




Product Specification

AU OPTRONICS CORPORATION

(V) Preliminary Specifications

() Final Specifications

Module	14.0”(13.97”) FHD 16:9 Color TFT-LCD with LED Backlight design
Model Name	B140HAK01.1 (H/W:0A)
Note ()	<i>oTP Display</i>

Customer

Date

Checked &
Approved by

Date

Note: This Specification is subject to change without notice.

Approved by

Date

Jonken Fan

2015/11/23

Prepared by

Date

Wade Chou

2015/11/23

AU Optronics corporation



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Record of Revision

Version and Date	Page	Old description	New Description	Remark
0.1 2015/08/11	All	First Edition for Customer		
0.2 2015/10/20	1	Model name: B140HAK01.0 (HW:1A)	B140HAK01.1 (H/W:0A)	change
	30	9.1 Shipping Label Format: TBD	update	update
	31~33	10. Appendix: EDID Description: TBD	update	update
0.3 2015/10/22	5	2.1 General Specification Contrast Ratio: 700typ	800 typ	update
	6	2.1 General Specification Surface Treatment: Anti-Glare	Glare	update
	7	2.2 General Touch Specification Touch panel sensor IC: EETI(3104) Channel: 74 X 42	Raydium (32380) 88 X 54	update
	8	2.3 Optical Characteristics Contrast Ratio: 700	800	update
0.4 2015/11/03	5	Weight 290g	Update weight from 290g to 270g	update
0.5 2015/11/23	22	Pin assignment	Modify Pin Assignment #1, #26, #30, #36 function description	

1. Handling Precautions

- 1) Since front polarizer is easily damaged, pay attention not to scratch it.
- 2) Be sure to turn off power supply when inserting or disconnecting from input connector.
- 3) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
- 4) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
- 5) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface.
- 6) Since CMOS LSI is used in this module, take care of static electricity and insure human earth when handling.
- 7) Do not open nor modify the Module Assembly.
- 8) Do not press the reflector sheet at the back of the module to any directions.
- 9) At the insertion or removal of the Signal Interface Connector, be sure not to rotate nor tilt the Interface Connector of the TFT Module.
- 10) After installation of the TFT Module into an enclosure (Notebook PC Bezel, for example), do not twist nor bend the TFT Module even momentarily. At designing the enclosure, it should be taken into consideration that no bending/twisting forces are applied to the TFT Module from outside. Otherwise the TFT Module may be damaged.
- 11) Small amount of materials having no flammability grade is used in the LCD module. The LCD module should be supplied by power complied with requirements of Limited Power Source (IEC60950 or UL1950), or be applied exemption.
- 12) Disconnecting power supply before handling LCD modules, it can prevent electric shock, DO NOT TOUCH the electrode parts, cables, connectors and LED circuit part of TFT module that a LED light bar build in as a light source of back light unit. It can prevent electrostatic breakdown.

2. General Description

B140HAK01.1 is a Color Active Matrix Liquid Crystal Display composed of a TFT LCD panel, a driver circuit, and LED backlight system. The screen format is intended to support the 16:9 FHD, 1920(H) x1080(V) screen and 262k colors (RGB 6-bits data driver) with LED backlight driving circuit. All input signals are eDP (Embedded DisplayPort) interface compatible.

B140HAK01.1 is designed for a display unit of notebook style personal computer and industrial machine.

2.1 General Specification

The following items are characteristics summary on the table at 25 °C condition:

Items	Unit	Specifications			
Screen Diagonal	[mm]	354.69			
Active Area	[mm]	309.14 x 173.89			
Pixels H x V		1920x3(RGB) x 1080			
Pixel Pitch	[mm]	0.161 x 0.161			
Pixel Format		R.G.B. Vertical Stripe			
Display Mode		Normally Black			
White Luminance (I _{LED} =23.5mA) (Note: I _{LED} is LED current)	[cd/m ²]	220 typ. (5 points average) 187 min. (5 points average)			
Luminance Uniformity		1.25 max. (5 points)			
Contrast Ratio		800 typ			
Response Time	[ms]	30 typ / 35 Max			
Nominal Input Voltage VDD	[Volt]	+3.3 typ.			
Power Consumption	[Watt]	3.95 max (Include Logic and Blu power) @mosaic			
Weight	[Grams]	270g max			
Physical Size	[mm]		Min.	Typ.	Max.
		Length	319.9	320.40	320.90
		Width	204.60	205.10	205.60
		Thickness	-	-	3.0 (Panel Side) 3.2 (PCBA Side)
Electrical Interface		2 Lane eDP 1.2			



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Glass Thickness	[mm]	0.4
Surface Treatment		Glare
Support Color		262K colors (RGB 6-bit)
Temperature Range Operating Storage (Non-Operating)	[°C] [°C]	0 to +50 -20 to +60
RoHS Compliance		RoHS Compliance

2.2 General Touch Specification

Item	Spec	Unit
Type of Touch Sensor	Projective Capacitive (on cell)	
Panel Size	14.0'	
Outline Dimension	NA (cover lens free)	mm
Total Thickness	NA (cover lens free)	mm
Total Weight	NA (cover lens free)	g
TP View Area	NA (cover lens free)	mm
TP Active Area	311.77 x 175.82 typ	mm
Interface	USB	
Report Rate	Follow Win10 – 100Hz	Hz
Multi-Touch Point	10 points	
Input method	Finger	
Touch panel sensor IC	Raydium (32380)	
Channel	88 X 54	
Distance between 2 point	Follow Win10	mm
Surface hardness	3 (Note 1)	H
Surface treatment	NA	
TP F/W version	NA	
Support OS	Window 10	
BM ink	NA	
TP Power Consumption	Active Mode: 0.3	W



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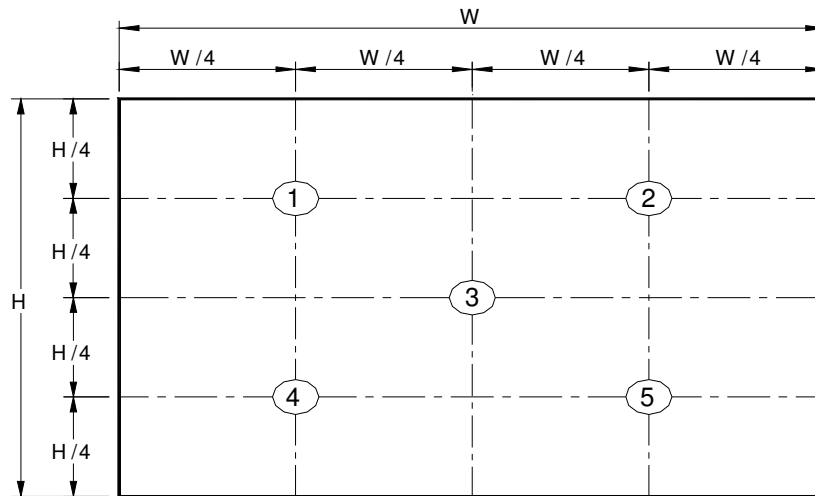
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2.3 Optical Characteristics

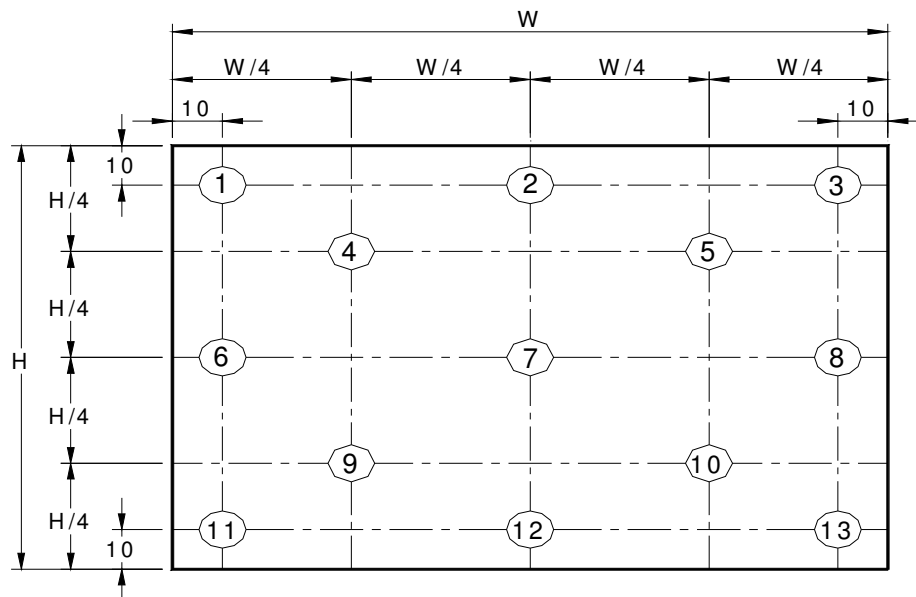
The optical characteristics are measured under stable conditions at 25°C (Room Temperature) :

