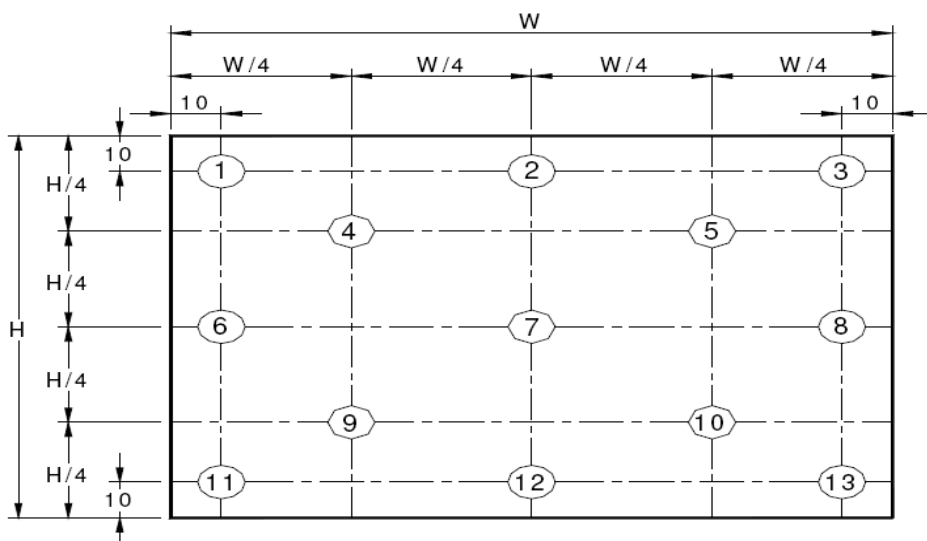


Figure 8. White Luminance and Uniformity Measurement Locations (5 points)

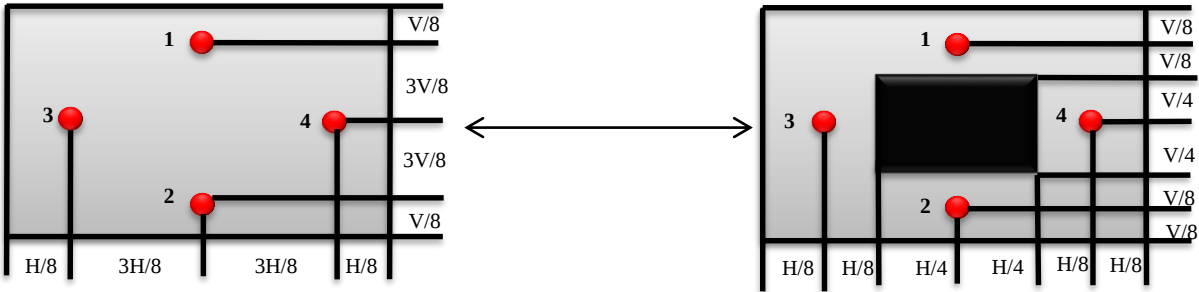
Center Luminance of white is defined as luminance values of center 5 points across the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in Figure 7 for a total of the measurements per display.



The White luminance uniformity on LCD surface is then expressed as : $\Delta Y5$ = Minimum Luminance of five points / Maximum Luminance of five points (see Figure 8) , $\Delta Y13$ = Minimum Luminance of 13 points /Maximum Luminance of 13 points (see Figure 9).

The electro-optical response time measurements shall be made as shown in Figure 10 by switching the “data” input signal ON and OFF. Tr: The luminance to change from 10% to 90% ,Tf: The luminance to change from 90% to 10% .

The test system : LMS PR810



Cross Talk (%) = $\left| \frac{Y_B - Y_A}{Y_A} \right| \times 100$

Figure 11. Cross Talk Modulation Test Description

Where:

Y_A = Initial luminance of measured area (cd/m²)

Y_B = Subsequent luminance of measured area (cd/m²)

The location 1/2/3/4 measured will be exactly the same in both patterns. The test background gray is from L64 to L192.Take the largest data as the result.

Cross Talk of one area of the LCD surface by another shall be measured by comparing the luminance (YA) of a 25mm diameter area, with all display pixels set to a gray level, to the luminance (YB) of that same area when any adjacent area is driven dark.(Refer to Figure 11)

The test system: PR730

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5.0 INTERFACE CONNECTION

5.1 Electrical Interface Connection

The electronics interface connector is I-PEX 20455-040E.
The connector interface pin assignments are listed in Table 6.

<Table 6. Pin Assignments for the Interface Connector>

PIN NO	Symbol Function	Description	PIN NO	Symbol Function	Description
1	NC	No connect	21	BL_GND	Backlight_ground
2	H_GND	High Speed Ground	22	BL_Enable	Backlight On / Off
3	Lane1_N	Comp Signal Link Lane 1	23	BL_PWM	System PWM signal Input
4	Lane1_P	True Signal Link Lane 1	24	NC	No connect
5	H_GND	High Speed Ground	25	NC	No connect
6	Lane0_N	Comp Signal Link Lane 0	26	BL_PWR	Backlight power
7	Lane0_P	True Signal Link Lane 0	27	BL_PWR	Backlight power
8	H_GND	High Speed Ground	28	BL_PWR	Backlight power
9	Aux_Ch_P	True Signal Auxiliary Ch.	29	BL_PWR	Backlight power
10	Aux_Ch_N	Comp Signal Auxiliary Ch.	30	NC	No connect
11	H_GND	High Speed Ground	31	TP_RST	Reset for Touch
12	LCD_VCC	LCD logic and driver power	32	GND	Ground–Shield
13	LCD_VCC	LCD logic and driver power	33	TP_SCL	I2C Clock for Touch
14	LCD_Self_Test(BIST)	LCD Panel Self Test Enable	34	TP_SDA	I2C Data for Touch
15	LCD_GND	LCD logic and driver ground	35	GND	Ground–Shield
16	LCD_GND	LCD logic and driver ground	36	TP_INT	Interrupt for Touch
17	HPD	HPD signal pin	37	NC	No connect
18	BL_GND	Backlight_ground	38	TP_EN	For Touch function enable (Low_Disable & High_Enable)
19	BL_GND	Backlight_ground	39	NC	No connect
20	BL_GND	Backlight_ground	40	VTSP	Touch panel power supply (3.3V)

Note: I2C using information 1.Digital Vcom Address: 1001111x 2..LED driver: 0110110x

5.2 eDP Interface

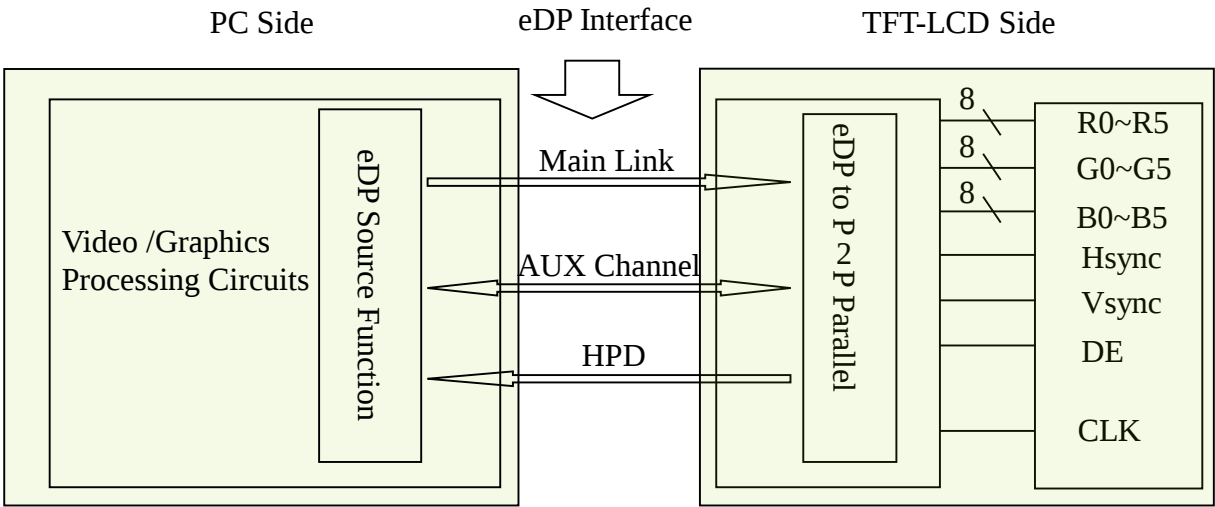


Figure 12. eDP Interface Architecture

Note:
Transmitter : Novatek NT56810 or equivalent.
Transmitter is not contained in module.

