



# LITEMAX DLF/DLH1315 Sunlight Readable 13.3" LED B/L LCD

(1st Edition 08 / 14 / 2009 )

All information is subject to change without notice.

Approved by	Checked by	Prepared by
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## Record of Revision

Version and Date	Page	Old Description	New Description	Remark
Aug.14 2009 v.01	All		Preliminary Spec. (First Draft)	

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## 1.0 GENERAL DESCRIPTION

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### 1.1 OVERVIEW

DLF1315-ENN-A01 is a 1,000 nits sunlight readable LED backlight display module with industrial grade panel. This module supports 1280 x 800 WXGA resolution and can display 262,144 colors. The optimum viewing angle is at 6 o'clock direction.

The DLF1315-ENN-A01 has been designed to apply the 6-bit 1 channel LVDS interface method. It is intended to support displays where high brightness, wide viewing angle, high color saturation, and high color depth are very important.

### 1.2 FEATURES

- LED B/L
- 1,000 nits
- Wide dimming range
- WXGA (1280 x 800 pixels) resolution
- LVDS interface with 1pixel/clock
- RoHs compliance

### 1.3 APPLICATION

- TFT LCD monitor
- Rugged Tablet PC
- Portable Device

### 1.4 GENERAL SPECIFICATIONS

Active Screen Size	286.08 (H) x 178.8 (V)
Pixel Pitch	0.51075mm
Number of Pixel	1280 x 800
Display Color	262,144 colors
Luminance, White	1,000 cd/m <sup>2</sup> (Center 1 point Typ.)
Viewing Angle (CR>10)	Viewing angle free ( R/L 140 (Typ.), U/D 120 (Typ.))
Power Consumption	7.3 Watt (with LED driver board) for continuous operation
Display Operating Mode	Normally white
Surface Treatment	AG , 25% Haze

## 1.5 MECHANICAL SPECIFICATIONS

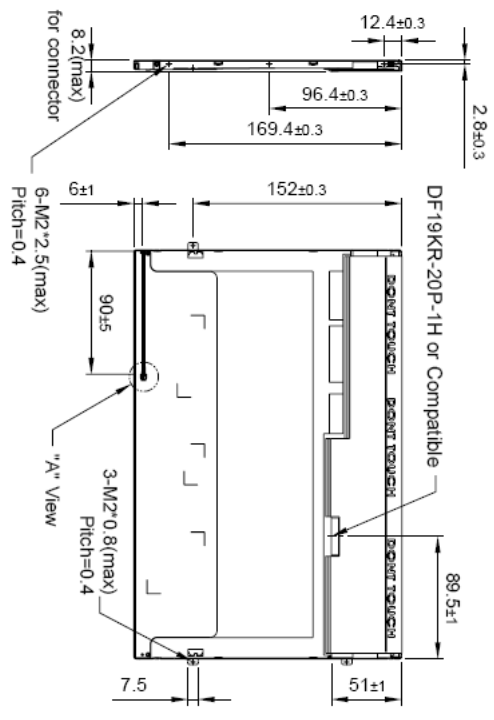
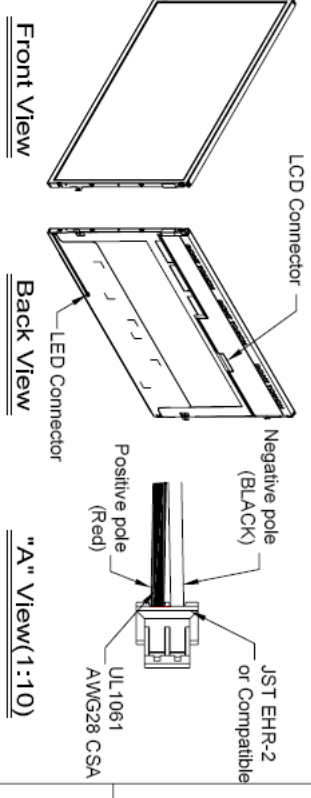
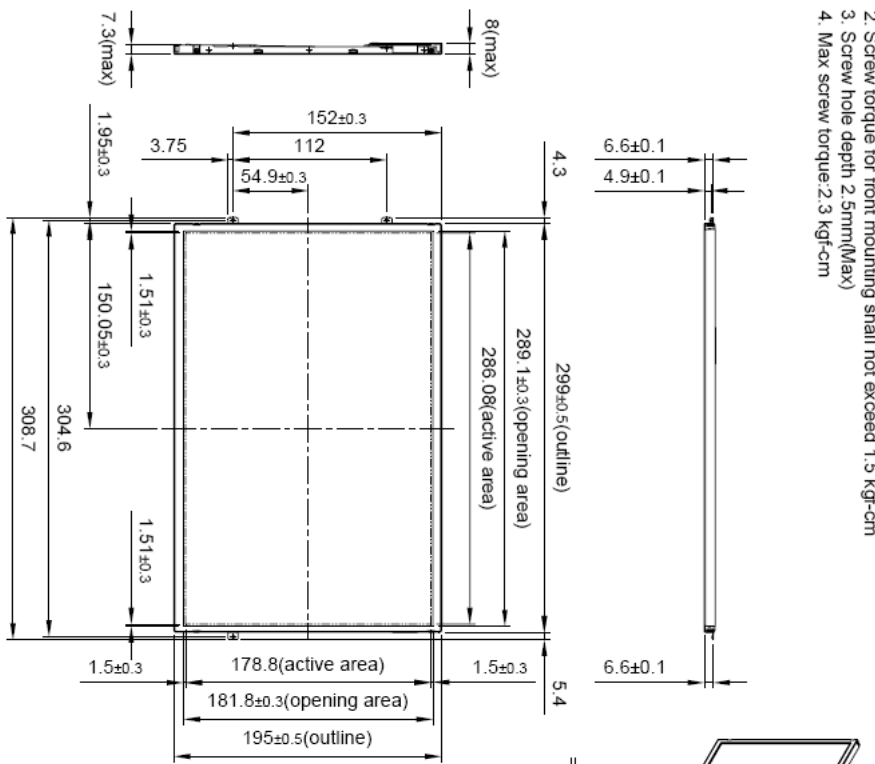
DLF1315-ENN-A01 Mechanical specifications:

Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal(H)	-	308.7 mm	-	mm	(1)
	Vertical(V)	-	195 mm	-	mm	(1)
	Depth(D)	-	8.2 mm	-	mm	(1)(2)
Weight		-	-	-	g	-

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

Note (2) The depth is without connector.

- Note :
1. General Tolerance:±0.5mm
  2. Screw torque for front mounting shall not exceed 1.5 kgf-cm
  3. Screw hole depth 2.5mm(Max)
  4. Max screw torque:2.3 kgf-cm



APPROVED	CHECKED	DESIGNED	DWG. NO.	LEVEL	GENERAL TOLERANCE	MATERIAL	DATE
		Jacky_Kuo	CM1315C	1	±0.5		2008.11.15

UNIT	SCALE	VECTOR	MADE	GENERAL TOLERANCE	ORIGINAL MODEL
MM	1:1			±0.5	CM1315C

TITLE	SAWING NUMBER	REVISION	DATE
CM1315C Outline Dimension(G133H-L01)			

**LiteMax**  
ELECTRONIC INC.

REV	ECN NO.	DESCRIPTION	SION	DATE

## 2.0 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Operating Ambient Temperature	T <sub>OP</sub>	-20	+70	°C	(0), (1), (2)
Storage Temperature	T <sub>ST</sub>	-30	+80	°C	(0), (1)

Test Item	Test Condition	Note
High Temperature Storage Test	80°C, 240 hours	(1) (2)
Low Temperature Storage Test	-40°C, 240 hours	
Thermal Shock Storage Test	-40°C, 0.5hour↔80°C, 0.5hour; 100cycles, 1hour/cycle	
High Temperature Operation Test	70°C, 240 hours	
Low Temperature Operation Test	-30°C, 240 hours	
High Temperature & High Humidity Operation Test	60°C, RH 90%, 240hours	
Heat Cycle Operation Test	-30°C, 1hour↔70°C, 1hour; 50cycles, 4hour/cycle	
ESD Test (Operation)	150pF, 330Ω, 1sec/cycle Condition 1 : panel contact, ±8KV Condition 2 : panel non-contact ±15KV	(2)
Shock (Non-Operating)	200G, 2ms, half sine wave, 1 time for ± X, ± Y, ± Z.	(2)(3)
Vibration (Non-Operating)	1.5G, 10 ~ 300 Hz, 10min/cycle, 3 cycles each X, Y, Z	(2)(3)

Note (1) Temperature and relative humidity range is shown in the figure below.