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
White Luminance ILED=23.5mA (Base Panel Only)			5 points average	187	220	-	cd/m2	1, 4, 5.
Viewing Angle		θR	Horizontal (Right) CR = 10 (Left)	-	85	-	degree	4, 9
		θL		-	85	-		
		ψH	Vertical (Upper) CR = 10 (Lower)	-	85	-		
		ψL		-	85	-		
Luminance Uniformity		δ5P	5 Points	-	-	1.25		1, 3, 4
Luminance Uniformity		δ13P	13 Points	-	-	1.6		2, 3, 4
Contrast Ratio		CR		-	800	-		4, 6
Cross talk		%				4		4, 7
Response Time		TRT	Rising + Falling	-	30	35		
Color / Chromaticity Coodinates	Red	Rx	CIE 1931	TBD	TBD	TBD	-	4
		Ry		TBD	TBD	TBD		
	Green	Gx		TBD	TBD	TBD		
		Gy		TBD	TBD	TBD		
	Blue	Bx		TBD	TBD	TBD		
		By		TBD	TBD	TBD		
	White	Wx		0.283	0.313	0.343		
		Wy		0.299	0.329	0.359		
		NTSC		%	-	45		

Note 1: 5 points position (Ref: Active area)



Note 2: 13 points position (Ref: Active area)



Note 3: The luminance uniformity of 5 or 13 points is defined by dividing the maximum luminance values by the minimum test point luminance

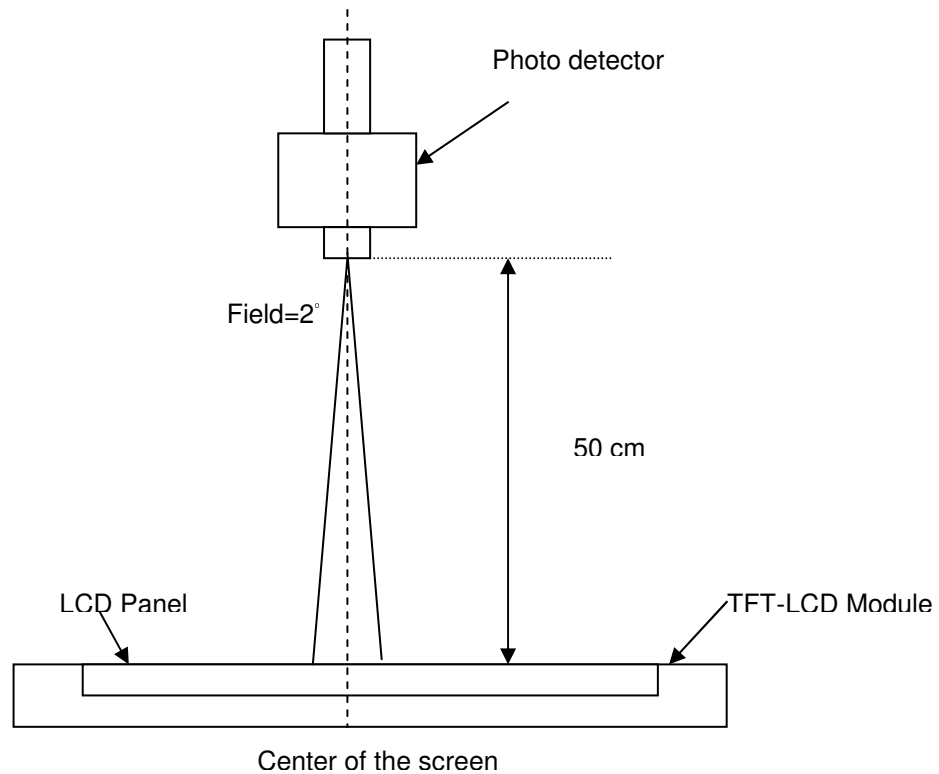
$$\delta_{W5} = \frac{\text{Maximum Brightness of five points}}{\text{Minimum Brightness of five points}}$$

$$\delta_{W13} = \frac{\text{Maximum Brightness of thirteen points}}{\text{Minimum Brightness of thirteen points}}$$

Note 4: Measurement method

The LCD module should be stabilized at given temperature for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting

Backlight for 30 minutes in a stable, windless and dark room, and it should be measured in the center of screen.



Note 5 : Definition of Average Luminance of White (Y_L):

Measure the luminance of gray level 63 at 5 points , $Y_L = [L(1) + L(2) + L(3) + L(4) + L(5)] / 5$

$L(x)$ is corresponding to the luminance of the point X at Figure in Note (1).

Note 6 : Definition of contrast ratio:

Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "White" state}}{\text{Brightness on the "Black" state}}$$

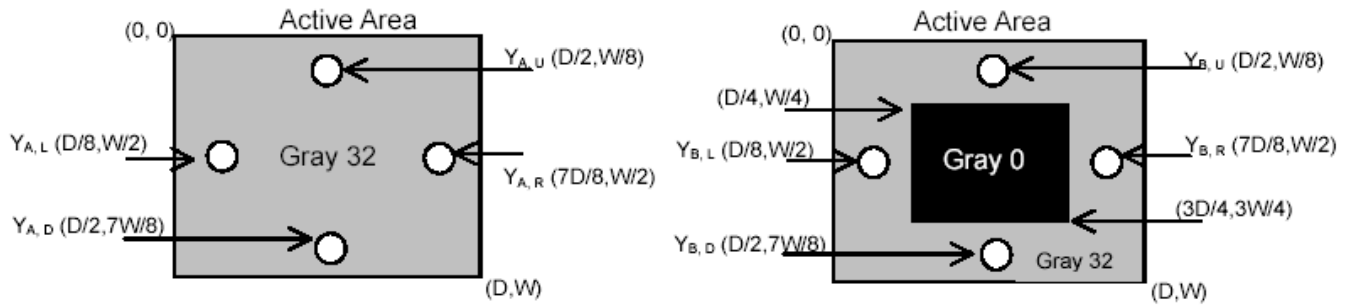
Note 7 : Definition of Cross Talk (CT)

$$CT = |Y_B - Y_A| / Y_A \times 100 (\%)$$

Where

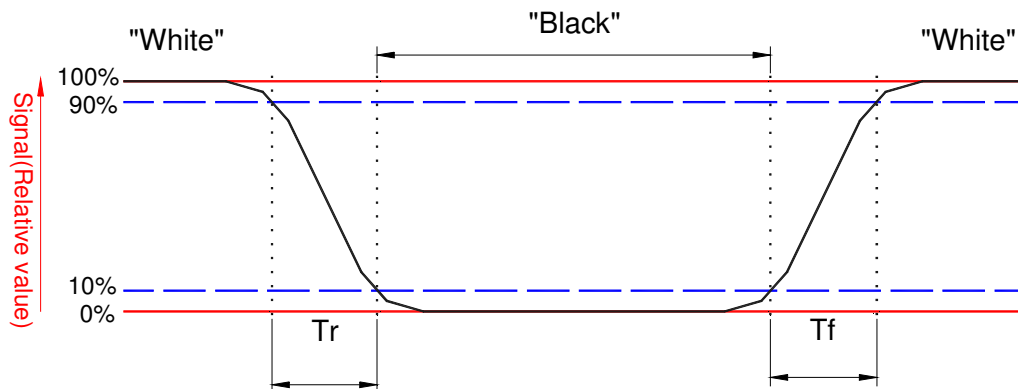
Y_A = Luminance of measured location without gray level 0 pattern (cd/m²)

Y_B = Luminance of measured location with gray level 0 pattern (cd/m²)



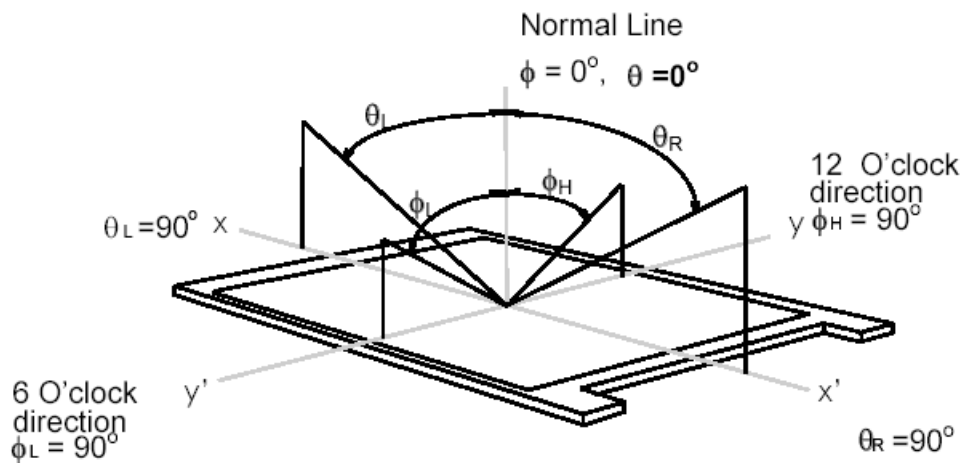
Note 8: Definition of response time:

The output signals of BM-7 or equivalent are measured when the input signals are changed from "Black" to "White" (falling time) and from "White" to "Black" (rising time), respectively. The response time interval between the 10% and 90% of amplitudes. Refer to figure as below.

