



(✓	)	Preliminary Specifications
(	)	Final Specifications

Module	15.6" (15.55) FHD 16:9 Color TFT-LCD with LED Backlight design
Model Name	B156HAB01.0 (H/W:0A) DPN:0079Y
Note ( 🗭 )	o-TP Display

	Customer	Date
-	Checked & Approved by	Date
-		4
	ote: This Specification nange without notice	

Approved by	Date
20	
Prepared by	Date
Eric DC Liu	<u>2016/01/26</u>
NBBU Market AU Optronics	





### **Contents**

1. Handling Precautions	4
2. General Description	5
2.1 General Specification	5
2.2 Optical Characteristics	7
3. Functional Block Diagram	12
4. Absolute Maximum Ratings	13
4.1 Absolute Ratings of TFT LCD Module	13
4.2 Absolute Ratings of Environment	13
5. Electrical Characteristics	14
5.1 TFT LCD Module	
5.2 Backlight Unit	17
5.3 Touch Sensor Power Consumption	
6. Signal Interface Characteristic	19
6.1 Pixel Format Image	19
6.2 Integration Interface Requirement	20
6.3 Interface Timing	22
6.4 Power ON/OFF Sequence	23
7. Panel Reliability Test	26
7.1 Vibration Test	26
7.2 Shock Test	26
7.3 Reliability Test	26
8. Mechanical Characteristics	27
8.1 LCM Outline Dimension	27
9. Shipping and Package	29
9.1 Shipping Label Format	29
9.2 Definition of customer PPID Label and Revision Code	29
9.3 Carton Package	30
9.4 Shipping Package of Palletizing Sequence	31
10. Appendix: EDID Description	32





### **Record of Revision**

Version and Date Page		Page	Old description	New Description	Remark
0.1	2015/10/23	All	First Edition for Customer		
0.2	2016/01/26	P.7		Update Color Chromaticity Coodinates	
		P.29		Update X20 Label	
		P.32		Update X20 EDID	

B156HAB01.0 <u>Document Version : 0.2</u> 3 Of 35





## **Product Specification**

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### 1. Handling Precautions

- Since front polarizer is easily damaged, pay attention not to scratch it.
- 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.
- 11) After installation of the TFT Module into an enclosure (Notebook PC Bezel, for example), do not twist nor bend the TFT Module even momentary. 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.
- 12) 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.
- 13) 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 electronic breakdown.







### 2. General Description

B156HAB01.0 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) x 1080(V) screen and 262k colors (RGB 6-bits data driver) with LED backlight driving circuit. All input signals are eDP(Embedded DisplayPort) interface compatible.

B156HAB01.0 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  $^{\circ}\mathrm{C}$  condition:

Items	Unit	Specification	ons			
Screen Diagonal	[mm]	394.9				
Active Area	[mm]	344.16 x 193.59				
Pixels H x V		1920 x 3(RG			7	
Pixel Pitch	[mm]	0.17925 x 0.				
Pixel Format		R.G.B. Verti	cal Stripe			
Display Mode		Normally Bl	ack			
White Luminance (ILED= 23 mA) (Note: ILED is LED current)	[cd/m²]				otal Solution) otal Solution)	
Luminance Uniformity		1.25 max. (5	5 points)			
Contrast Ratio		800:1 typ				
Response Time	[ms]	25 Typ				
Nominal Input Voltage VDD	[Volt]	+3.3 typ.				
Power Consumption	[Watt]	4.35W				
Weight	[Grams]	380g max ( 580g max (		, ,		
			Min	Тур	Max	
		Length	359.0	359.5	360.0	
Physical Size	[mm]	Width	223.3	223.8	224.3	
		Thickness	-	-	3.2 (Panel Side) 3.4 (PCBA Side)	
			Min	Тур	Max	
		Length	373.4	373.5	373.6	
Total solution [Note: OGS Touch module]	[mm]	Width	236.6	236.7	236.8	
		Thickness	-	-	4.2 (Panel Side) 4.4 (PCBA Side)	
Electrical Interface		2 Lane eDP		1	ı	
Glass Thickness	[mm]	0.4				
Surface Treatment		Glare				
Support Color		262K colors	( RGB 6-b	oit )		
Temperature Range Operating Storage (Non-Operating)	[°C]	0 to +50 -20 to +60				
RoHS Compliance		RoHS Comp	oliance			
		•				







### 2.1.1 General Touch Specification

Item	Spec	Unit
Type of Touch Sensor	Projective Capacitive (on cell)	
Panel Size	15.6''	
Outline Dimension	373.5 x 236.7 typ	mm
Total Thickness	0.7 typ	mm
Total Weight	170 typ	g
TP View Area	345.16 x 194.59 typ	mm
TP Active Area	346.36 x 195.79 typ	mm
Interface	USB or I2C	
Report Rate	>100	Hz
Multi-Touch Point	10 points	
Input method	Finger	
Touch panel sensor IC	EETi (3104)	
Channel	82(Rx) x 46(Tx)	
Distance between 2 point	TBD	mm
Surface treatment	NA	
TP F/W version	TBD	
Support OS	Window 8 / Window 10	
BM ink	NA	
TP Power Consumption	300	mW