- (a) 90 %RH Max. ( $T_a \leq 40$  °C).
- (b) Wet-bulb temperature should be 39 °C Max. ( $T_a > 40$  °C).
- (c) No condensation.

Note (2) No display malfunctions.

Note (3) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.

Note (4) Temperature of panel display surface area should be 80 °C Max.

### 3.0 ELECTRICAL CHARACTERISTICS

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#### 3.1 ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Value			Unit	Note	
		Min.	Typ.	Max.			
Power Supply Voltage	V <sub>CC</sub>	3.0	3.3	3.6	V	-	
Ripple Voltage	V <sub>RP</sub>	-	-	100	mV	-	
Rush Current	I <sub>RUSH</sub>	-	-	1.5	A	-	
Power Supply Current	White	I <sub>CC</sub>	-	255	295	mA	-
	Black		-	330	375	mA	-
Logical Input Voltage	"H" Level	V <sub>IL</sub>	-	-	+100	mV	-
	"L" Level	V <sub>IH</sub>	-100	-	-	mV	-
Terminating Resistor	R <sub>T</sub>	-	100	-	Ohm	-	
Power per EBL WG	P <sub>EBL</sub>	-	TBD	-	W	-	



### 3.2 INPUT TERMINAL PIN ASSIGNMENT

Pin	Symbol	Description	Polarity	Remark
1	V <sub>SS</sub>	Ground		
2	V <sub>CC</sub>	Power Supply +3.3 V (typical)		
3	V <sub>CC</sub>	Power Supply +3.3 V (typical)		
4	V <sub>EDID</sub>	DDC 3.3V Power		DDC 3.3V Power
5	BIST	Connection to GND		
6	CLK <sub>EDID</sub>	DDC Clock		DDC Clock
7	DATA <sub>EDID</sub>	DDC Data		DDC Data
8	Rxin0-	LVDS Differential Data Input	Negative	R0~R5, G0
9	Rxin0+	LVDS Differential Data Input	Positive	
10	V <sub>SS</sub>	Ground		G1~G5, B0, B1
11	Rxin1-	LVDS Differential Data Input	Negative	
12	Rxin1+	LVDS Differential Data Input	Positive	
13	V <sub>SS</sub>	Ground		B2~B5, DE, Hsync, Vsync
14	Rxin2-	LVDS Differential Data Input	Negative	
15	Rxin2+	LVDS Differential Data Input	Positive	
16	V <sub>SS</sub>	Ground		LVDS Level Clock
17	CLK-	LVDS Clock Data Input	Negative	
18	CLK+	LVDS Clock Data Input	Positive	
19	V <sub>SS</sub>	Ground		
20	V <sub>SS</sub>	Ground		

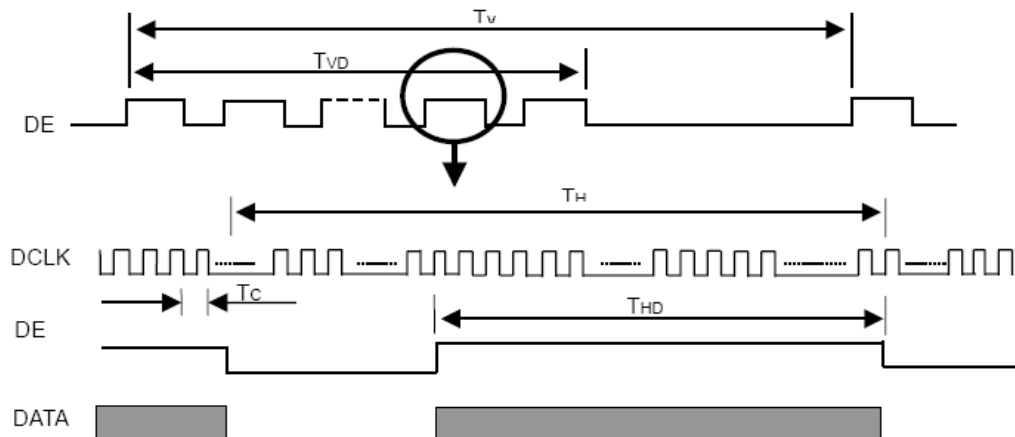
Note (1) Connector Part No.: DF19KR-20P-1H (HIROSE) or equivalent