5.3 Data Input Format

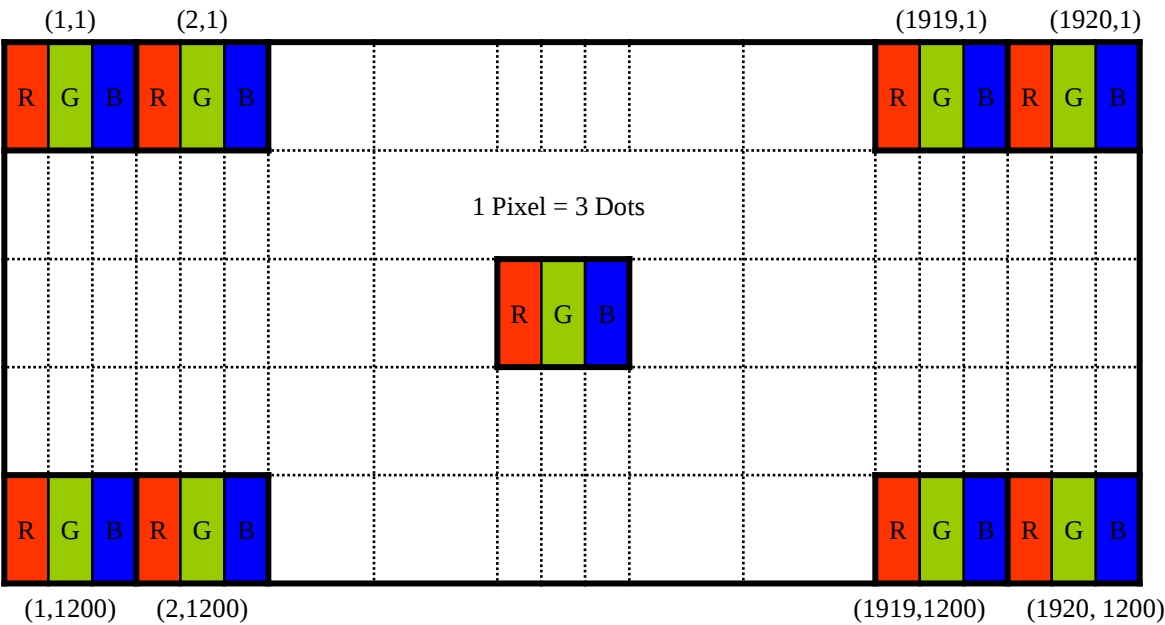


Figure 13. Display Position of Input Data (V-H)

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5.4 Back-light & LCM Interface Connection

BLU Interface Connector: UJU PF040-B09B-C09 .

<Table 7. Pin Assignments for the BLU Connector>

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	Vout	LED anode connection	6	LED	LED cathode connection
2	Vout	LED anode connection	7	LED	LED cathode connection
3	Vout	LED anode connection	8	LED	LED cathode connection
4	NC	No Connection	9	LED	LED cathode connection
5	GND	GND			

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6.0 SIGNAL TIMING SPECIFICATION

6.1 The NS080WUM-LX1 Is Operated By The DE Only

< Table 8. Signal Timing Specification >

Item		Symbols	Min	Typ	Max	Unit
Clock	Frequency	1/Tc	-	319.494	-	MHz
Frame Period		Tv	-	1264	-	lines
			-	120	-	Hz
			-	8.33	-	ms
Vertical Display Period		Tvd	-	1200	-	lines
One line Scanning Period		Th	-	2080	-	clocks
Horizontal Display Period		Thd	-	1920	-	clocks

Note : The above is as optimized setting.

6.2 eDP Rx Interface Timing Parameter

The specification of the eDP Rx interface timing parameter is shown in Table 9.

<Table 9. eDP Main-Link RX TP4 Package Pin Parameters>

Item	Symbol	Min	Typ	Max	Unit	Remark
Spread spectrum clock (Link clock down-spreading)	SSC	-	-	0.5	%	
Differential peak-to-peak input voltage at package pins	V _{RX-DIFFp-p}	120	-	1200	mV	
Rx input DC common mode voltage	V _{RX_DC_CM}	0	-	2	V	
Differential termination resistance	R _{RX-DIFF}	80	-	100	Ω	
Single-ended termination resistance	R _{RX-SE}	40	-	60	Ω	
Rx short circuit current limit	I _{RX_SHORT}	-	-	20	mA	
Intra-pair skew at Rx package pins (HBR) RX intra-pair skew tolerance at HBR	L _{RX_SKEW_INTRA_PAIR}	-	-	60	ps	
AC Coupling Capacitor	C _{SOURCE_ML}	75		200	nF	Source side

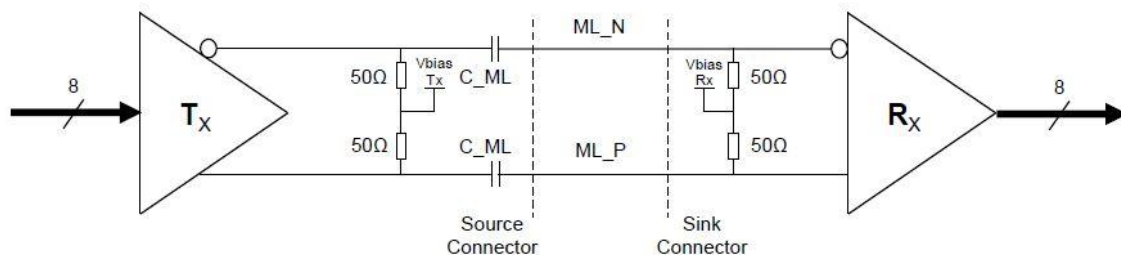
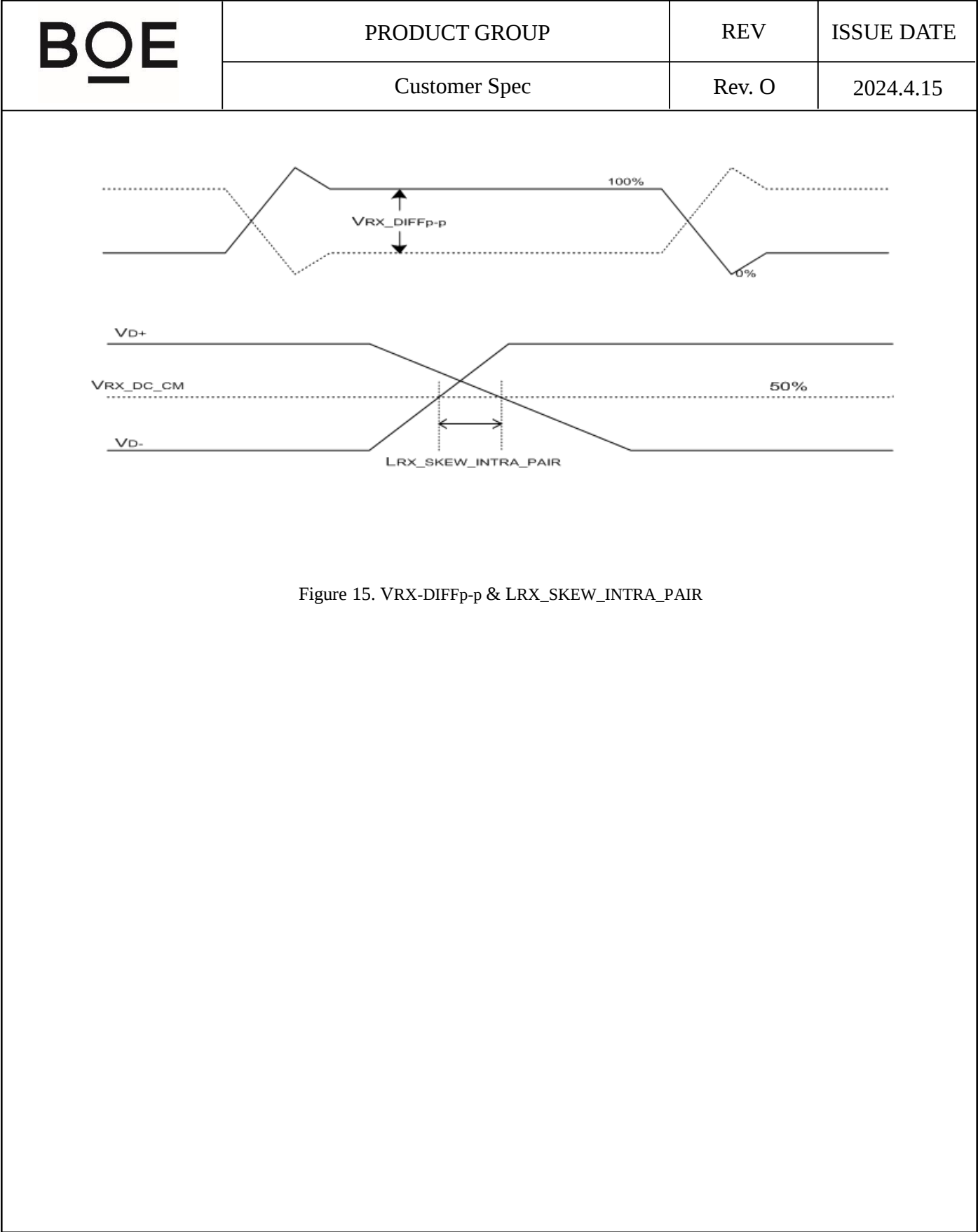