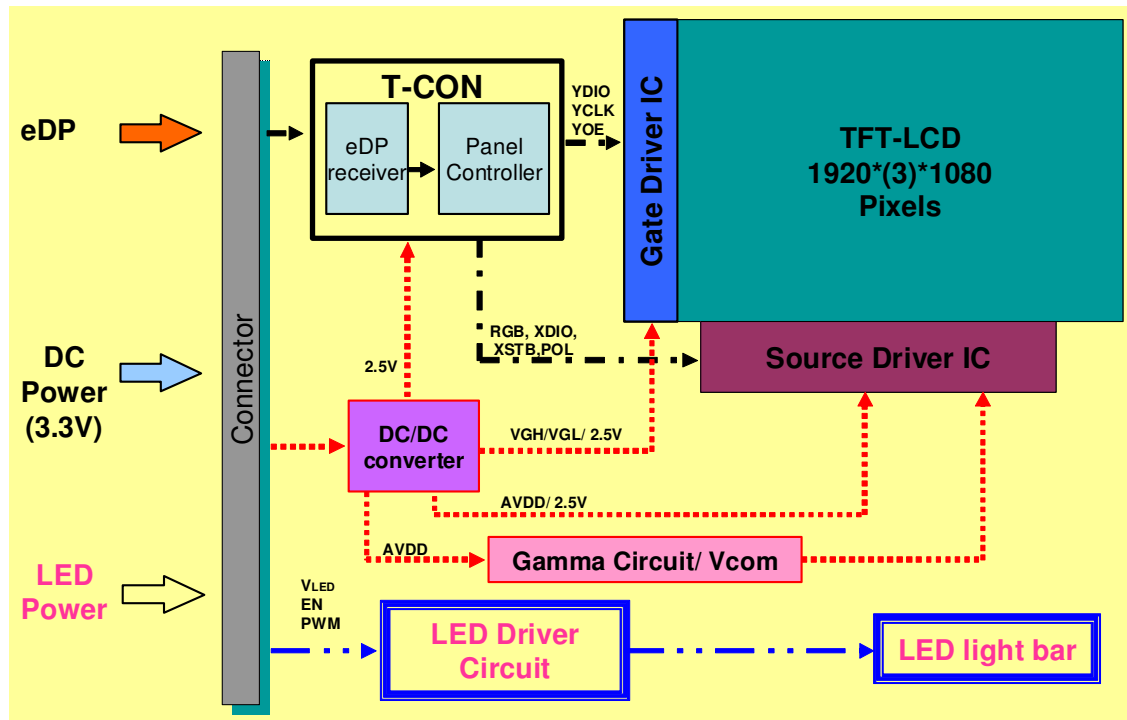


Note 9. Definition of viewing angle

Viewing angle is the measurement of contrast ratio ≥ 10 , at the screen center, over a 180° horizontal and 180° vertical range (off-normal viewing angles). The 180° viewing angle range is broken down as follows; 90° (θ) horizontal left and right and 90° (ϕ) vertical, high (up) and low (down). The measurement direction is typically perpendicular to the display surface with the screen rotated about its center to develop the desired measurement viewing angle.



3. Functional Block Diagram





4. Absolute Maximum Ratings

An absolute maximum rating of the module is as following:

4.1 Absolute Ratings of TFT LCD Module

Item	Symbol	Min	Max	Unit	Conditions
Logic/LCD Drive Voltage	Vin	-0.3	3.6	[Volt]	Note 1,2

4.2 Absolute Ratings of Touch Sensor

Item	Symbol	Min	Max	Unit	Conditions
Touch Sensor Power Supply (Touch IC Unit)	Vin	TBD	TBD	[Volt]	
Touch Sensor Power ripple	VTSP-Ripple	-	100	[mV] p-p	

4.3 Absolute Ratings of Environment

Item	Symbol	Min	Max	Unit	Conditions
Operating Temperature	TOP	0	+50	[°C]	Note 4
Operation Humidity	HOP	5	95	[%RH]	Note 4
Storage Temperature	TST	-20	+60	[°C]	Note 4
Storage Humidity	HST	5	95	[%RH]	Note 4

Note 1: At Ta (25°C)

Note 2: Permanent damage to the device may occur if exceed maximum values

Note 3: LED specification refer to section 5.2

Note 4: For quality performance, please refer to AUO IIS (Incoming Inspection Standard).

Note 5: The packing material of system forbid to involve ammonium component

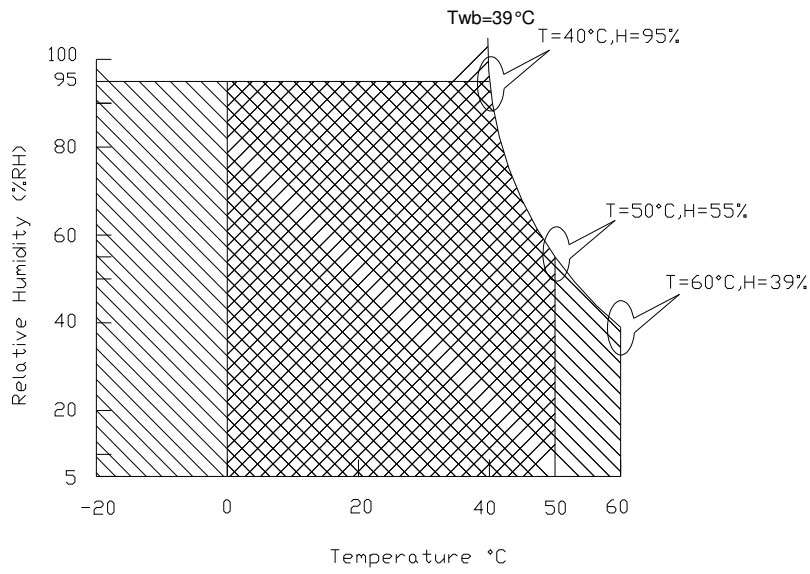
Note 6: The reliability test conditions of system do not exceed the verified conditions of TFT module

Note 7: Be sure the panel test condition do not exceed the component limitation of TFT module(TN Liquid crystal , for example)



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5. Electrical Characteristics

5.1 TFT LCD Module

5.1.1 Power Specification

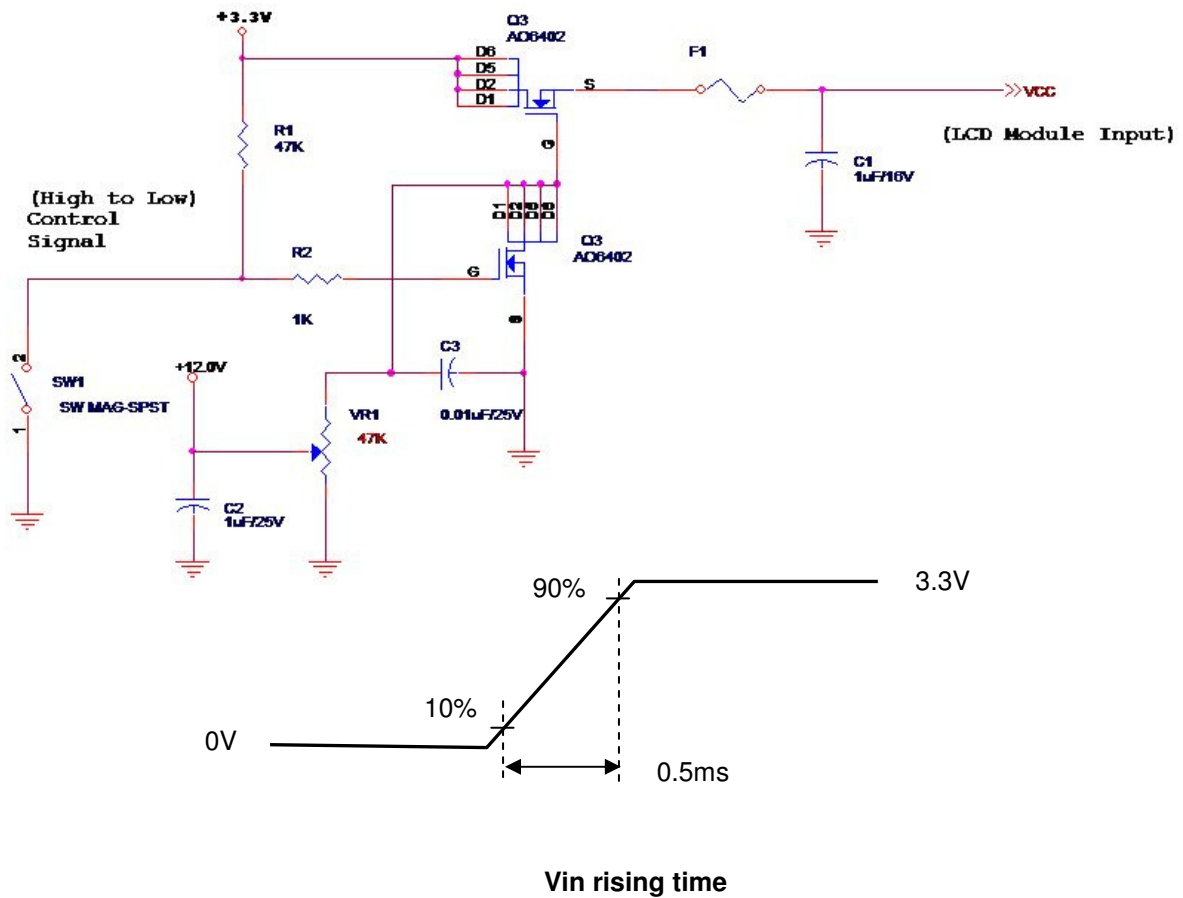
Input power specifications are as follows;