Note (2) User's connector Part No: DF-19G-20S-1SD or equivalent( DF-19G-20S-1F & DF-19G-20S-1C)

### 3.3 INPUT SIGNAL TIMMING SPECIFICATION

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK	Frequency	1/T <sub>c</sub>	50	71.1	80	MHz	-
DE	Vertical Total Time	T <sub>V</sub>	810	823	1900	TH	-
	Vertical Addressing Time	T <sub>VD</sub>	800	800	800	TH	-
	Horizontal Total Time	T <sub>H</sub>	1360	1440	1900	Tc	-
	Horizontal Addressing Time	T <sub>HD</sub>	1280	1280	1280	Tc	-

#### INPUT SIGNAL TIMING DIAGRAM



#### 4.0 LED DRIVING BOARD SPECIFICATION:

We developed this LED driving board to support industrial high brightness and commercial applications. The rev.1A has released for RoHS Compliant purpose.

Item	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	Remark
<b>Input Voltage</b>	<b>Vin</b>		<b>10.0</b>	<b>12.0</b>	<b>14.0</b>	<b>V</b>	
<b>Input Current (Low Brightness)</b>	<b>IinL</b>	VIN=12V,Vadj=5V	<b>0.0</b>	-----	-----	<b>mA</b>	
<b>Input Current (High Brightness)</b>	<b>IinH</b>	VIN=12V,Vadj=0V	<b>520</b>	<b>540</b>	<b>570</b>	<b>mA</b>	
<b>LED Current (Low Brightness)</b>	<b>IoutL</b>	VIN=12V,Vadj=5V	<b>0.0</b>	-----	-----	<b>Arms</b>	
<b>LED Current (High Brightness)</b>	<b>IoutH</b>	VIN=12V,Vadj=0V	<b>236</b>	<b>296</b>	<b>358</b>	<b>mA</b>	
<b>Working Frequency</b>	<b>Freq</b>	VIN=12V,Vadj=0V	<b>120</b>	<b>125</b>	<b>130</b>	<b>KHZ</b>	
<b>PWM Frequency</b>	<b>Freq</b>	VIN=12V	<b>180</b>	<b>200</b>	<b>220</b>	<b>HZ</b>	
<b>Brightness Control</b>	<b>Vadj</b>	Connection of Voltage	<b>0.5</b>	-----	<b>4.8</b>	<b>V</b>	
<b>ON/OFF Control</b>	<b>Von/off</b>	Normal Operation	<b>2</b>	-----	<b>5</b>	<b>V</b>	
<b>Output Voltage</b>	<b>Vout</b>	VIN=12V,Vadj=0V	<b>20.613</b>	<b>20.979</b>	<b>21.359</b>	<b>V</b>	
<b>Efficiency</b>	$\eta$	VIN=12V,Vadj=0V	<b>93.55</b>	<b>95.83</b>	<b>95.82</b>	<b>%</b>	