Figure 14. Main link differential pair



<Table 10. HPD Characteristics>

Item	Symbol	Min	Typ	Max	Unit	Remark
HPD voltage	V _{HPD}	2.25	-	3.6	V	
Hot Plug Detection Threshold	-	2.0	-	-	V	Source side Detecting
Hot Unplug Detection Threshold	-	-	-	0.8V	V	
HPD_IRQ Pulse Width	HPD_IRQ	0.5	-	1	ms	
HPD_TimeOut	-	2.0	-	-	ms	

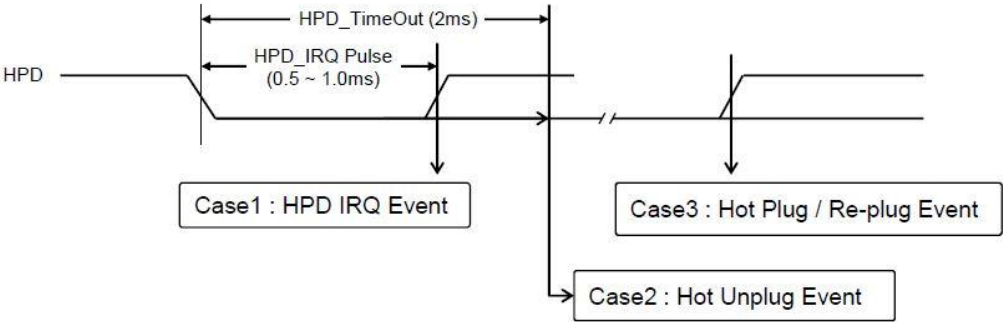


Figure 16. HPD Events

<Table 11. AUX Characteristics>

Item	Symbol	Min	Typ	Max	Unit	Remark
AUX unit interval	UIAUX	0.4	0.5	0.6	Us	
AUX peak-to-peak input differential voltage	VAUX-RX-DIFFp-p	0.29	-	1.38	V	
AUX CH termination DC resistance	RAUX-TERM	80	100	120	Ohm	
AUX DC common mode voltage	VAUX-DC-CM	0	-	2	V	
AUX turn around common mode voltage	VAUX-TURN-CM	-	-	0.3	V	
AUX short circuit current limit	IAUX-SHORT	-	-	90	mA	
AUX AC Coupling Capacitor	CSOURCE-AUX	75	-	200	nf	Source side

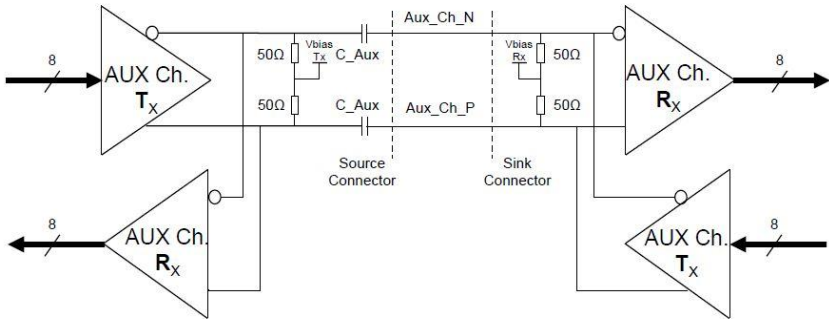


Figure 17. AUX differential pair

7.0 INPUT SIGNALS, BASIC DISPLAY COLORS & GRAY SCALE OF COLORS

<Table 12. Input Signal & Basic Display Colors & Gray Scale of Colors >

	Colors & Gray scale	Data signal																							
		R0 R1 R2 R3 R4 R5 R6 R7	G0 G1 G2 G3 G4 G5 G6 G7	B0 B1 B2 B3 B4 B5 B6 B7																					
Basic colors	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																					
	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																					
	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																					
	Light Blue	0 0 0 0 0 0 0 0	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1																					
	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																					
	Purple	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																					
Gray scale of Red	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																					
	△	1 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																					
	Darker	0 1 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																					
	△	↑							↑							↑									
	▽	↓							↓							↓									
	Brighter	1 0 1 1 1 1 1 1	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																					
	▽	0 1 1 1 1 1 1 1	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																					
Gray scale of Green	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																					
	△	0 0 0 0 0 0 0 0	1 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																					
	Darker	0 0 0 0 0 0 0 0	0 1 0 0 0 0 0 0	0 0 0 0 0 0 0 0																					
	△	↑							↑							↑									
	▽	↓							↓							↓									
	Brighter	0 0 0 0 0 0 0 0	1 0 1 1 1 1 1 1	0 0 0 0 0 0 0 0																					
	▽	0 0 0 0 0 0 0 0	0 1 1 1 1 1 1 1	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																					
Gray scale of Blue	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																					
	△	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	1 0 0 0 0 0 0 0																					
	Darker	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 1 0 0 0 0 0 0																					
	△	↑							↑							↑									
	▽	↓							↓							↓									
	Brighter	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	1 0 1 1 1 1 1 1																					
	▽	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 1 1 1 1 1 1 1																					
	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																					
Gray scale of White& Black	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																					
	△	1 0 0 0 0 0 0 0	1 0 0 0 0 0 0 0	1 0 0 0 0 0 0 0																					
	Darker	0 1 0 0 0 0 0 0	0 1 0 0 0 0 0 0	0 1 0 0 0 0 0 0																					
	△	↑							↑							↑									
	▽	↓							↓							↓									
	Brighter	1 0 1 1 1 1 1 1	1 0 1 1 1 1 1 1	1 0 1 1 1 1 1 1																					
	▽	0 1 1 1 1 1 1 1	0 1 1 1 1 1 1 1	0 1 1 1 1 1 1 1																					
		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																				

8.0 POWER SEQUENCE

To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below.