The power specification are measured under 25°C and frame frequency under 60Hz

Symble	Parameter	Min	Typ	Max	Units	Note
VDD	Logic/LCD Drive Voltage	3.0	3.3	3.6	[Volt]	
PDD	VDD Power	-	-	1.15	[Watt]	Note 1
IDD	IDD Current	-	-	348	[mA]	Note 1
IRush	Inrush Current	-	-	2000	[mA]	Note 2
VDDrp	Allowable Logic/LCD Drive Ripple Voltage	-	-	100	[mV] p-p	

Note 1 : Maximum Measurement Condition : Mosaic pattern at 3.3V driving voltage. ($P_{max}=V_{3.3} \times I_{white}$)

Note 2 : Measure Condition



5.1.2 Signal Electrical Characteristics

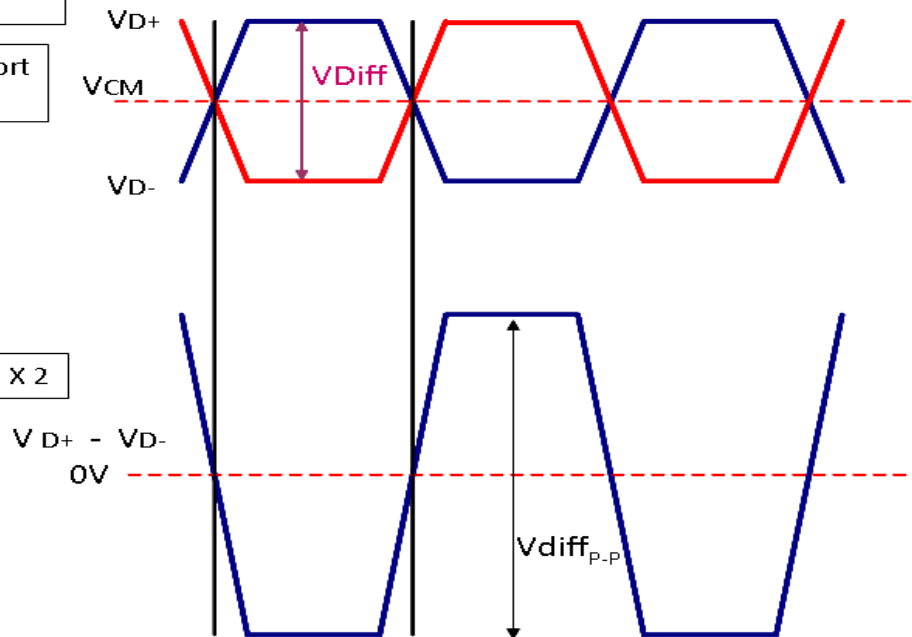
Signal electrical characteristics are as follows;

Display Port main link signal:

Differential pair VD+ , VD-
Which is one Display port
Main link

VCM of Display port
Main link

$$V_{diffP-P} = [(VD+) - (VD-)] \times 2$$

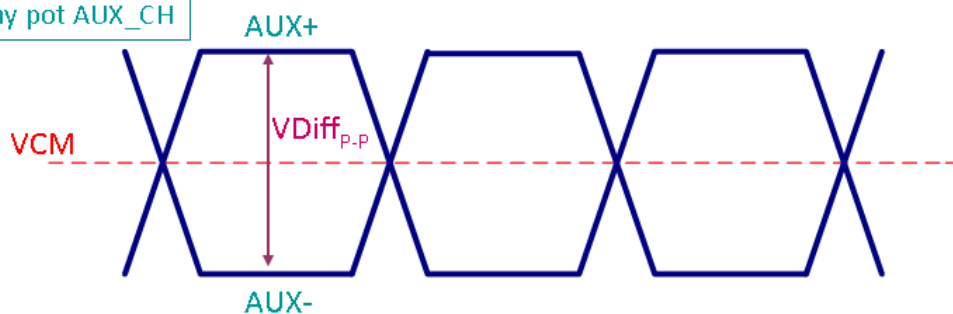


Display port main link					
		Min	Typ	Max	unit
VCM	RX input DC Common Mode Voltage		0		V
VDiff _{P-P}	Peak-to-peak Voltage at a receiving Device	100		1320	mV

Follow as VESA display port standard V1.1a

Display Port AUX_CH signal:

Differential AUX+ , AUX-
Which is Display port AUX_CH





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Display port AUX_CH					
		Min	Typ	Max	unit
VCM	AUX DC Common Mode Voltage		0		V
VDiff _{P-P}	AUX Peak-to-peak Voltage at a receiving Device	0.4	0.6	0.8	V

Follow as VESA display port standard V1.1a.

Display Port VHPD signal:

Display port VHPD					
		Min	Typ	Max	unit
VHPD	HPD Voltage	2.25	-	3.6	V

Follow as VESA display port standard V1.1a.



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5.2 Backlight Unit

5.2.1 LED characteristics

Parameter	Symbol	Min	Typ	Max	Units	Condition
Backlight Power Consumption	PLED	-	-	2.8	[Watt]	(Ta=25°C), Note 1
LED Life-Time	N/A	15,000	-	-	Hour	(Ta=25°C), Note 2 I _F =25 mA

Note 1: Calculator value for reference $P_{LED} = V_F$ (Normal Distribution) * I_F (Normal Distribution) / Efficiency

Note 2: The LED life-time define as the estimated time to 50% degradation of initial luminous.

5.2.2 Backlight input signal characteristics

Parameter	Symbol	Min	Typ	Max	Units	Remark
LED Power Supply	VLED (Note 1)	5.0	12.0	21.0	[Volt]	Define as Connector Interface (Ta=25°C)
LED Enable Input	VLED_EN	2.5	--	3.3	[Volt]	
LED Enable Input		--	--	0.5	[Volt]	
PWM Logic Input	VPWM_EN	2.5	--	5.5	[Volt]	
PWM Logic Input		--	--	0.5	[Volt]	
PWM Input Frequency	FPWM	200	1K	100K	Hz	
PWM Duty Ratio	Duty	5	--	100	%	

Note 1 : Recommend system pull up/down resistor no bigger than 10kohm

Note 2 : measured in panel VIN



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Note 3 : If the PWM duty ratio(min) is set between 5% to 1% , the PWM input frequency should be set below 1KHz .

The brightness-duty characteristic might not be able to keep in it's linearity if the dimming control is operated in 1% to 5% range.

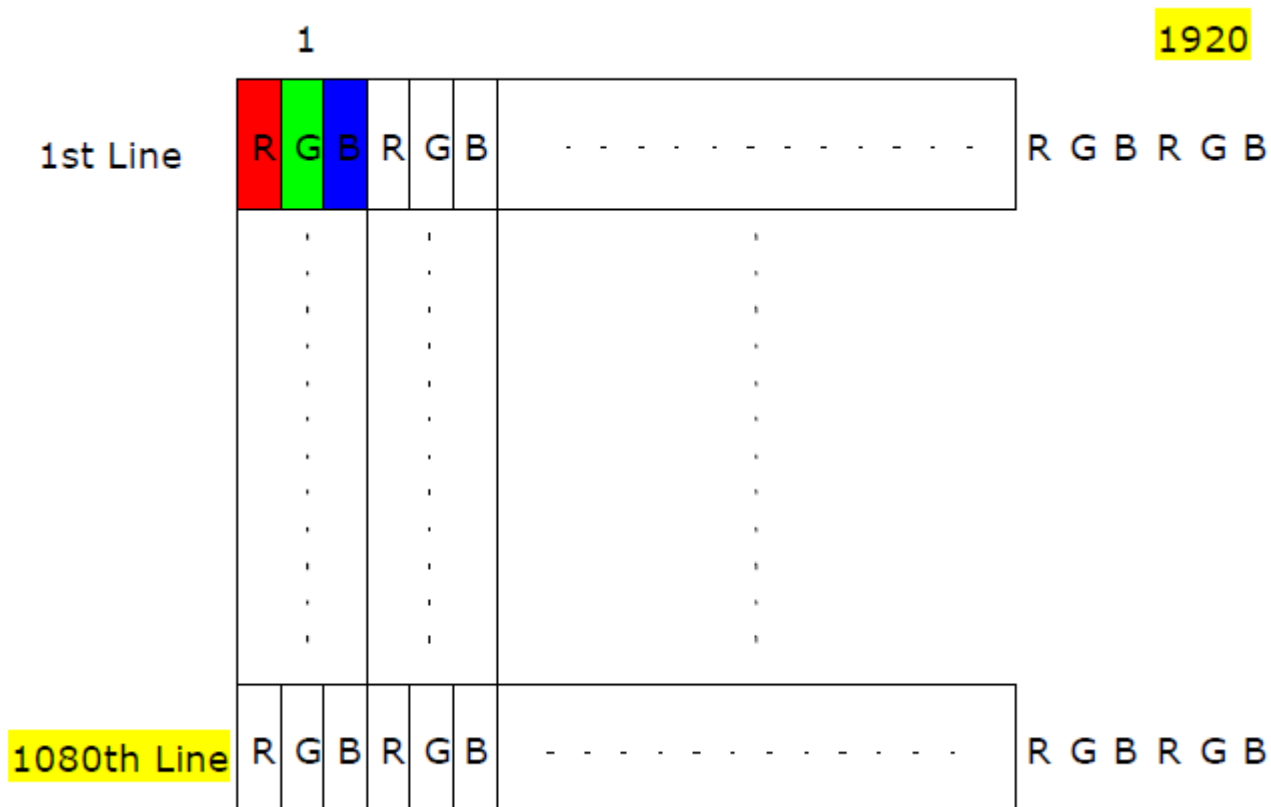
5.3 Touch Sensor Power Consumption

Items	Symbol	Specifications			Unit	Notes
		Min.	Typ.	Max.		
Touch Panel Power Supply (Touch IC Unit)	VDD	3.0	3.3	3.6	V	
	Pvtsp			TBD	mW	Active mode
	Pvtsp			TBD	mW	Idle Mode
	Pvtsp			TBD	mW	Sleep Mode

6. Signal Interface Characteristic

6.1 Pixel Format Image

Following figure shows the relationship of the input signals and LCD pixel format.