### 2.2 Optical Characteristics

Item		Symbol	Conditions	Min.	Тур.	Мах.	Unit	Note
White Luminance ILED=21mA			5 points average	187	220	-	cd/m²	1, 4, 5.
		ΘR	Horizontal (Right)	80	85	-	degree	
Viewing Ar	nale	θι	CR = 10 (Left)	80	85	-	acgree	
Viewing Ai	igie	Ψн	Vertical (Upper)	80	85	- (		4, 9
		Ψι	CR = 10 (Lower)	80	85	-		
Luminance Un	iformity	δ <sub>5P</sub>	5 Points	-	-	1.25		1, 3, 4
Luminance Un	iformity	δ <sub>13P</sub>	13 Points	-	- (	1.60		2, 3, 4
Contrast Ro	atio	CR		-	800	-		4, 6
Cross tal	k	%			<b>\</b>	4		4, 7
Response T	ïme	T <sub>RT</sub>	Rising + Falling	-	25	35		
	Red	Rx		0.536	0.566	0.596		
		Ry		0.313	0.343	0.373		
Color /	Green	Gx		0.317	0.347	0.377		
Chromaticity		Gy	CIE 1931	0.543	0.573	0.603		4
Coodinates	Dhar	Вх		0.129	0.159	0.189		7
	Blue	Ву	2	0.085	0.115	0.145		
		Wx		0.283	0.313	0.343		
	White	Wy		0.299	0.329	0.359		
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		~			l			

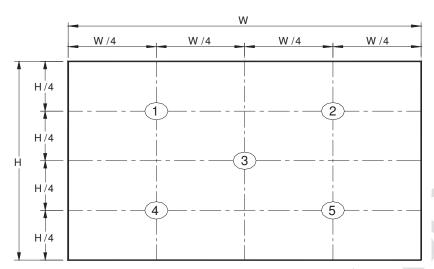
7 of 35



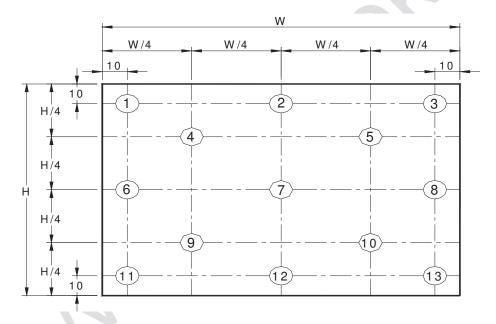
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Note 1: 5 points position (Ref: Active area)



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

c		Maximum Brightness of five points
δ w5	=	Minimum Brightness of five points
2		Maximum Brightness of thirteen points
δ w13	=	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





Field=2°

50 cm

TFT-LCD Module

Center of the screen

**Note 5**: Definition of Average Luminance of White (Y<sub>L</sub>):

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.

Contrast ratio (CR)=

Brightness on the "White" state

Brightness on the "Black" state

Note 7: Definition of Cross Talk (CT)

 $CT = | YB - YA | / YA \times 100 (\%)$ 

Where

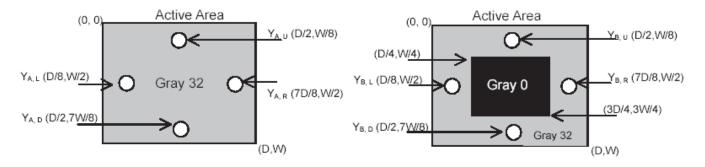
YA = Luminance of measured location without gray level 0 pattern (cd/m2)

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



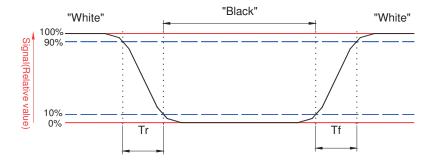
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Note 8: Definition of response time:

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.





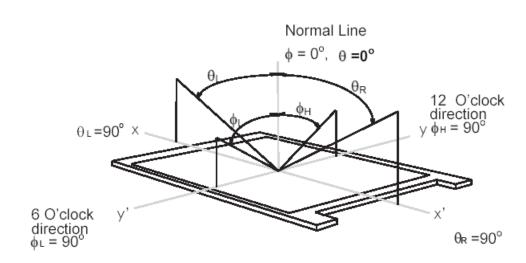


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Note 9. Definition of viewing angle

Viewing angle is the measurement of contrast ratio  $\geq$  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° ( $\theta$ ) horizontal left and right and 90° ( $\Phi$ ) 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.