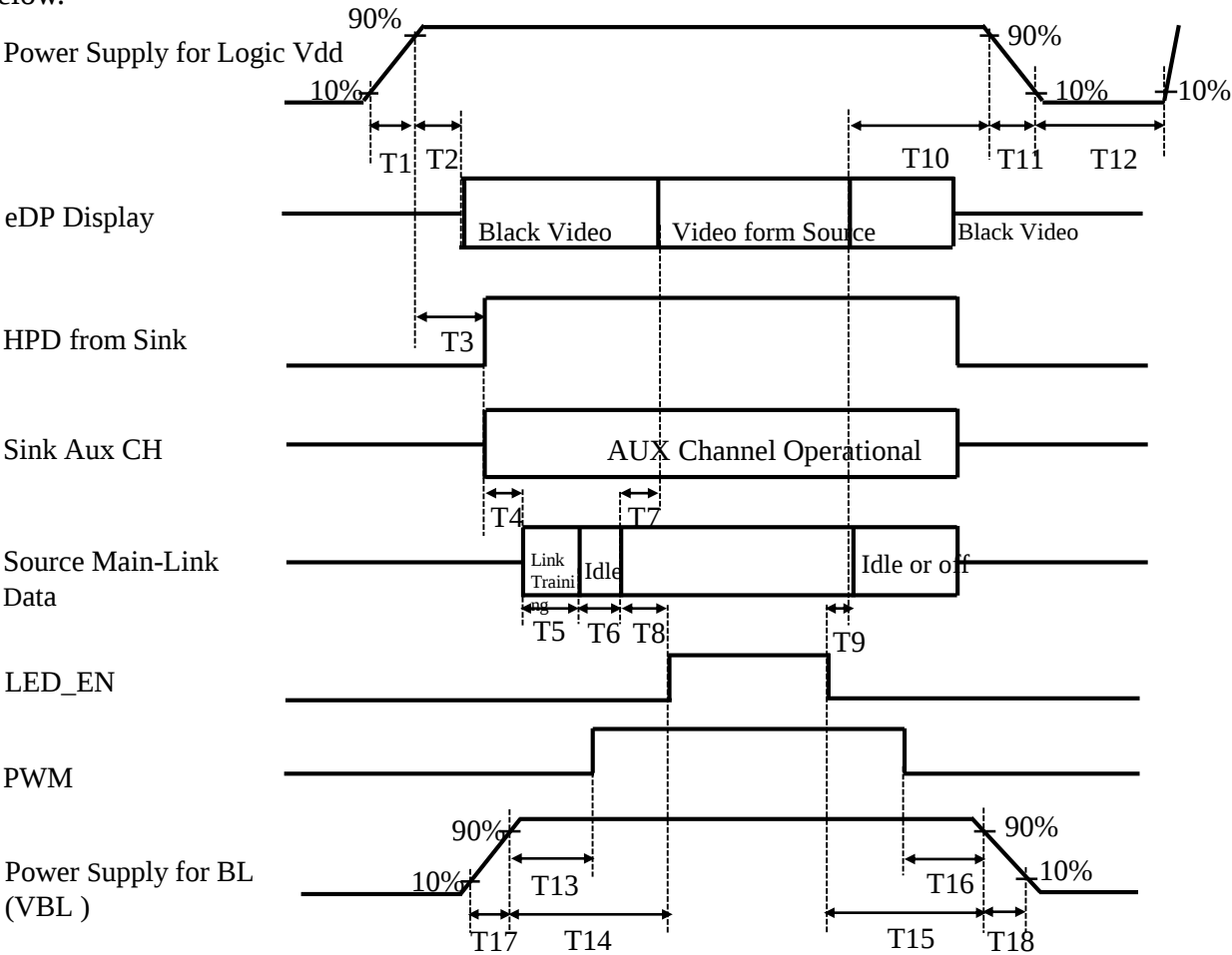


Figure 18-1. Power Sequence

- 0.5ms ≤ T1 ≤ 10 ms
 - 0ms < T2 ≤ 80 ms
 - 0ms < T3 ≤ 80 ms
 - T4+T5+T6+T8>80ms
 - 0ms < T7 ≤ 50ms
 - 50ms < T8
 - 0ms < T9
- 100ms < T10 < 500 ms
 - 0.5ms ≤ T11 ≤ 10 ms
 - 500ms ≤ T12
 - 0ms < T13
 - 0ms < T14
 - 0ms < T15
 - 0ms < T16
- 0.5ms ≤ T17
 - 0.5ms ≤ T18

Notes:

- When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.
- Do not keep the interface signal high impedance when power is on. Back Light must be turn on after power for logic and interface signal are valid.

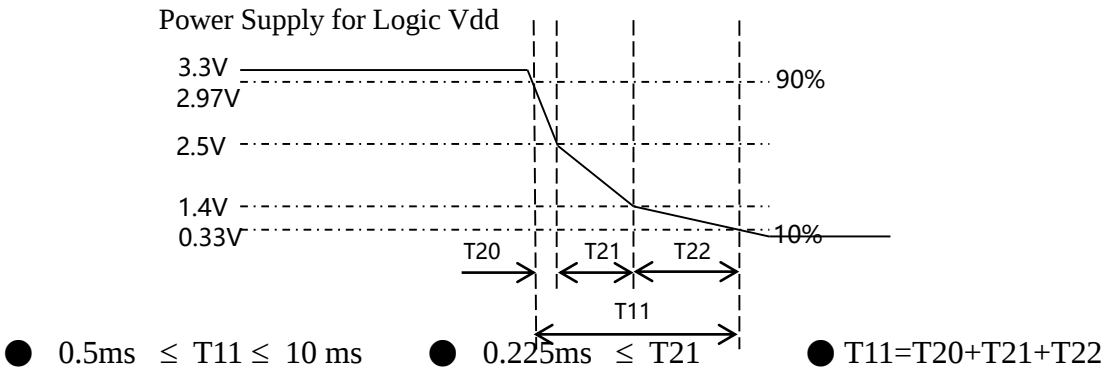


Figure 19. T11 timing requirements

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	Customer Spec	Rev. O	2024.4.15

To prevent a latch-up or DC operation of the TLCM module, the power on/off sequence of Touch shall be as shown in below

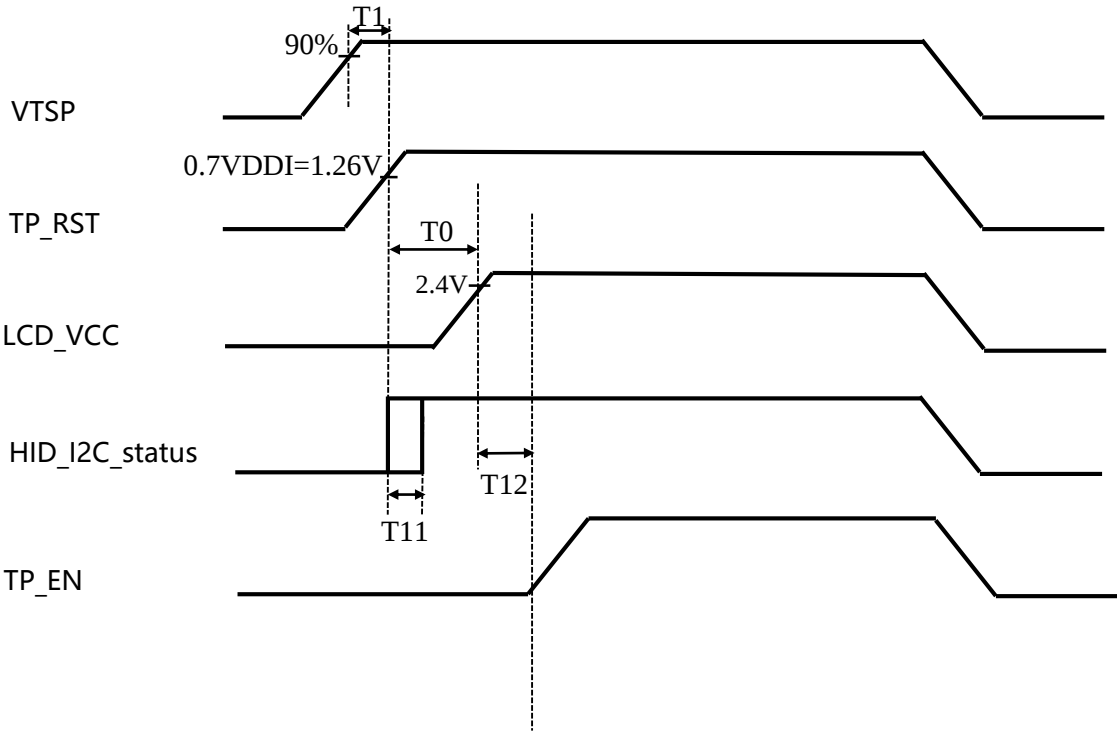


Figure18-2 .Touch Power Sequence

- 10ms ≤ T0
- 10ms ≤ T1
- 20ms ≤ T11
- 205ms ≤ T12

Notes:

1. When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on. Back Light must be turn on after power for logic and interface signal are valid.

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9.0 Connector Description

Physical interface is described as for the connector on LCM.
These connectors are capable of accommodating the following signals and will be following components.

9.1 TFT LCD Module

< Table 13. Signal Connector >

Connector Name /Description	For Signal Connector
Manufacturer	I-PEX
Type/ Part Number	I-PEX 20455-040E
Mating Housing/ Part Number	I-PEX 20455-040E

BOE	PRODUCT GROUP	REV	ISSUE DATE
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10.0 MECHANICAL CHARACTERISTICS

10.1 Dimensional Requirements

Figure 23 shows mechanical outlines for the model NS080WUM-LX1.
Other parameters are shown in Table 14.

<Table 14. Dimensional Parameters>

Parameter	Specification	Unit
Active Area	172.224 (H) ×107.64 (V)	mm
Number of pixels	1920 (H) X 1200 (V) (1 pixel = R + G + B dots)	pixels
Pixel pitch	89.7 (H) X 89.7 (V)	um
Pixel arrangement	RGB Vertical stripe	
Display colors	16.7M(8bit)	
Display mode	Normally white	
Dimensional outline	180.2±0.08 *121.9±0.08*2.35(Max)(Body)@TLCM 180.2±0.08*121.9±0.08*4.35(Max)(PCBA)@TLCM	mm
Weight	92 (max)	g

10.2 Mounting

See Figure 24.

10.3 Anti-Glare and Polarizer Hardness.

The surface of the LCD has an Anti-Glare coating to minimize reflection and a coating to reduce scratching. Front POL > 3H.

10.4 Light Leakage

There shall not be visible light from the back-lighting system around the edges of the screen as seen from a distance 50cm from the screen with an overhead light level of 350lux.