6.2 Integration Interface Requirement

6.2.1 Connector Description

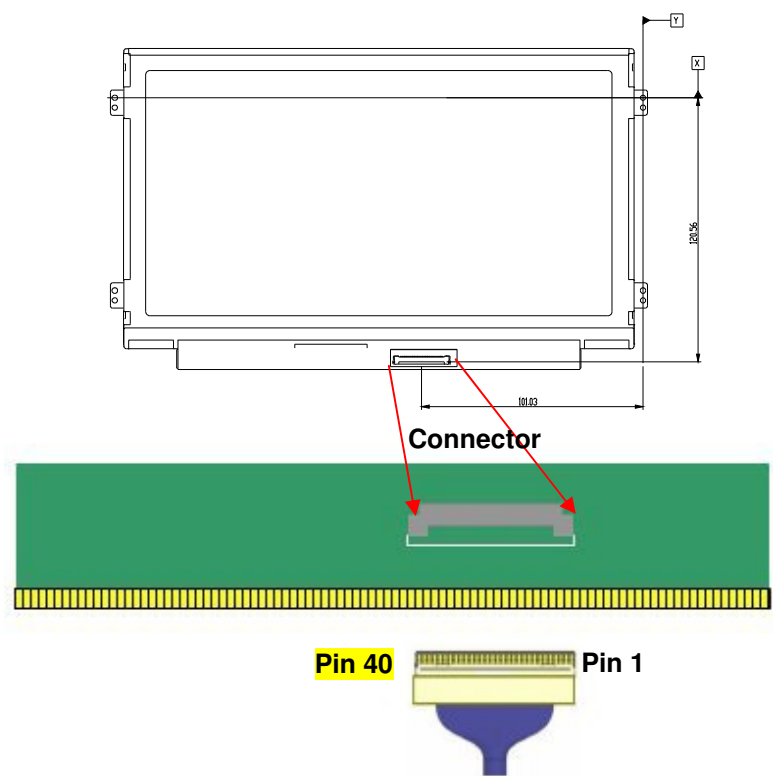
Physical interface is described as for the connector on module.

These connectors are capable of accommodating the following signals and will be following components.

Connector Name / Designation	For Signal Connector
Manufacturer	JAE or Compatible
Type / Part Number	HD1S040HA1 or Compatible
Mating Housing/Part Number	HD1P040MA1 or Compatible

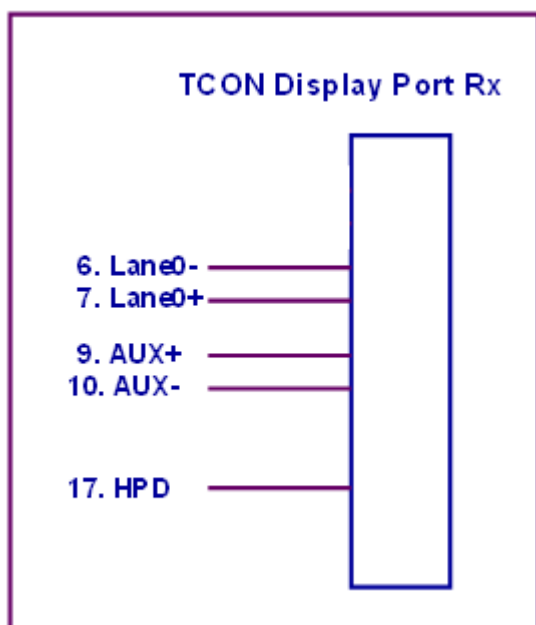
6.2.2 Pin Assignment (with Touch Sensor Pin Assignment)

PIN NO	Symbol	Function
1	NC	NO Connect
2	H_GND	High Speed Ground
3	Lane1_N	Comp Signal Link Lane 1
4	Lane1_P	True Signal Link Lane 1
5	H_GND	High Speed Ground
6	Lane0_N	Comp Signal Link Lane 0
7	Lane0_P	True Signal Link Lane 0
8	H_GND	High Speed Ground
9	AUX_CH_P	True Signal Auxiliary Ch.
10	AUX_CH_N	Comp Signal Auxiliary Ch.
11	H_GND	High Speed Ground
12	LCD_VCC	LCD logic and driver power
13	LCD_VCC	LCD logic and driver power
14	LCD_Self_Test	LCD Panel Self Test Enable
15	LCD_GND	LCD logic and driver ground
16	LCD_GND	LCD logic and driver ground
17	HPD	HPD signal pin
18	BL_GND	Backlight ground
19	BL_GND	Backlight ground
20	BL_GND	Backlight ground
21	BL_GND	Backlight ground
22	BL_Enable	Backlight On / Off
23	BL_PWM_DIM	System PWM signal Input
24	NC	No connect
25	NC	No connect
26	BL_PWR	Backlight power
27	BL_PWR	Backlight power
28	BL_PWR	Backlight power
29	BL_PWR	Backlight power
30	NC	No connect
31	TP_D-	USB Data- for Touch
32	TP_D+	USB Data+ for Touch
33	GND	Ground-Shield
34	VTSP	Touch panel power supply (3.3V)
35	VTSP	Touch panel power supply (3.3V)
36	NC/TP_EN (10pin CNT)	TP enable (active high)
37	TP_CLK	I2C Clock for Touch
38	TP_Data	I2C Data for Touch
39	INT	Interrupt for Touch
40	RST	Reset for Touch



Note1: Start from right side.

Note2: Input signals shall be low or High-impedance state when VDD is off.
Internal circuit of **eDP inputs** are as following.



6.3 Interface Timing

6.3.1 Timing Characteristics

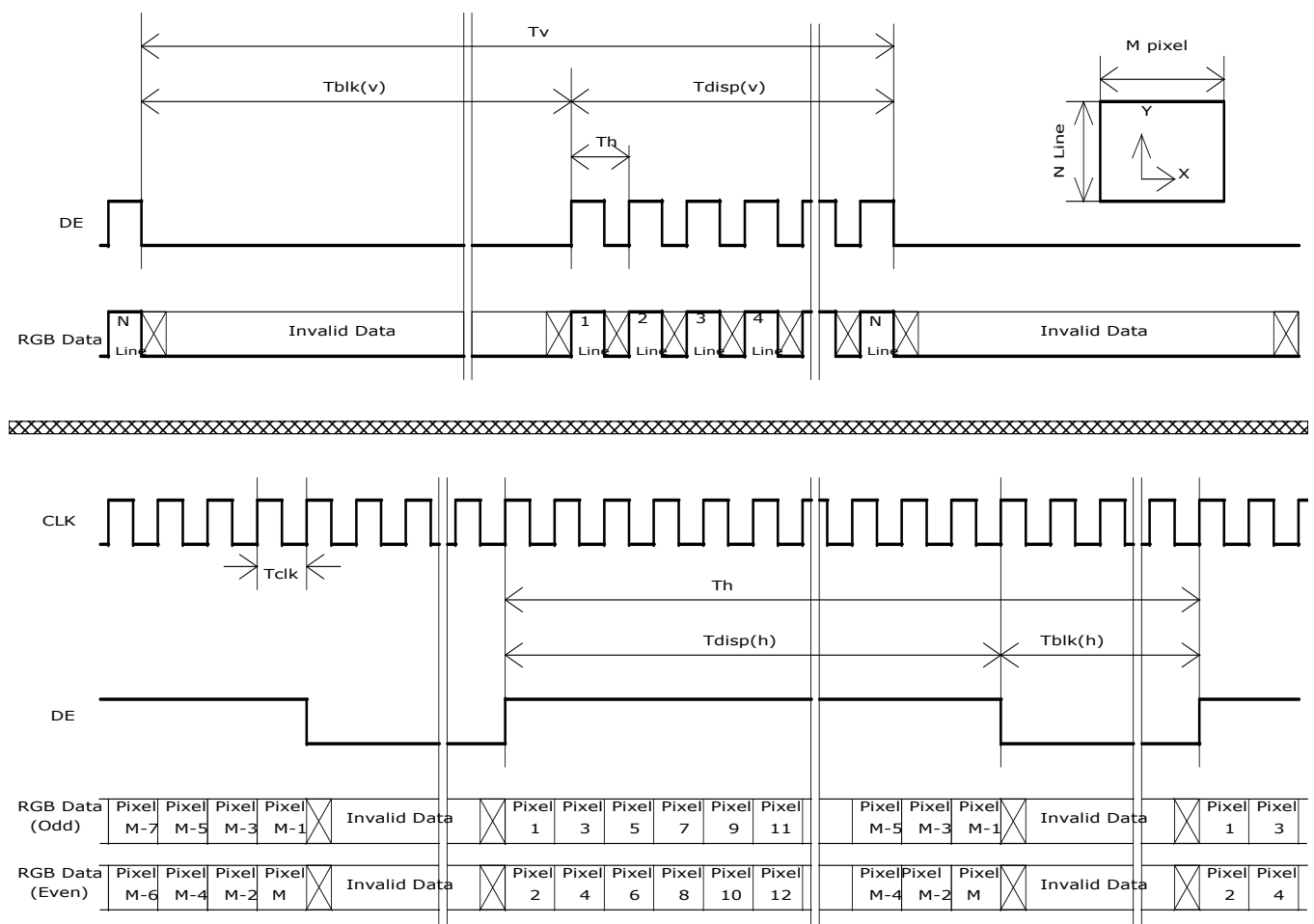
Basically, interface timings should match the 1920x1080 /60Hz manufacturing guide line timing.