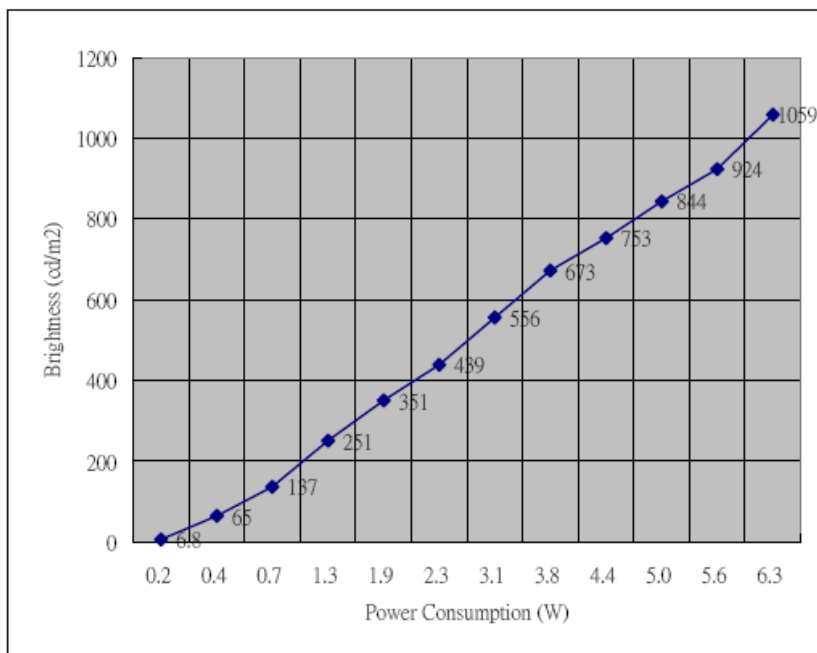
## 5.0 OPTICAL CHARACTERISTICS

### 5.1 OPTICAL SPECIFICATIONS

#### 光 學 / Optical

項 次 Item	符 號 Symbol	條 件 Condition	數 據 Data	單 位 Unit	備 註 Note
色度 /Color chromaticity	Red	Rx	0.581	-	測試方式/Test Mode : (1) (2) (3)
		Ry	0.369	-	
	Green	Gx	0.348	-	
		Gy	0.561	-	
	Blue	Bx	0.156	-	
		By	0.157	-	
	White	Wx	0.313	-	
		Wy	0.356	-	
中央輝度 /Center Luminance of White	Lc	$\theta x=0$ $\theta y=0$ BM-7	1000	cd/m <sup>2</sup>	
平均輝度/Average	La		900	cd/m <sup>2</sup>	
輝度均勻性/Uniform	Lu		75	%	
對比/Contrast Ratio	CR		$\theta x=0$ $\theta y=0$ Klein K-10	800	-
色彩飽和度 / Color Saturation	NTSC		37	%	
視 角 /Viewing Angle	Horizontal	$\theta x+$	70	Deg	測試方式/Test Mode : (1) (3)
		$\theta x-$	70		
	Vertical	$\theta y+$	60		
		$\theta y-$	60		

### 5.2 LED BACKLIGHT DIMMING vs POWER CONSUMPTION CHART



## **6.0 PRECAUTIONS**

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### **6.1 HANDLING PRECAUTIONS**

- (1) The module should be assembled into the system firmly by using every mounting hole. Be careful not to twist or bend the module.
- (2) While assembling or installing modules, it can only be in the clean area. The dust and oil may cause electrical short or damage the polarizer.
- (3) Use fingerstalls or soft gloves in order to keep display clean during the incoming inspection and assembly process.
- (4) Do not press or scratch the surface harder than a HB pencil lead on the panel because the polarizer is very soft and easily scratched.
- (5) If the surface of the polarizer is dirty, please clean it by some absorbent cotton or soft cloth. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanently damage the polarizer due to chemical reaction.
- (6) Wipe off water droplets or oil immediately. Staining and discoloration may occur if they left on panel for a long time.
- (7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contacting with hands, legs or clothes, it must be washed away thoroughly with soap.
- (8) Protect the module from static electricity, it may cause damage to the C-MOS Gate Array IC.
- (9) Do not disassemble the module.
- (10) Do not pull or fold the lamp wire.
- (11) Pins of I/F connector should not be touched directly with bare hands.

### **6.2 STORAGE PRECAUTIONS**

- (1) High temperature or humidity may reduce the performance of module. Please store LCD module within the specified storage conditions.
- (2) It is dangerous that moisture come into or contacted the LCD module, because the moisture may damage LCD module when it is operating.
- (3) It may reduce the display quality if the ambient temperature is lower than 10 °C. For example, the response time will become slowly, and the starting voltage of lamp will be higher than the room temperature.

### **6.3 OPERATION PRECAUTIONS**

- (1) Do not pull the I/F connector in or out while the module is operating.
- (2) Always follow the correct power on/off sequence when LCD module is connecting and operating. This can prevent the CMOS LSI chips from damage during latch-up.