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11.0 RELIABILITY TEST

The reliability test items and its conditions are shown in below.
<Table 15. Reliability Test>

No	Test Items	Conditions	Remark
1	High temperature storage test	Ta = 60°C , 60%RH, 240 hrs	
2	Low temperature storage test	Ta = -20°C , 240 hrs	
3	High temperature & high humidity operation test	Ta = 50°C , 80%RH, 240 hrs	
4	High temperature operation test	Ta = 50°C , 60%RH, 240 hrs	
5	Low temperature operation test	Ta = 0°C , 240 hrs	
6	Thermal shock	Ta = -20 °C ↔ 60 °C (0.5 hr), 60%±3%RH, 100 cycle	
7	Vibration test (non-operating)	Ta = 25°C , 60%RH, 1.5G, 10~500Hz, Sine X,Y,Z / Sweep rate : 1 hour	Note 1
8	Shock test (non-operating)	Ta = 25°C , 60%RH, 220G, Half Sine Wave 2msec±X,±Y,±Z Once for each direction	Note 1
9	Electro-static discharge test (operating)	Air : 150 pF, 330Ω, ±15 KV Contact : 150 pF, 330Ω, ±8 KV Ta = 25°C , 60%RH,	Note 2

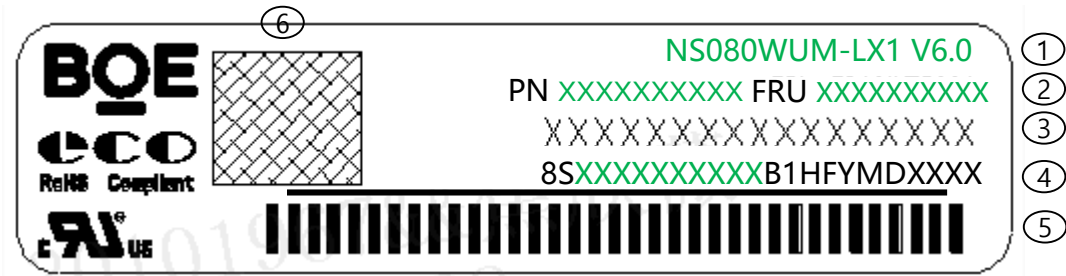
- Notes :
- 1. The fixture must be hard enough , so that the module would not be twisted or bent.
 - 2. Self- recovery and restart recovery is allowed. No hardware failures.

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12.0 HANDLING & CAUTIONS (1) Cautions when taking out the module - Pick the pouch only, when taking out module from a shipping package. (2) Cautions for handling the module - As the electrostatic discharges may break the LCD module, handle the LCD module with care. Peel a protection sheet off from the LCD panel surface as slowly as possible. - As the LCD panel and back - light element are made from fragile glass material, impulse and pressure to the LCD module should be avoided. - As the surface of the polarizer is very soft and easily scratched, use a soft dry cloth without chemicals for cleaning. - Do not pull the interface connector in or out while the LCD module is operating. - Put the module display side down on a flat horizontal plane. - Handle connectors and cables with care. (3) Cautions for the operation - When the module is operating, do not lose CLK, ENAB signals. If any one of these signals is lost, the LCD panel would be damaged. - Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged. (4) Cautions for the atmosphere - Dew drop atmosphere should be avoided. - Do not store and/or operate the LCD module in a high temperature and/or humidity atmosphere. Storage in an electro-conductive polymer packing pouch and under relatively low temperature atmosphere is recommended. (5) Cautions for the module characteristics - Do not apply fixed pattern data signal to the LCD module at product aging. - Applying fixed pattern for a long time may cause image sticking. (6) Other cautions - Do not disassemble and/or re-assemble LCD module. - Do not re-adjust variable resistor or switch etc. - When returning the module for repair or etc. Please pack the module not to be broken. We recommend to use the original shipping packages.			
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13.0 LABEL

(1) Product Label



标签尺寸: 48mm × 12mm, 厚度0.075mm

- 1. FG-CODE: NS080WUM-LX1 V6.0
- 2. FRU码: XXXXXXXXXXXX; PN码: XXXXXXXXXXXX
- 3. MDL ID(厂内信息)
- 4. PPID 8S码: XXXXXXXXXXXX
- 5. MDL ID 条纹码(厂内信息)
- 6. PPID对应二维码(客户端信息)

<Table 16. Module ID Naming Rule>

MDL ID 编码规则

序列号	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
代码	X	X	X	6	X	X	X	X	X	X	X	X	X	X	X	X	X
描述	GBN代码		等级	B6	年		月	FG Code后四位				序列号					

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(2) High voltage caution label

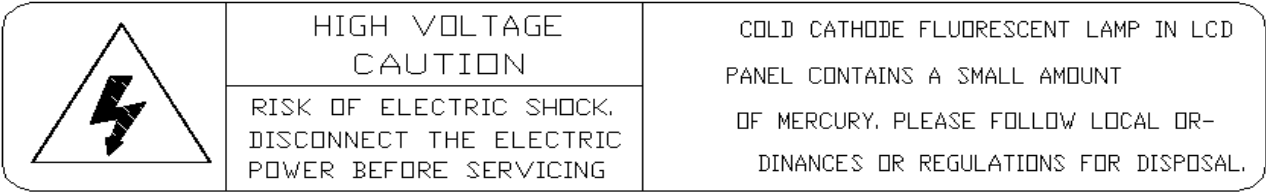


Figure 20. High Voltage Caution Label

(3) Box label



Figure 21. Box Label

Serial number marked part needs to print, show as follows:

1. FG-CODE(Before 12 bit)
2. Product quantity
3. Box ID
4. Date
5. The client section material number(The client)
6. FG-Code After four
7. The supplier code

Total Size:100×60mm

<Table 17. Box Label Naming Rule >

Digit Code	1	2	3	4	5	6	7	8	9	10	11	12	13
Code	B	9	A	F	1	7	8	N	0	0	3	2	7
Description	Product Name		Product Grade	B8	Year		Month	Revision	BOX Serial Number				

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14.0 PACKING INFORMATION

14.1 Packing Order

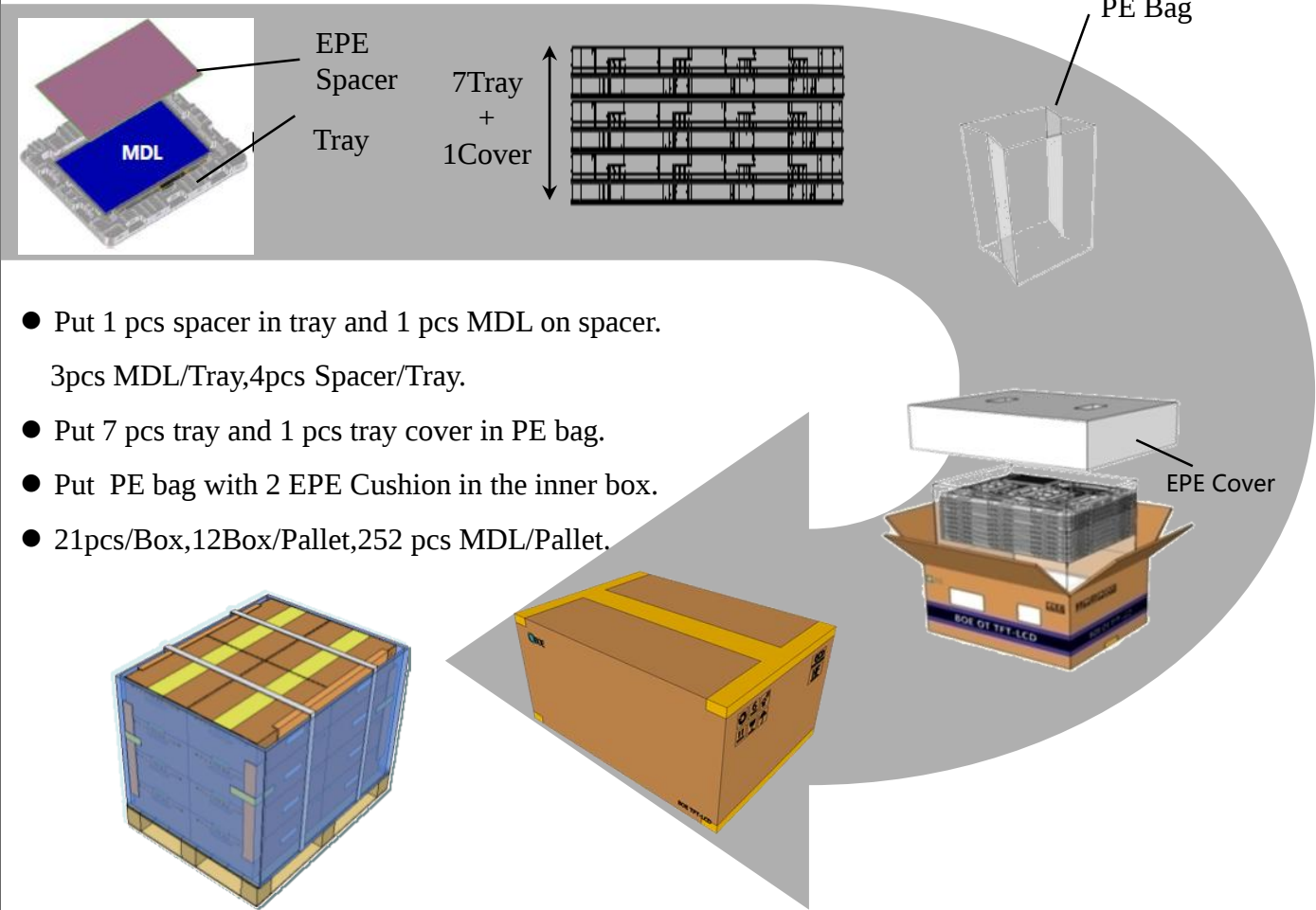


Figure 22. Packing Order

14.2 Note

- Box dimension: 522mm*392mm*294mm
- Package quantity in one box: 21pcs
- Total weight: 10.0 kg/Box (Typ)