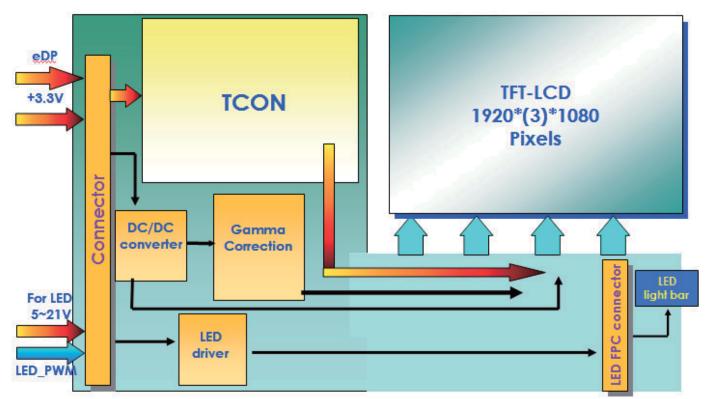


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### 3. Functional Block Diagram

The following diagram shows the functional block of the 15.6 inches wide Color TFT/LCD 40 Pin (One CH/connector Module)







### 4. Absolute Maximum Ratings

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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	Vin	-0.3	+4.0	[Volt]	Note 1,2

4.2 Absolute Ratings of Environment

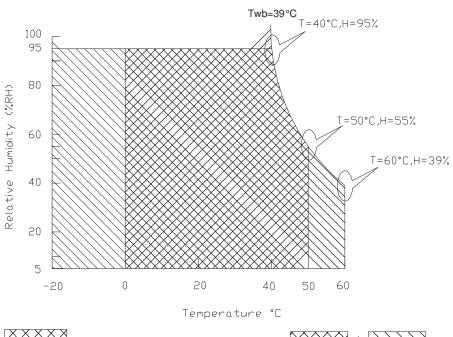
Item	Symbol	Min	Max	Unit	Conditions
Operating	TOP	0	+50	[°C]	Note 4
Operation Humidity	HOP	5	95	[%RH]	Note 4
Storage Temperature	TST	-20	+60	[°C]	Note 4
Storage Humidity	HST	5	95	[%RH]	Note 4

Note 1: At Ta ( $25^{\circ}$ C)

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

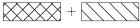
Note 3: LED specification refer to section 5.2

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





Storage Range







#### 5. Electrical Characteristics

#### 5.1 TFT LCD Module

### 5.1.1 Power Specification

Input power specifications are as follows;

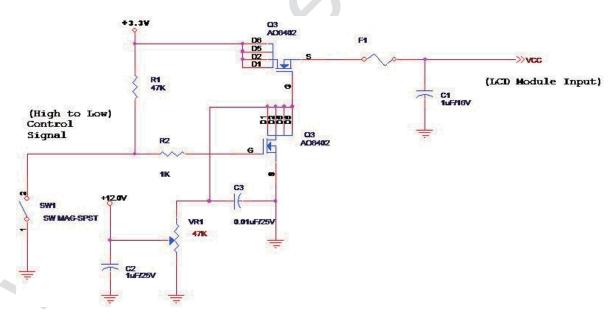
The power specification are measured under  $25^{\circ}$ C and frame frenquency under 60Hz

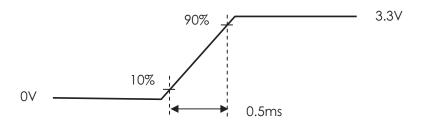
Symble	Parameter	Min	Тур	Max	Units	Note
VDD	Logic/LCD Drive Voltage	3.0	3.3	3.6	[Volt]	
PDD	VDD Power	-	-	1.2	[Watt]	Note 1
IDD	IDD Current	-	-	400	[mA]	Note 1
IRush	Inrush Current	-	-	2000	[mA]	Note 2
VDDrp	Allowable Logic/LCD Drive Ripple Voltage	-	-	100	[mV] p-p	•

Note 1: Maximum Measurement Condition: Black Pattern at 3.3V driving voltage. (Pmax=V3.3 X lblack)

Typical Measurement Condition: Mosaic Pattern

Note 2: Measure Condition





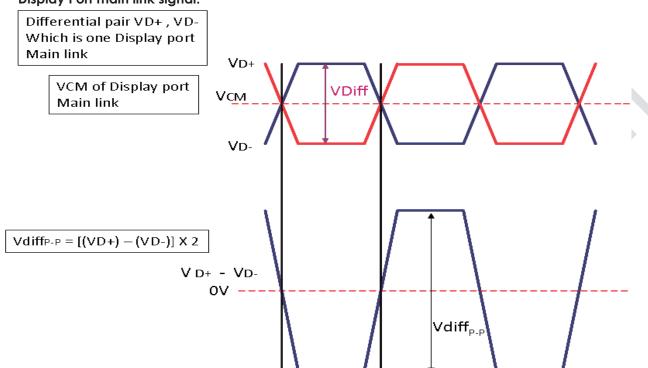


### **5.1.2 Signal Electrical Characteristics**

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Signal electrical characteristics are as follows;

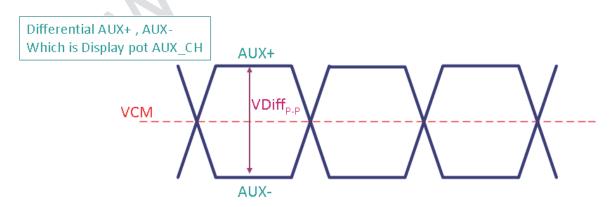
### Display Port main link signal:



Display port main link								
		Min	Тур	Max	unit			
VCM	RX input DC Common Mode Voltage		0		V			
VDiff <sub>P-P</sub>	Peak-to-peak Voltage at a receiving Device	100		1320	mV			

Follow as VESA display port standard V1.1a

### Display Port AUX\_CH signal:







	Display port AUX_CH								
		Min	Тур	Мах	unit				
VCM	AUX DC Common Mode Voltage		0		V				
VDiff <sub>P-P</sub>	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	Тур	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	Тур	Max	Units	Condition
Backlight Power Consumption	PLED	-	-	3.15	[Watt]	(Ta=25°C), Note 1 Vin =12V
LED Life-Time	N/A	15,000	-	-	Hour	(Ta=25°C), Note 2 I <sub>F</sub> =23 mA

Note 1: Calculator value for reference PLED = VF (Normal Distribution) \* IF (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	Тур	Max	Units	Remark
LED Power Supply	VLED	5.0	12.0	21.0	[Volt]	
LED Enable Input High Level	VLED_EN	2.5	1	5.5	[Volt]	
LED Enable Input Low Level	*Note 1	1	-	0.5	[Volt]	
PWM Logic Input High Level	VPWM_EN	2.5	-	5.5	[Volt]	Define as
PWM Logic Input Low Level	*Note 1	-	ı	0.5	[Volt]	Connector Interface
PWM Input Frequency	FPWM	200	1K	10K	Hz	(Ta=25°C)
PWM Duty Ratio	Duty	5		100	%	

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





### **5.3 Touch Sensor Power Consumption**

Items	Symbol	S	pecification	Unit	Notes	
nems	39111001	Min.	Тур.	Max.	Orili	Moles
	VTSP	4.5	5	5.5	>	
Touch Panel Power Supply	VDD	3.0	3.3	3.6	V	
	Pvtsp	-	-	300	mW	Active mode
	Pvtsp	-	-	-	mW	Idle Mode
	Pvtsp	-	-		mW	Sleep Mode





B156HAB01.0 <u>Document Version : 0.2</u> 18 of 35





### 6. Signal Interface Characteristic

### 6.1 Pixel Format Image

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

	1					192	20	
1st Line	R G B	R G B	 R	G	В	R	G B	
							· · · · ·	
1080th Line	R G B	R G B	 R	G	В	R	G B	





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### **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	STM or compatible
Type / Part Number	STM MSAK24025P40 or compatible
Mating Housing/Part Number	STM PK24025P40 or compatible

### 6.2.2 Pin Assignment

eDP lane is a differential signal technology for LCD interface and high speed data transfer device.

PIN NO Symbol Function  1 DCR Reserved for DCR  2 H_GND High Speed Ground  3 Lane1_N Complement signal link lane1	
2 H_GND High Speed Ground	
11_GND I IIIght speed Ground	
3 Lane1_N Complement signal link lane1	
4 Lane1_P True signal link lane1	
<sup>5</sup> 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.	
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 signale 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 (Reverse for AUO TEST only)
25	NC	No connect (Reverse for AUO TEST only)
26	BL_PWR	Backlight power
27	BL_PWR	Backlight power
28	BL_PWR	Backlight power
29	BL_PWR	Backlight power
30	NC	No Connect (Reserved for CM)
31	TP_D-	USB Data- for Touch
32	TP_D+	USB Data+ for Touch
33	GND	Ground-Shield
34	VTSP	Touch panel power supply (5V)
35	VTSP	Touch panel power supply (5V)
36	TP_EN	TP Enable (active high)
37	TP_CLK	I2C Clock for Touch (NC for USB input)
38	TP_Data	I2C Data for Touch (NC for USB input)
39	INT	Interrupt for Touch (NC for USB input)
40	RST	Reset for Touch (NC for USB input)

Note1: start from right side

Note2: Input signals shall be low or High-impedance state when VDD is off.







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### **6.3 Interface Timing**

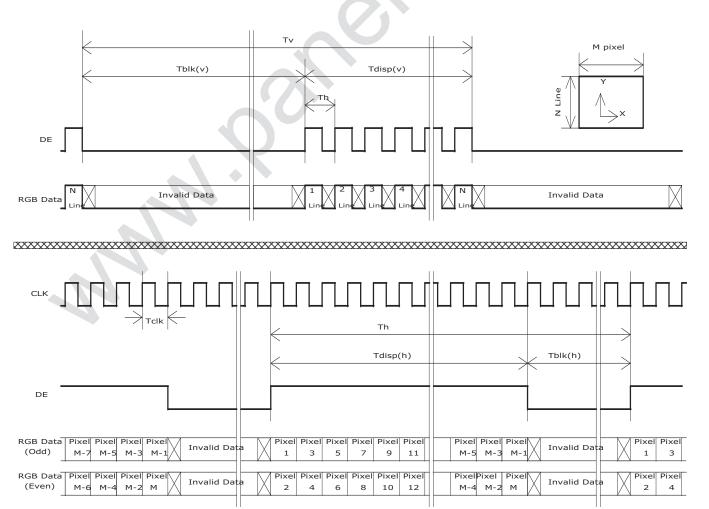
Basically, interface timings should match the 1920x1080 /60Hz manufacturing guide line timing.