Parameter		Symbol	Min.	Typ.	Max.	Unit
Frame Rate		-	-	60	-	Hz
Clock frequency		1/ T _{Clock}	66.9	72	80	MHz
Vertical Section	Period	T _V	1100	1130	1080+A	T _{Line}
	Active	T _{VD}	1080			
	Blanking	T _{VB}	20	50	A	
Horizontal Section	Period	T _H	1010	1050	960+B	T _{Clock}
	Active	T _{HD}	960			
	Blanking	T _{HB}	50	90	B	

Note : 1. DE mode only

2. The maximum clock frequency = $(960+B) \times (1080+A) \times 60 < 80\text{MHz}$

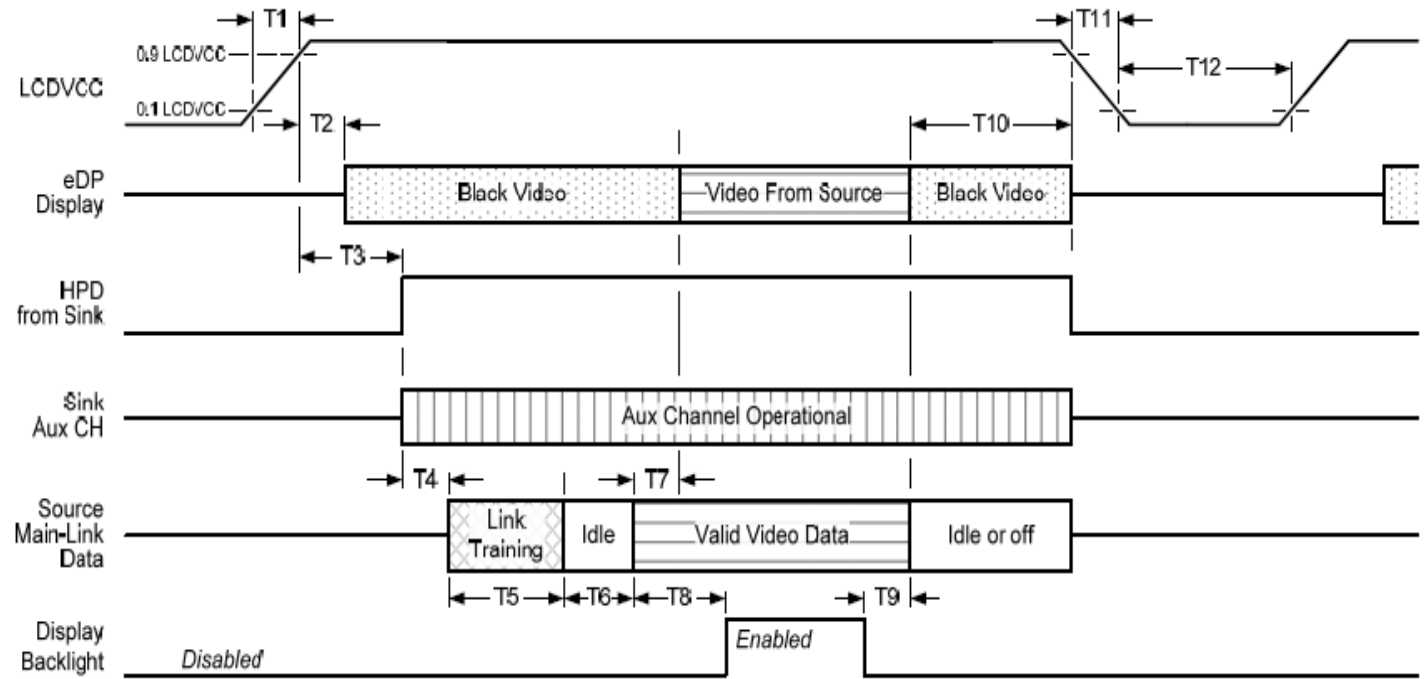
6.3.2 Timing diagram



6.4 Power ON/OFF Sequence

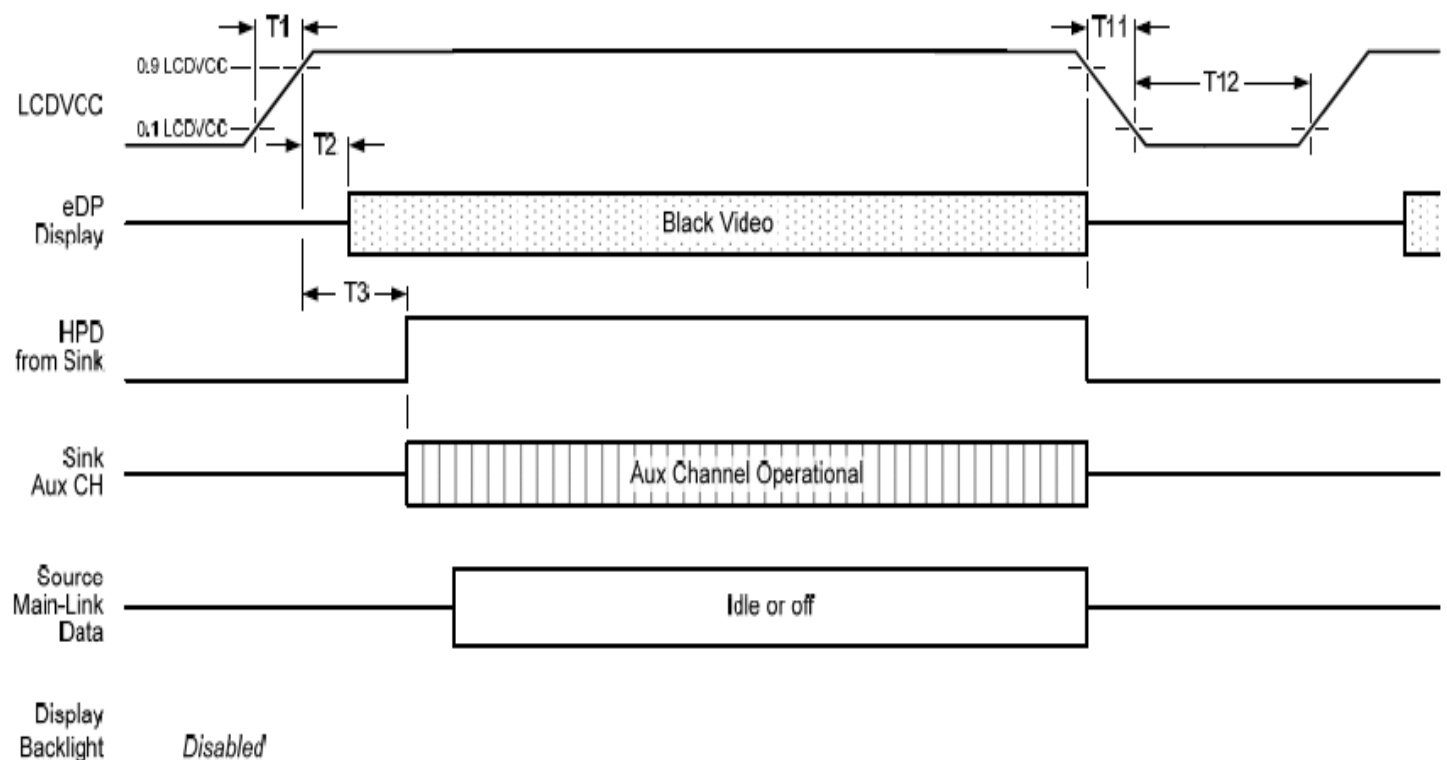
Power on/off sequence is as follows. Interface signals and LED on/off sequence are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off

Display Port panel power sequence:



Display port interface power up/down sequence, normal system operation

Display Port AUX_CH transaction only:



Display port interface power up/down sequence, AUX_CH transaction only



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Display Port panel power sequence timing parameter:

Timing parameter	Description	Reqd. by	Limits			Notes
			Min.	Typ.	Max.	
T1	power rail rise time, 10% to 90%	source	0.5ms		10ms	
T2	delay from LCDVDD to black video generation	sink	0ms		200ms	prevents display noise until valid video data is received from the source
T3	delay from LCDVDD to HPD high	sink	0ms		200ms	sink AUX_CH must be operational upon HPD high.
T4	delay from HPD high to link training initialization	source				allows for source to read link capability and initialize.
T5	link training duration	source				dependant on source link to read training protocol.
T6	link idle	source				Min accounts for required BS-Idle pattern. Max allows for source frame synchronization.
T7	delay from valid video data from source to video on display	sink	0ms		50ms	max allows sink validate video data and timing.
T8	delay from valid video data from source to backlight enable	source				source must assure display video is stable.
T9	delay from backlight disable to end of valid video data	source				source must assure backlight is no longer illuminated.
T10	delay from end of valid video data from source to power off	source	0ms		500ms	
T11	power rail fall time, 90% to 10%	source			10ms	
T12	power off time	source	500ms			

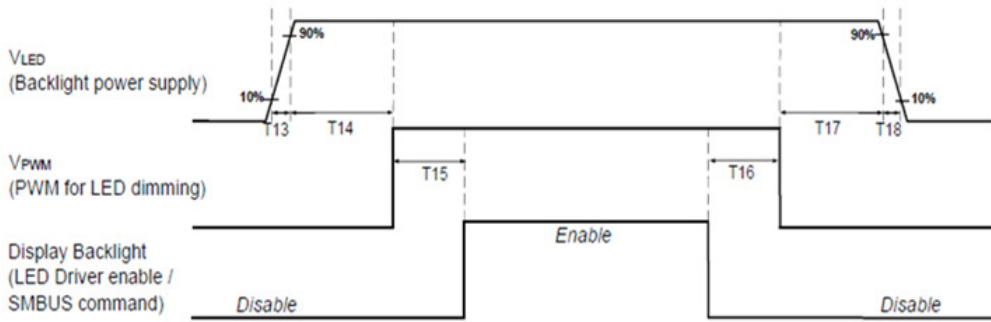
Note1: The sink must include the ability to generate black video autonomously. The sink must automatically enable black video under the following conditions:

- upon LCDVDD power on (within T2 max)-when the "Novideostream_Flag" (VB-ID Bit 3) is received from the source (at the end of T9).
- when no main link data, or invalid video data, is received from the source. Black video must be displayed within 64ms (typ) from the start of either condition. Video data can be deemed invalid based on MSA and timing information, for example.

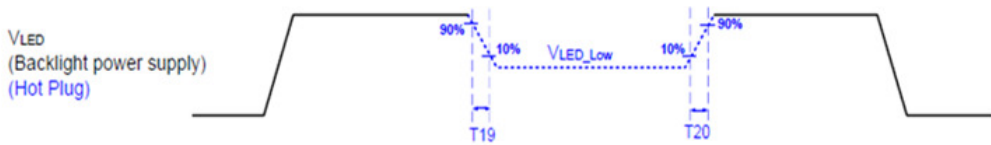
Note 2: The sink may implement the ability to disable the black video function, as described in Note 1, above, for system development and debugging purpose.

Note 3: The sink must support AUX_CH polling by the source immediately following LCDVDD power on without causing damage to the sink device (the source can re-try if the sink is not ready). The sink must be able to respond to an AUX_CH transaction with the time specified within T3 max.

Display Port panel B/L power sequence timing parameter:



Note : When the adapter is hot plugged, the backlight power supply sequence is shown as below.



	Min (ms)	Max (ms)
T13	0.5	10
T14	10	-
T15	10	-
T16	10	-
T17	10	-
T18	0.5	10
T19	1*	-
T20	1*	-

Seamless change: $T19/T20 = 5 \times T_{PWM}^*$

* $T_{PWM} = 1/PWM \text{ Frequency}$

7. Panel Reliability Test

7.1 Vibration Test

Test Spec:

- Test method: Non-Operation
- Acceleration: 1.5 G
- Frequency: 10 - 500Hz Random
- Sweep: 30 Minutes each Axis (X, Y, Z)

7.2 Shock Test

Test Spec:

- Test method: Non-Operation
- Acceleration: 220 G , Half sine wave
- Active time: 2 ms
- Pulse: X,Y,Z .one time for each side

7.3 Reliability Test

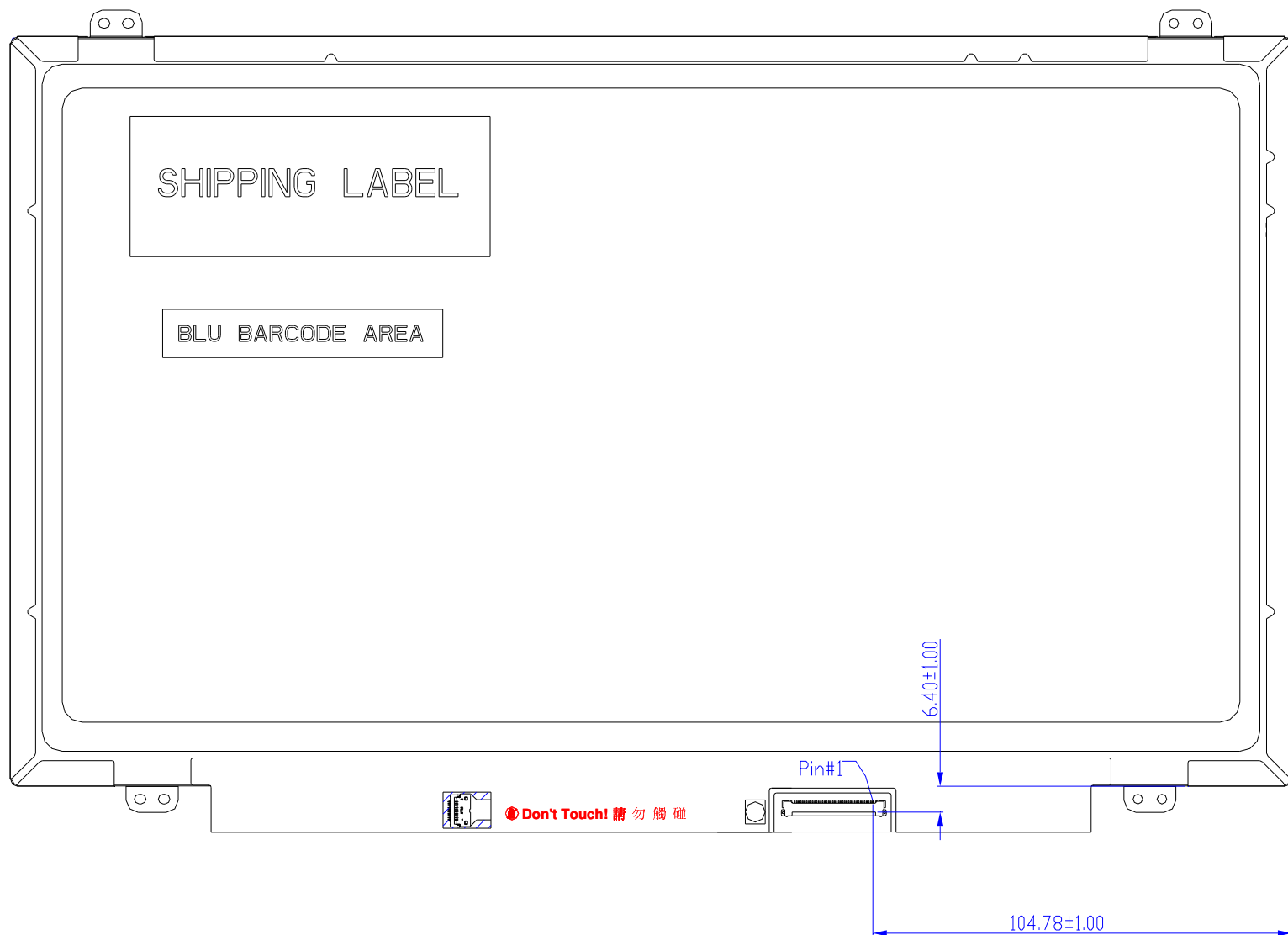
Items	Required Condition	Note
Temperature Humidity Bias	Ta= 40°C, 90%RH, 300h	
High Temperature Operation	Ta= 50°C, Dry, 300h	
Low Temperature Operation	Ta=0°C, 300h	
High Temperature Storage	Ta= 60°C, 300h	
Low Temperature Storage	Ta= -20°C, 250h	
Thermal Shock Test	Ta=-20°C(30min) ~60°C(30min), 100cycles condition.	
ESD	Contact : ±8 KV Air : ±15 KV	Note 1

Note1: According to EN 61000-4-2 , ESD class B: Some performance degradation allowed. No data lost
 . Self-recoverable. No hardware failures.