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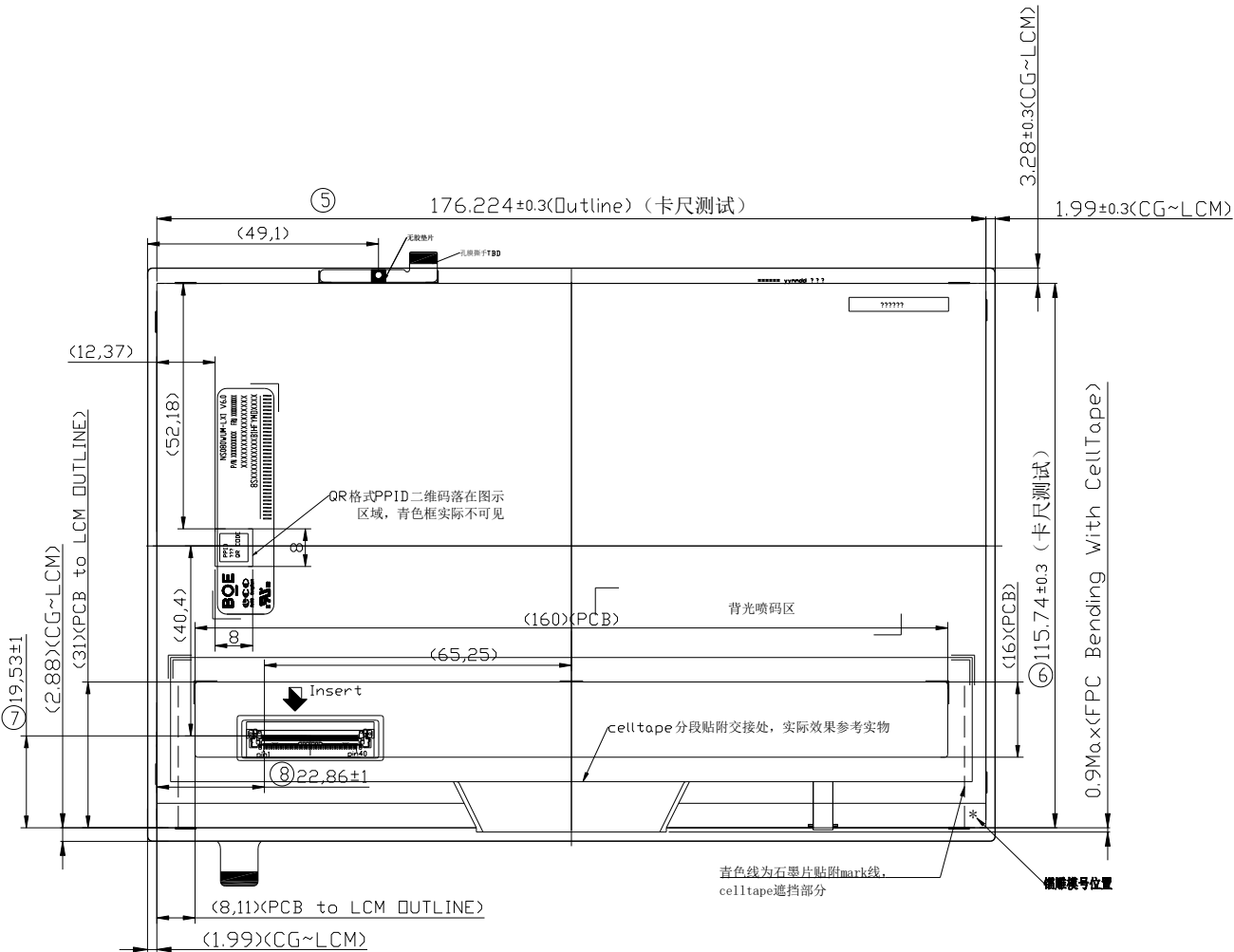


Figure 26. TFT-LCD Module Outline Dimensions (Rear view)

- Notes:
1. Warpage and deformation Spec.: 0.5mm Max..
 2. The eDP connector is measured at PIN 1 and mating line.
 3. Unspecified tolerance refer to ±0.3 mm.
 4. Critical dimension: ① ~ ⑧
 5. Measurement method refer to Appendix A
 6. System matching refer to Appendix B
 7. “()”marks the reference dimensions.

16.0 EDID Table

Byte#	Byte#	Field Name and Comments (BIOS EDID based)	Lenovo Requirements	Value	Value	Value	Remarks (Can not edit cell by protected)
(Dec)	(Hex)			(Hex)	(Dec)	(Binary)	
0	00	EDID Header	"00h" fixed	00	0	00000000	
1	01		"FFh" fixed	FF	255	11111111	
2	02		"FFh" fixed	FF	255	11111111	
3	03		"FFh" fixed	FF	255	11111111	
4	04		"FFh" fixed	FF	255	11111111	
5	05		"FFh" fixed	FF	255	11111111	
6	06		"FFh" fixed	FF	255	11111111	
7	07		"00h" fixed	00	0	00000000	
8	08	ID	08h -> "30h" fixed	09	9	00001001	BOE
9	09	Manufacturer Name	09h -> "AEh" fixed LEN (30AEh)	E5	229	11100101	
10	0A	ID Product Code	Lenovo Spec defined	FF	255	11111111	# 0
11	0B			0C	12	00001100	
12	0C	ID Serial	Basically "00h"	00	0	00000000	
13	0D	Number (32-bit serial	Basically "00h"	00	0	00000000	
14	0E	number)	Basically "00h"	00	0	00000000	
15	0F		Basically "00h"	00	0	00000000	
16	10	Manufacture week (1-53) & Model year Flag (FFh)	Panel EDID: "00h" or Manufacture week	14	20	00010100	20 weeks
17	11	Manufacture year (year - 1990) or Model year	Manufacture year	22	34	00100010	Manufacture Year: 2024
18	12	EDID Structure version		01	1	00000001	1.4
19	13	EDID Revision		04	4	00000100	
20	14	Video Input Definition		A5	165	10100101	Digital Video Signal Interface. 8 Bits per Primary Color. DisplayPort.
21	15	H screen size (cm) or Aspect Ratio	H screen size (cm)	11	17	00010001	17 cm
22	16	V screen size (cm) or Aspect Ratio	V screen size (cm)	0B	11	00001011	11 cm
23	17	Display gamma (gamma x 100)-100		78	120	01111000	2.20
24	18	Feature support(DPM S)	BIOS EDID: Lenovo Spec Defined Bit 0" must be set to "1", to indicate that the display supports continuous frequency	07	7	00000111	Standby Mode is not supported. Suspend Mode is not supported. Active Off = Very Low Power is not supported. RGB 4:4:4. sRGB Standard is the default color space. Preferred Timing Mode includes the native pixel format and preferred refresh rate of the display device. Display is continuous frequency.

25	19	Red/Green Low Bits	Basically enter the same value as CAS.	1E	30	00011110	Gamut 77.83 % (NTSC, Area Ratio)
26	1A	Blue/White Low Bits		DB	219	11011011	
27	1B	Red x		A7	167	10100111	0.652
28	1C	Red y		57	87	01010111	0.341
29	1D	Green x		4C	76	01001100	0.300
30	1E	Green y		9E	158	10011110	0.619
31	1F	Blue x		24	36	00100100	0.144
32	20	Blue y		0B	11	00001011	0.044
33	21	White x		4C	76	01001100	0.299
34	22	White y		50	80	01010000	0.315
35	23	Established Timing 1	"00h" fixed	00	0	00000000	
36	24	Established Timing 2	"00h" fixed	00	0	00000000	
37	25	Manufacturer's Reserved Timings	"00h" fixed	00	0	00000000	
38	26	Standard Timing Identification #1	"01h" fixed	01	1	00000001	Standard Timing unused
39	27	Standard Timing Identification #1	"01h" fixed	01	1	00000001	Standard Timing unused
40	28	Standard Timing Identification #2	"01h" fixed	01	1	00000001	Standard Timing unused
41	29	Standard Timing Identification #2	"01h" fixed	01	1	00000001	Standard Timing unused
42	2A	Standard Timing Identification #3	"01h" fixed	01	1	00000001	Standard Timing unused
43	2B	Standard Timing Identification #3	"01h" fixed	01	1	00000001	Standard Timing unused
44	2C	Standard Timing Identification #4	"01h" fixed	01	1	00000001	Standard Timing unused
45	2D	Standard Timing Identification #4	"01h" fixed	01	1	00000001	Standard Timing unused
46	2E	Standard Timing Identification #5	"01h" fixed	01	1	00000001	Standard Timing unused
47	2F	Standard Timing Identification #5	"01h" fixed	01	1	00000001	Standard Timing unused
48	30	Standard Timing Identification #6	"01h" fixed	01	1	00000001	Standard Timing unused
49	31	Standard Timing Identification #6	"01h" fixed	01	1	00000001	Standard Timing unused
50	32	Standard Timing Identification #7	"01h" fixed	01	1	00000001	Standard Timing unused
51	33	Standard Timing Identification #7	"01h" fixed	01	1	00000001	Standard Timing unused
52	34	Standard Timing Identification #8	"01h" fixed	01	1	00000001	Standard Timing unused
53	35	Standard Timing Identification #8	"01h" fixed	01	1	00000001	Standard Timing unused