Parai	Symbol	Min.	Тур.	Max.	Unit	
Frame Rate		-	48 60 -		-	Hz
Clock frequency		1/Tclock	-	141	-	MHz
	Period	T∨	1084	1116	3080	
Vertical	Active	TvD		<b>T</b> Line		
Section	Blanking	T∨B	4	36	2000	
	Period	T <sub>H</sub>	2000	2104	2320	
Horizontal	Active	T <sub>HD</sub>		1920		<b>T</b> Clock
Section	Blanking	<b>T</b> HB	80	184	400	

Note: 1. DE mode only

2. The maximum clock frequency = (1920+B)\*(1080+A)\*60 < 149.1MHz

### 6.3.2 Timing diagram





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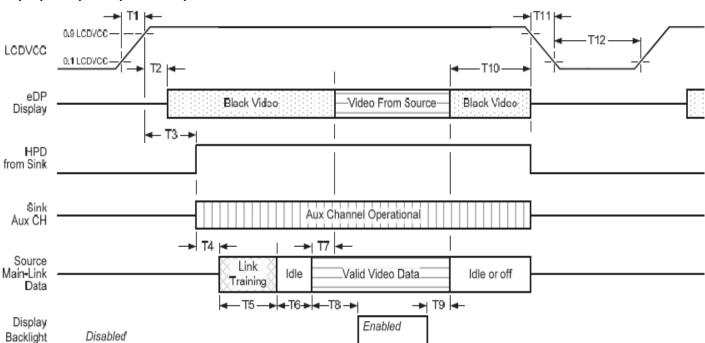
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### 6.4 Power ON/OFF Sequence

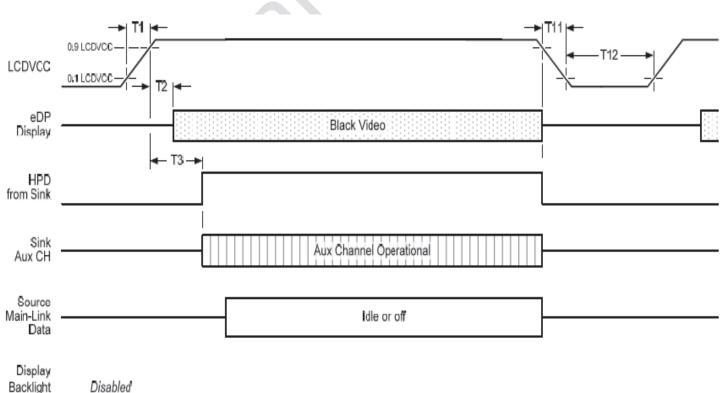
Power on/off sequence is as follows. Interface signals and LED on/off sequence are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off

### 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	December 1	David los	Limits			Notes	
parameter	Description	Reqd. by	Min.	Тур.	Max.	Notes	
T1	power rail rise time, 10% to 90%	source	0.5ms		10ms		
Т2	delay from LCDVDD to black video generation	sink	0ms		200ms	prevents display noise until valid video data is received from the source	
Т3	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.	
Т5	link training duration	source				dependant on source link to read training protocol.	
Т6	link idle	source				Min accounts for required BS-Idle pattern. Max allows for source frame synchronization.	
<b>T7</b>	delay from valid video data from source to video on display	sink	0ms		50ms	max allows sink validate video data and timing.	
Т8	delay from valid video data from source to backlight enable	source				source must assure display video is stable.	
Т9	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, 905 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 (with in 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.



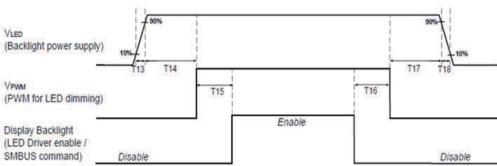


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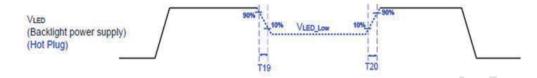
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### Display Port panel B/L power sequence timing parameter:



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	200 200 200
T16	10	=
T17	10	=
T18	0.5	10
T19	1*	
T20	1*	. <u> </u>