Remark: MTBF (Excluding the LED): 30,000 hours with a confidence level 90%

8.1 Total Solution Outline Dimension





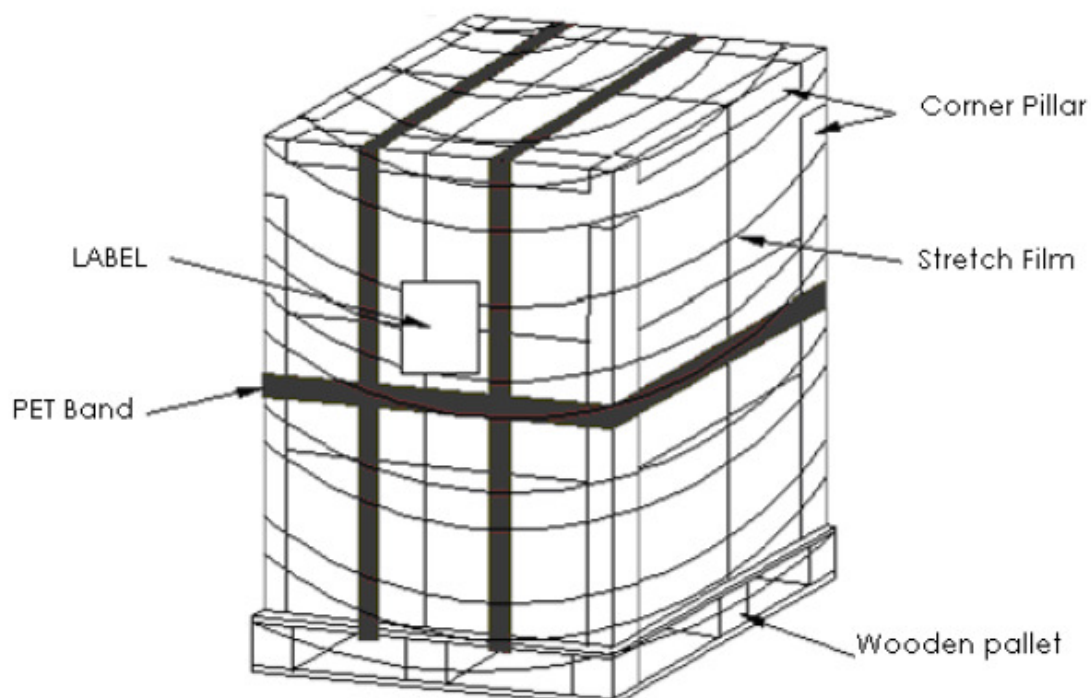
Back View

9. Shipping and Package

9.1 Shipping Label Format

 *XXXXXXXXXXXX-XXXXXX	Manufactured YY/WW Model No: B140HAK01.1 AU Optronics Made in China (S01)	 
	H/W: 0A F/W: 1	 
CT: CFPEP 01 XXXXXXXX		

9.2 Shipping Package of Palletizing Sequence



10. Appendix: EDID Description

Address	FUNCTION	Value	Value	Value
HEX		HEX	BIN	DEC
00	Header	00	00000000	0
01		FF	11111111	255
02		FF	11111111	255
03		FF	11111111	255
04		FF	11111111	255
05		FF	11111111	255
06		FF	11111111	255
07		00	00000000	0
08	EISA Manuf. Code LSB	06	00000110	6
09	Compressed ASCII	AF	10101111	175
0A	Product Code	3D	00111101	61
0B	hex, LSB first	11	00010001	17
0C	32-bit ser #	00	00000000	0
0D		00	00000000	0
0E		00	00000000	0
0F		00	00000000	0
10	Week of manufacture	00	00000000	0
11	Year of manufacture	19	00011001	25
12	EDID Structure Ver.	01	00000001	1
13	EDID revision #	04	00000100	4
14	Video input def. <i>(digital I/P, non-TMDS, CRGB)</i>	90	10010000	144
15	Max H image size <i>(rounded to cm)</i>	1F	00011111	31
16	Max V image size <i>(rounded to cm)</i>	11	00010001	17
17	Display Gamma <i>(=(gamma*100)-100)</i>	78	01111000	120
18	Feature support <i>(no DPMS, Active OFF, RGB, tmg Blk#1)</i>	02	00000010	2
19	Red/green low bits (Lower 2:2:2:2 bits)	C3	11000011	195
1A	Blue/white low bits (Lower 2:2:2:2 bits)	25	00100101	37
1B	Red x (Upper 8 bits)	92	10010010	146
1C	Red y/ highER 8 bits	57	01010111	87
1D	Green x	5A	01011010	90
1E	Green y	94	10010100	148
1F	Blue x	2A	00101010	42
20	Blue y	22	00100010	34
21	White x	50	01010000	80
22	White y	54	01010100	84
23	Established timing 1	00	00000000	0
24	Established timing 2	00	00000000	0
25	Established timing 3	00	00000000	0
26	Standard timing #1	01	00000001	1
27		01	00000001	1
28	Standard timing #2	01	00000001	1
29		01	00000001	1
2A	Standard timing #3	01	00000001	1
2B		01	00000001	1
2C	Standard timing #4	01	00000001	1

2D		01	00000001	1
2E	Standard timing #5	01	00000001	1
2F		01	00000001	1
30	Standard timing #6	01	00000001	1
31		01	00000001	1
32	Standard timing #7	01	00000001	1
33		01	00000001	1
34	Standard timing #8	01	00000001	1
35		01	00000001	1
36	Pixel Clock/10000 LSB	14	00010100	20
37	Pixel Clock/10000 USB	37	00110111	55
38	Horz active Lower 8bits	80	10000000	128
39	Horz blanking Lower 8bits	B2	10110010	178
3A	HorzAct:HorzBlnk Upper 4:4 bits	70	01110000	112
3B	Vertical Active Lower 8bits	38	00111000	56
3C	Vertical Blanking Lower 8bits	28	00101000	40
3D	Vert Act : Vertical Blanking (upper 4:4 bit)	40	01000000	64
3E	HorzSync. Offset	30	00110000	48
3F	HorzSync.Width	64	01100100	100
40	VertSync.Offset : VertSync.Width	31	00110001	49
41	Horz&Vert Sync Offset/Width Upper 2bits	00	00000000	0
42	Horizontal Image Size Lower 8bits	35	00110101	53
43	Vertical Image Size Lower 8bits	AD	10101101	173
44	Horizontal & Vertical Image Size (upper 4:4 bits)	10	00010000	16
45	Horizontal Border <i>(zero for internal LCD)</i>	00	00000000	0
46	Vertical Border <i>(zero for internal LCD)</i>	00	00000000	0
47	Signal <i>(non-intr, norm, no stero, sep sync, neg pol)</i>	18	00011000	24
48	Pixel Clock/10,000 (LSB)	B8	10111000	184
49	Pixel Clock/10,000 (MSB)	24	00100100	36
4A	Horizontal Addressable Pixels, lower 8 bits	80	10000000	128
4B	Horizontal Blanking Pixels, lower 8 bits	B2	10110010	178
4C	H Pixels, upper nibble : H Blanking, upper nibble	70	01110000	112
4D	Vertical Addressable Lines, lower 8 bits	38	00111000	56
4E	Vertical Blanking Lines, lower 8 bits	28	00101000	40
4F	V lines, upper nibble : V blanking, upper nibble	40	01000000	64
50	Horizontal Front Porch, lower 8 bits	30	00110000	48
51	Horizontal Sync Pulse, lower 8 bits	64	01100100	100
52	V Front Porch, lower nibble : V Sync Pulse, lower nibble	31	00110001	49
53	VFP, 2 bits: VSP 2 bits: HFP 2 bits: HFP 2 bits	00	00000000	0
54	Horizontal Image Size in mm, lower 8 bits	35	00110101	53
55	Vertical Image Size in mm, lower 8 bits	AD	10101101	173
56	H Image Size, upper nibble : V Image Size, upper nibble	10	00010000	16
57	Horizontal Border	00	00000000	0
58	Vertical Border	00	00000000	0
59	Bit Encode Sync Information	18	00011000	24
5A	DC	00	00000000	0
5B	HTOTAL	00	00000000	0
5C	HA	00	00000000	0
5D	HBL	00	00000000	0

5E	HFP	00	00000000	0
5F	HFPe	00	00000000	0
60	HBP	00	00000000	0
61	HB	00	00000000	0
62	HSO	00	00000000	0
63	HS	00	00000000	0
64	VTOTAL	00	00000000	0
65	VA	00	00000000	0
66	VBL	00	00000000	0
67	VFP	00	00000000	0
68	VBP	00	00000000	0
69	VB	00	00000000	0
6A	VSO	00	00000000	0
6B	VS	00	00000000	0
6C	Detail Timing Description #4	00	00000000	0
6D	Flag	00	00000000	0
6E	Reserved	00	00000000	0
6F	For Brightness Table and Power Consumption	02	00000010	2
70	Flag	00	00000000	0
71	PWM % [7:0] @ Step 0	10	00010000	16
72	PWM % [7:0] @ Step 5	48	01001000	72
73	PWM % [7:0] @ Step 10	FF	11111111	255
74	Nits [7:0] @ Step 0	0F	00001111	15
75	Nits [7:0] @ Step 5	3C	00111100	60
76	Nits [7:0] @ Step 10	6E	01101110	110
77	Panel Electronics Power @ 32x32 Chess Pattern =	15	00010101	21
78	Backlight Power @ 60 nits =	2A	00101010	42
79	Backlight Power @ Step 10 =	23	00100011	35
7A	Nits @ 100% PWM Duty =	6E	01101110	110
7B	Flag	20	00100000	32
7C	Flag	20	00100000	32
7D	Flag	20	00100000	32
7E	Extension Flag	00	00000000	0
7F	Checksum	61	01100001	97