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54	36	Pixel Clock/10,000 (LSB)	BIOS EDID: Preferred(Typical) Timing Mode	3E	62	00111110	315.50MHz		
55	37	Pixel Clock/10,000 (MSB) /		7B	123	01111011	(FV 120.00 Hz, FH 151.68 kHz)		
56	38	Horizontal Active		80	128	10000000	1920 pixels		
57	39	Horizontal Blanking		A0	160	10100000	160 pixels		
58	3A	Horizontal Active : Horizontal Blanking		70	112	01110000	(Hbp= 80 pixels)		
59	3B	Vertical Active		B0	176	10110000	1200 lines		
60	3C	Vertical Blanking		40	64	01000000	64 lines		
61	3D	Vertical Active : Vertical Blanking		40	64	01000000	(Vbp= 4 lines)		
62	3E	Horizontal Sync. Offset		30	48	00110000	48 pixels		
63	3F	Horizontal Sync Pulse Width		20	32	00100000	32 pixels		
64	40	Vertical Sync Offset : Sync Width		66	102	01100110	54 lines / 6 lines		
65	41	Horizontal Vertical Sync Offset/Width		0C	12	00001100			
66	42	Horizontal Image Size		AC	172	10101100	172 mm		
67	43	Vertical Image Size		6C	108	01101100	108 mm		
68	44	Horizontal & Vertical Image Size	00	0	00000000				
69	45	Horizontal Border	00	0	00000000	0 pixels			
70	46	Vertical Border	00	0	00000000	0 lines			
71	47	Signal Interface Type	1A	26	00011010	Non-Interlaced (1 frame = 1 field) Normal Display – No Stereo. Digital Separate Sync: Vertical Sync is Positive; Horizontal Sync is Positive			
72	48	Pixel Clock/10,000 (LSB)	BIOS EDID: Slow Refresh Rate Timing Mode	9F	159	10011111	157.75MHz		
73	49	Pixel Clock/10,000 (MSB) /		3D	61	00111101	(FV 60.00 Hz, FH 75.84 kHz)		
74	4A	Horizontal Active		80	128	10000000	1920 pixels		
75	4B	Horizontal Blanking		A0	160	10100000	160 pixels		
76	4C	Horizontal Active : Horizontal Blanking		70	112	01110000	(Hbp= 80 pixels)		
77	4D	Vertical Active		B0	176	10110000	1200 lines		
78	4E	Vertical Blanking		40	64	01000000	64 lines		
79	4F	Vertical Active : Vertical Blanking		40	64	01000000	(Vbp= 4 lines)		
80	50	Horizontal Sync. Offset		30	48	00110000	48 pixels		
81	51	Horizontal Sync Pulse Width		20	32	00100000	32 pixels		
82	52	Vertical Sync Offset : Sync Width		66	102	01100110	54 lines / 6 lines		
83	53	Horizontal Vertical Sync Offset/Width		0C	12	00001100			
84	54	Horizontal Image Size		AC	172	10101100	172 mm		
85	55	Vertical Image Size		6C	108	01101100	108 mm		
86	56	Horizontal & Vertical Image Size		00	0	00000000			
87	57	Horizontal Border		00	0	00000000	0 pixels		
88	58	Vertical Border		00	0	00000000	0 lines		
89	59	Signal Interface Type	1A	26	00011010	#N/A			

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90	5A	Reserved for definition	5Ah -> "00h" fixed 5Bh -> "00h" fixed 5Ch -> "00h" fixed 5Dh -> "FDh" fixed 5Eh -> "00h" fixed 64h -> "01h" fixed 65h -> "0Ah" fixed 66h -> "20h" fixed 67h -> "20h" fixed 68h -> "20h" fixed 69h -> "20h" fixed 70h -> "20h" fixed 71h -> "20h" fixed 5F~63 need confirm with LCD vendor	00	0	00000000	
91	5B	Reserved for definition		00	0	00000000	
92	5C	Reserved for definition		00	0	00000000	
93	5D	ASCII String		FD	253	11111101	
94	5E	Vertical Rate Offsets		00	0	00000000	
95	5F	Minimum Vertical Rate		30	48	00110000	Minimum Vertical Rate:48Hz
96	60	Maximum Vertical Rate:		78	120	01111000	Maximum Vertical Rate:120Hz
97	61	Minimum Horizontal Rate:		98	152	10011000	Minimum Horizontal Rate:152KHz
98	62	Maximum Horizontal Rate		98	152	10011000	Maximum Horizontal Rate:152KHz
99	63	Maximum Pixel Clock,Binary coded clock rate in MHz ÷ 10,		20	32	00100000	Maximum Pixel Clock:320MHz
100	64	Video Timing Support Flags.01h,Range Limits Only		01	1	00000001	
101	65	Line Feed (if Byte 10 = 00h or 01h)		0A	10	00001010	
102	66	Space (if Byte 10 = 00h or 01h)		20	32	00100000	
103	67	Space (if Byte 10 = 00h or 01h)		20	32	00100000	
104	68	Space (if Byte 10 = 00h or 01h)		20	32	00100000	
105	69	Space (if Byte 10 = 00h or 01h)		20	32	00100000	
106	6A	Space (if Byte 10 = 00h or 01h)		20	32	00100000	
107	6B	Space (if Byte 10 = 00h or 01h)		20	32	00100000	
108	6C	Flag	6Ch -> "00h" fixed 6Dh -> "00h" fixed 6Eh -> "00h" fixed 6Fh -> "FEh" fixed 70h -> "00h" fixed 71h -> "4Ch" fixed 72h -> "4Fh" fixed 73h -> "56h" fixed 71~73: LEN 74h -> "Size 75h -> "Size 76h -> "Size 74~76: Size 77h -> "Resolution 78h -> "Resolution 79h -> "Resolution 7Ah ->"Resolution 7Bh ->"Resolution 7Ch ->"Resolution 7Dh -> "Resolution 77~7D: Resolution	00	0	00000000	
109	6D	Flag		00	0	00000000	
110	6E	Flag		00	0	00000000	
111	6F	Data Type Tag		FC	252	11111100	Display Product Name:
112	70	Flag		00	0	00000000	
113	71	Model Name		4E	78	01001110	
114	72	Model Name		53	83	01010011	
115	73	Model Name		30	48	00110000	
116	74	Model Name		38	56	00111000	
117	75	Model Name		30	48	00110000	
118	76	Model Name		57	87	01010111	
119	77	Model Name		55	85	01010101	
120	78	Model Name		4D	77	01001101	
121	79	Model Name		2D	45	00101101	
122	7A	Model Name		4C	76	01001100	
123	7B	Model Name		58	88	01011000	
124	7C	Model Name		31	49	00110001	
125	7D	Model Name		0A	10	00001010	
126	7E	Extension flag		01	1	00000001	Extention EDID 1 blocks
127	7F	Checksum		DE	222	11011110	