Seamless change: T19/T20 = 5xT<sub>PWM</sub>\*

\*T<sub>PWM</sub>= 1/PWM Frequency





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

**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%

B156HAB01.0 Document Version: 0.2

**(P)** 

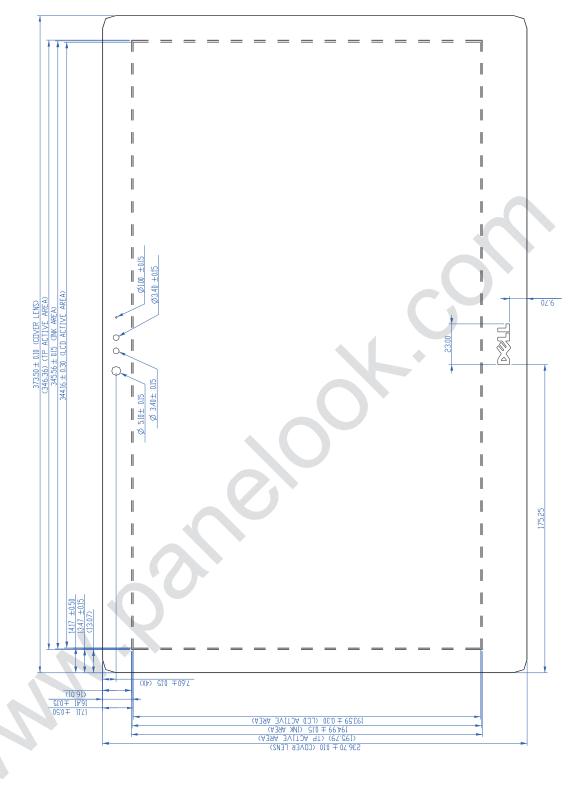


**Product Specification** 

AU OPTRONICS CORPORATION

8. Mechanical Characteristics

8.1 LCM Outline Dimension 8.1.1 Standard Front View





554.30 MAX (WITH PCB) 202.00 MAX (DUTLINE)



**Product Specification** 



B156HAB01:0\_DocumentVersion:0.2

**②** 







### 9. Shipping and Package

### 9.1 Shipping Label Format



Manufactured YY/MM Model No: B156HAB01.0

AU Optronics

H/W: OA F/W:1 MADE IN CHINA(SO1)









### 9.2 Definition of customer PPID Label and Revision Code

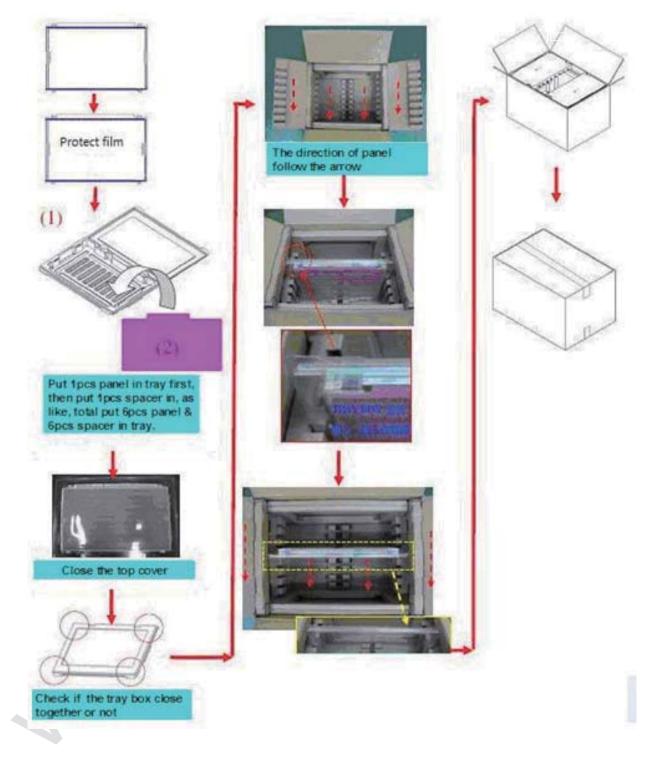
Please refer to the Dell Part identification Label Specification, Number: 13190

Build Name(s):	PPID Revision Code(s):
Sub System Test (SST) Working Sample (WS) ENG 2	X00, X01, X02,, X0n
Product Test (PT) Engineering Sample (ES) ENG 3	X10, X11, X12,, X1n
System Test (ST) Customer Sample (CS) ENG 4	X20, X21, X22, X2n
X-Build (XB) Mass Production (MP) ENG 5	A00, A01, A02, A0n