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128	80	EDID Extension Block Tag	EDID Extension Block Tag	70	112	01110000	DisplayID EDID Extension Block tag	
129	81	Display ID version	Display ID version	20	32	00100000	DisplayID Version/Revision = 2.0	
130	82	section size	section size	79	121	01111001	Section Size (byte) = 121 bytes	
131	83	product Type identifier	product Type identifier	02	2	00000010	Display Product Primary Use Case	
132	84	Extension count	Extension count	00	0	00000000	Extension count	
133	85	DID2.0 Data block tag[81h] = CTA DisplayID	DID Block #1 Header	25	37	00100101	DID2.0 Data block tag[25h] = Dynamic Video Timing Range Limits	
134	86	Block revision		00	0	00000000	Block revision = Revision 1	
135	87	Number of Payload Bytes in block=		09	9	00001001	Number of Payload Bytes in block= 9 Bytes	
136	88	DID DATA Block #1	DID DATA Block AMD VSDB	66	102	01100110	Minimum Pixel Clock (Low bit, Range = 0.001Mhz (000000h) ~ 16,777.216Mhz (FFFFFFh))	
137	89			D0	208	11010000	Minium Pixel Clock (Middle bit)	
138	8A			04	4	00000100	Minium Pixel Clock (High bit)	
139	8B			66	102	01100110	Maximum Pixel Clock (Low bit, Range = 0.001Mhz (000000h) ~ 16,777.216Mhz (FFFFFFh))	
140	8C			D0	208	11010000	Maximum Pixel Clock (Middle bit)	
141	8D			04	4	00000100	Maximum Pixel Clock (High bit)	
142	8E			30	48	00110000	Min. Vertical Rate : 40Hz (Range : 0Hz (00h) ~ 255Hz (FFh))	
143	8F			78	120	01111000	Max. Vertical Rate : 60 Hz (Range : 0Hz (000h) ~ 255Hz (FFh))	
144	90			80	128	10000000	Seamless Dynamic Video Timing Support : Seamless Dynamic Video Timing change shall be supported with a fixed horizontal pixel rate and dynamic vertical blanking.	
145	91	DID Block #2 Header		81	129	10000001	DID2.0 Data block tag[81h] = CTA DisplayID	
146	92			00	0	00000000	Block revision = Revision 0	
147	93			15	21	00010101	Number of Payload Bytes in block= 21Bytes	
148	94	DID DATA Block #2 AMD VSDB		74	116	01110100	CTA Block1 Tag Code and Block1 Length = Vendor Specific Data Block(03h)	
149	95			1A	26	00011010	AMD IEEE OUI value (0x00001A)	
150	96			00	0	00000000	(Hex. LSB first)	
151	97			00	0	00000000	(Hex. LSB first)	
152	98			03	3	00000011	AMD VSDB Version 3	
153	99			01	1	00000001	Indicate AMD FreeSync™ function capability.	
154	9A			30	48	00110000	Min Refresh Rate	
155	9B			78	120	01111000	Max Refresh Rate	
156	9C			00	0	00000000	Freesync MCCS VCP Code	
157	9D			00	0	00000000	Indicate AMD FreeSync™ Premium PRO capability.	
158	9E			6A	106	01101010	Max Luminance 1 (for HDR) = 01101010nit	
159	9F			4A	74	01001010	Max Luminance 2 (for HDR) = 01001010nit	
160	A0			6A	106	01101010	Max Luminance 2 (for HDR) = 01101010nit	
161	A1			4A	74	01001010	Max Luminance 2 (for HDR) = 01001010nit	
162	A2			78	120	01111000	Bits 7:0 -Freesync Maximum Refresh Rate (MSB)	
163	A3			00	0	00000000	Bits 9:8 - MSB FreeSync Maximum refresh rate [Hz]	
164	A4			00	0	00000000	Maximum Fast Transport Input Pixel Rate [kHz] - bits 7:0	
165	A5			00	0	00000000	Maximum Fast Transport Input Pixel Rate [kHz] - bits 15:8	

166	A6			00	0	00000000	Maximum Fast Transport Input Pixel Rate [kHz] - bits 23:16
167	A7			00	0	00000000	Additional Sink information offset DP/eDP Port: offset from DPCD 0x403
168	A8			00	0	00000000	eDP Display Features Handshake DPCD offset, eDP Port: offset from DPCD 0x380
169	A9	DID Block #3 Header		2B	43	00101011	DID2.1 Data block tag[2Bh] = Adaptive-Sync Data Block
170	AA			00	0	00000000	Block revision = Revision 0
171	AB			0C	12	00001100	Number of Payload Bytes in block= 12 Bytes
172	AC	DID DATA Block #3 Adaptive-Sync		27	39	00100111	Adaptive-Sync Operation and Range Information RR#1
173	AD			00	0	00000000	Flicker performance is met in any duration decrease within the refresh rate range without jitter impact.
174	AE			30	48	00110000	Min. Vertical Rate: 00110000Hz
175	AF			78	120	01111000	Maximum Refresh Rate7:0
176	B0			00	0	00000000	bit1:0 =01: Maximum Refresh Rate9:8
177	B1			00	0	00000000	Flicker performance is met in any duration decrease within the refresh rate range without jitter impact.
178	B2			27	39	00100111	Adaptive-Sync Operation and Range Information RR#2
179	B3			00	0	00000000	Flicker performance is met in any duration decrease within the refresh rate range without jitter impact.
180	B4			30	48	00110000	Min. Vertical Rate: 00110000Hz
181	B5			3C	60	00111100	Maximum Refresh Rate7:0
182	B6			00	0	00000000	bit1:0 =01: Maximum Refresh Rate9:8
183	B7			00	0	00000000	Flicker performance is met in any duration decrease within the refresh rate range without jitter impact.
184	B8		"00h" fixed	00	0	00000000	
185	B9		"00h" fixed	00	0	00000000	
186	BA		"00h" fixed	00	0	00000000	
187	BB		"00h" fixed	00	0	00000000	
188	BC		"00h" fixed	00	0	00000000	
189	BD		"00h" fixed	00	0	00000000	
190	BE		"00h" fixed	00	0	00000000	
191	BF		"00h" fixed	00	0	00000000	
192	C0		"00h" fixed	00	0	00000000	
193	C1		"00h" fixed	00	0	00000000	
194	C2		"00h" fixed	00	0	00000000	
195	C3		"00h" fixed	00	0	00000000	
196	C4		"00h" fixed	00	0	00000000	
197	C5		"00h" fixed	00	0	00000000	
198	C6		"00h" fixed	00	0	00000000	
199	C7		"00h" fixed	00	0	00000000	
200	C8		"00h" fixed	00	0	00000000	
201	C9		"00h" fixed	00	0	00000000	
202	CA		"00h" fixed	00	0	00000000	
203	CB		"00h" fixed	00	0	00000000	

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204	CC		"00h" fixed	00	0	00000000		
205	CD		"00h" fixed	00	0	00000000		
206	CE		"00h" fixed	00	0	00000000		
207	CF		"00h" fixed	00	0	00000000		
208	D0		"00h" fixed	00	0	00000000		
209	D1		"00h" fixed	00	0	00000000		
210	D2		"00h" fixed	00	0	00000000		
211	D3		"00h" fixed	00	0	00000000		
212	D4		"00h" fixed	00	0	00000000		
213	D5		"00h" fixed	00	0	00000000		
214	D6		"00h" fixed	00	0	00000000		
215	D7		"00h" fixed	00	0	00000000		
216	D8		"00h" fixed	00	0	00000000		
217	D9		"00h" fixed	00	0	00000000		
218	DA		"00h" fixed	00	0	00000000		
219	DB		"00h" fixed	00	0	00000000		
220	DC		"00h" fixed	00	0	00000000		
221	DD		"00h" fixed	00	0	00000000		
222	DE		"00h" fixed	00	0	00000000		
223	DF		"00h" fixed	00	0	00000000		
224	E0		"00h" fixed	00	0	00000000		
225	E1		"00h" fixed	00	0	00000000		
226	E2		"00h" fixed	00	0	00000000		
227	E3		"00h" fixed	00	0	00000000		
228	E4		"00h" fixed	00	0	00000000		
229	E5		"00h" fixed	00	0	00000000		
230	E6		"00h" fixed	00	0	00000000		
231	E7		"00h" fixed	00	0	00000000		
232	E8		"00h" fixed	00	0	00000000		
233	E9		"00h" fixed	00	0	00000000		
234	EA		"00h" fixed	00	0	00000000		
235	EB		"00h" fixed	00	0	00000000		
236	EC		"00h" fixed	00	0	00000000		
237	ED		"00h" fixed	00	0	00000000		
238	EE		"00h" fixed	00	0	00000000		
239	EF		"00h" fixed	00	0	00000000		
240	F0		"00h" fixed	00	0	00000000		
241	F1		"00h" fixed	00	0	00000000		
242	F2		"00h" fixed	00	0	00000000		
243	F3		"00h" fixed	00	0	00000000		
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244	F4		"00h" fixed	00	0	00000000	
245	F5		"00h" fixed	00	0	00000000	
246	F6		"00h" fixed	00	0	00000000	
247	F7		"00h" fixed	00	0	00000000	
248	F8		"00h" fixed	00	0	00000000	
249	F9		"00h" fixed	00	0	00000000	
250	FA		"00h" fixed	00	0	00000000	
251	FB		"00h" fixed	00	0	00000000	
252	FC		"00h" fixed	00	0	00000000	
253	FD		"00h" fixed	00	0	00000000	
254	FE		"00h" fixed	52	82	01010010	Please check data
255	FF	Checksum		90	144	10010000	Please check data