### 9.3 Carton Package

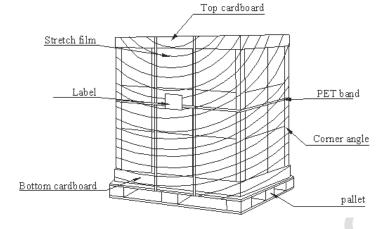








### 9.4 Shipping Package of Palletizing Sequence







10. Appendix: EDID Description

	Byte	Field Name and Comments	Value	Value	Value
	(hex)	Tield Name and Comments	(hex)	(binary)	(DEC)
	0	Header	00	00000000	0
	1	Header	FF	11111111	255
	2	Header	FF	11111111	255
Header	3	Header	FF	11111111	255
l He	4	Header	FF	11111111	255
	5	Header	FF	11111111	255
	6	Header	FF	11111111	255
	7	Header	00	00000000	0
	8	EISA manufacture code = 3 Character ID	06	00000110	6
	9	EISA manufacture code (Compressed ASCII)	AF	10101111	175
	0A	Panel Supplier Reserved – Product Code	ED	11101101	237
	0B	Panel Supplier Reserved – Product Code	10	00010000	16
rct _	0C	LCD module Serial No - Preferred but Optional ("0" if not used)	00	00000000	0
Vendor / Product EDID Version	0D	LCD module Serial No - Preferred but Optional ("0" if not used)	00	00000000	0
endor /	0E	LCD module Serial No - Preferred but Optional ("0" if not used)	00	00000000	0
> _	0F	LCD module Serial No - Preferred but Optional ("0" if not used)	00	00000000	0
	10	Week of manufacture	00	00000000	0
	11	Year of manufacture	19	00011001	25
	12	EDID structure version # = 1	01	00000001	1
	13	EDID revision # = 4	04	00000100	4
	14	Video I/P definition	95	10010101	149
ers	15	Max H image size = ?? cm(Rounded to cm)	22	00100010	34
Display aramete	16	Max V image size = ?? cm(Rounded to cm)	13	00010011	19
Display Parameters	17	Display gamma = (gamma ×100)-100 = Example: ( 2.2×100 ) - 100 = 120	78	01111000	120
	18	Feature support	02	00000010	2
	19	Red/Green Low bit (RxRy/GxGy)	2E	00101110	46
	1A	Blue/White Low bit (BxBy/WxWy)	8E	10001110	142
	1B	Red X Rx = 0.???	95	10010101	149
or es	1C	Red Y Ry = 0.???	58	01011000	88
Col	1D	Green X Rx = 0.???	59	01011001	89
Panel Color Coordinates	1E	Green Y Ry = 0.???	93	10010011	147
<u>a</u> 0	1F	Blue X Rx = 0.???	29	00101001	41
	20	Blue Y Ry = 0.???	25	00100101	37
	21	White X Rx = 0.???	53	01010011	83
	22	White Y Ry = 0.???	5A	01011010	90
Established Timings	23	Established timings 1 (00h if not used)	00	00000000	0
ning	24	Established timings 2 (00h if not used)	00	00000000	0
sta Tir		Manufacturer's timings (00h if not used)	00	00000000	0





	26	Standard timing ID1 (01h if not used)	01	00000001	1
	27	Standard timing ID1 (01h if not used)	01	00000001	1
	28	Standard timing ID2 (01h if not used)	01	00000001	1
	29	Standard timing ID2 (01h if not used)	01	00000001	1
	2A	Standard timing ID3 (01h if not used)	01	00000001	1
₽	2B	Standard timing ID3 (01h if not used)	01	00000001	1
Standard Timing ID	2C	Standard timing ID4 (01h if not used)	01	00000001	1
틀	2D	Standard timing ID4 (01h if not used)	01	00000001	1
dard	2E	Standard timing ID5 (01h if not used)	01	00000001	1
tanc	2F	Standard timing ID5 (01h if not used)	01	00000001	1
SO	30	Standard timing ID6 (01h if not used)	01	00000001	1
	31	Standard timing ID6 (01h if not used)	01	00000001	1
	32	Standard timing ID7 (01h if not used)	01	00000001	1
	33	Standard timing ID7 (01h if not used)	01	00000001	1
	34	Standard timing ID8 (01h if not used)	01	00000001	1
	35	Standard timing ID8 (01h if not used)	01	00000001	1
		Pixel Clock/10,000			
	36	(LSB)	14	00010100	20
	37	Pixel Clock/10,000 (MSB)	37	00110111	55
	38	Horizontal Active = ???? pixels (lower 8 bits)	80	10000000	128
	30	Horizontal Blanking (Thbp) = 320 pixels	00	10000000	120
	39	(lower 8 bits)	B4	10110100	180
	3A	Horizontal Active/Horizontal blanking (Thbp) (upper4:4 bits)	70	01110000	112
	3B	Vertical Active = ??? lines	38	00111000	56
r #1	30	Vertical Active = !:! lines  Vertical Blanking (Tvbp) = ?? lines (DE Blanking	30	00111000	50
ripte	3C	typ. for DE only panels)	26	00100110	38
Descripter #1	3D	Vertical Active: Vertical Blanking (Tvbp) (upper4:4 bits)	40	01000000	64
ing	3E	Horizontal Sync, Offset (Thfp) = ?? pixels	6C	01101100	108
Timing	3F	Horizontal Sync, Pulse Width = ??? pixels	30	00110000	48
	<u> </u>	Vertical Sync, Offset (Tvfp) = ? lines Sync		0011000	
	40	Width = ? lines	AA	10101010	170
	41	Horizontal Vertical Sync Offset/Width upper 2 bits	00	00000000	0
	42	Horizontal Image Size =??? mm	58	01011000	88
	43	Vertical image Size = ??? mm	C1	11000001	193
	44	Horizontal Image Size / Vertical image size	10	00010000	16
	45	Horizontal Border = 0 (Zero for Notebook LCD)	00	00000000	0
	46	Vertical Border = 0 (Zero for Notebook LCD)	00	00000000	0





	47	Bit[7] 0: Non-interlace, 1: Interlace Bit[6:5] 00: Normal display, no strero, see VESA EDID Spec 1.3 Bit[4:3] 00: Analog composite, 01: Bipolar analog composite, 10: Digital	1A	00011010	26
	48	Pixel Clock/10,000 (LSB)	24	00100100	36
	49	Pixel Clock/10,000 (MSB)	2C	00101100	44
	4A	Horizontal Active = xxxx pixels (lower 8 bits)	80	10000000	128
	4B	Horizontal Blanking (Thbp) = xxxx pixels (lower 8 bits)	B8	10111000	184
	4C	Horizontal Active/Horizontal blanking (Thbp) (upper4:4 bits)	70	01110000	112
	4D	Vertical Active = xxxx lines	38	00111000	56
	4E	Vertical Blanking (Tvbp) = xxxx lines (DE Blanking typ. for DE only panels)	26	00100110	38
	4F	Vertical Active : Vertical Blanking (Tvbp) (upper4:4 bits)	40	01000000	64
	50	Horizontal Sync, Offset (Thfp) = xxxx pixels	6C	01101100	108
#2	51	Horizontal Sync, Pulse Width = xxxx pixels	30	00110000	48
Timing Descripter #2 (=Timing Descripter #1)	52	Vertical Sync, Offset (Tvfp) = xx lines Sync Width = xx lines	AA	10101010	170
g Des ng De	53	Horizontal Vertical Sync Offset/Width upper 2 bits	00	00000000	0
min imir	54	Horizontal Image Size =xxx mm	58	01011000	88
Τ=)	55	Vertical image Size = xxx mm	C1	11000001	193
	56	Horizontal Image Size / Vertical image size	10	00010000	16
	57	Horizontal Border = 0 (Zero for Notebook LCD)	00	00000000	0
	58	Vertical Border = 0 (Zero for Notebook LCD)	00	00000000	0
		Bit[7] 0: Non-interlace, 1: Interlace Bit[6:5] 00: Normal display, no strero, see VESA EDID Spec 1.3 Bit[4:3] 00: Analog composite, 01: Bipolar analog composite, 10: Digital			
<u>်</u>	59	==> fix=1A	1A	00011010	26
#	5A	Flag	00	00000000	0
ript( cific	5B	Flag	00	00000000	0
spe spe	5C	Flag	00	00000000	0
Timing Descripter #3 Dell specific information	5D	Data Type Tag: Alphanumeric Data String (ASCII) ==> fix=FE	FE	11111110	254
H	5E	Flag	00	00000000	0





	5F	Dell P/N 1 <sup>st</sup> Character	30	00110000	48
	60	Dell P/N 2 <sup>nd</sup> Character	30	00110000	48
	61	Dell P/N 3 <sup>rd</sup> Character	37	00110111	55
	62	Dell P/N 4 <sup>th</sup> Character	39	00111001	57
	63	Dell P/N 5 <sup>th</sup> Character	59	01011001	89
	64	EDID Revision Bit[6:0] See charts below Bit[7] 0: X-rev, 1: A-rev	14	00010100	20
	65	Manufacturer P/N	42	01000010	66
	66	Manufacturer P/N	31	00110001	49
	67	Manufacturer P/N	35	00110101	53
	68	Manufacturer P/N	36	00110110	54
	69	Manufacturer P/N	48	01001000	72
	6A	Manufacturer P/N	41	01000001	65
	6B	Manufacturer P/N (If <13 char, then terminate with ASCII code 0Ah, set remaining char = 20h)	42	01000010	66
	6C	Flag	00	00000000	0
	6D	Flag	00	00000000	0
	6E	Flag	00	00000000	0
	6F	Data Type Tag: Manufacturer Specified Data 00 ==>fix=00	00	00000000	0
	70	Flag	00	00000000	0
	71	Color Management	00	00000000	0
4	72	Panel Structure	41	01000001	65
er #	73	Frame Rate	22	00100010	34
Timing Descripter #4	74	Light Controller Interface and Luminance	96	10010110	150
Desc	75	Outdoor Features	01	00000001	1
l gui	76	Multi-Media Features	11	00010001	17
i i i	77	Multi-Media Features	00	00000000	0
	78	Special Features #1	00	00000000	0
	79	Special Features #2	0A	00001010	10
	7A	Special Features #3	01	00000001	1
	7B	(If <13 char, then terminate with ASCII code 0Ah, set remaining char = 20h)	0A	00001010	10
	7C	(If <13 char, then terminate with ASCII code 0Ah, set remaining char = 20h)	20	00100000	32
	7D	(If <13 char, then terminate with ASCII code 0Ah, set remaining char = 20h)	20	00100000	32
Checksum	7E	Extension flag (# of optional 128 EDID extension blocks to follow, Typ = 0)	00	00000000	0
Chec	7F	Checksum (The 1-byte sum of all 128 bytes in this EDID block shall = 0)	D9	11011001	217