




## Product Specification

AU OPTRONICS CORPORATION

( ) Preliminary Specifications

(V) Final Specifications

|  |  |
|--|--|
| Module   | WXGA Color TFT-LCD with LED Backlight design |
| Model Name   | B121EW09 V3 (H/W:1A)                         |
| Note (  ) | LED Backlight with driving circuit design    |

Customer

Date

Checked &  
Approved by

Date

Note: This Specification is subject to change without notice.

Approved by

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2010/01/15

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2010/01/15

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AU Optronics corporation



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### Record of Revision

| Version and Date | Page | Old description | New Description                       | Remark |
|------------------|------|-----------------|---------------------------------------|--------|
| 0.1 2009/1/21    |      |                 |                                       |        |
| 0.2 2009/5/12    | 32   |                 | Update shipping label                 |        |
| 0.3 2009/6/09    | 6    |                 | Update min. brightness                |        |
| 0.3 2009/6/09    | 7    |                 | Update Color Chromaticity             |        |
| 0.4 2009/9/29    | 37   |                 | Delete IIS data                       |        |
| 1.0 2009/11/01   | 29   |                 | Update 2D graph                       |        |
| 1.0 2009/11/01   | 31   |                 | Update shipping label (add H/W & F/W) |        |
|                  |      |                 |                                       |        |
|                  |      |                 |                                       |        |
|                  |      |                 |                                       |        |
|                  |      |                 |                                       |        |
|                  |      |                 |                                       |        |
|                  |      |                 |                                       |        |



### 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.
- 11) 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.
- 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 electrostatic breakdown.



## Product Specification

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### 2. General Description

B121EW09 V3 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 WXGA (1280(H) x 800(V)) screen and 262k colors (RGB 6-bits data driver) with LED backlight driving circuit. All input signals are LVDS interface compatible.

B121EW09 V3 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]                 | 307.9 (12.1W")   |       |       |     |
| Active Area                                 | [mm]                 | 261.12(H) X 163.20(V)                                      |       |       |     |
| Pixels H x V                                |                      | 1280x3(RGB) x 800  |       |       |     |
| Pixel Pitch                                 | [mm]                 | 0.204X0.204  |       |       |     |
| Pixel Arrangement                           |                      | R.G.B. Vertical Stripe                                     |       |       |     |
| Display Mode                                |                      | Normally White   |       |       |     |
| White Luminance<br>(I <sub>LED</sub> =20mA) | [cd/m <sup>2</sup> ] | 220 typ. (5 points average)<br>187 min. (5 points average) |       |       |     |
| Luminance Uniformity                        |                      | 1.25 max. (5 points)                                       |       |       |     |
| Contrast Ratio                              |                      | 300 typ  |       |       |     |
| Response Time                               | [ms]                 | 16 typ / 25 Max  |       |       |     |
| Nominal Input Voltage VDD                   | [Volt]               | +3.3 typ.  |       |       |     |
| Power Consumption                           | [Watt]               | 3.87 max.(Include Logic and BLU power)                     |       |       |     |
| Weight                                      | [Grams]              | 295 max.   |       |       |     |
| Physical Size                               | [mm]                 |  | L     | W     | T   |
|   |                      | Max  | 276.3 | 178.6 | 5.3 |
|   |                      | Typical  | 275.8 | 178.1 | -   |
|   |                      | Min  | 275.3 | -     | -   |
| Electrical Interface                        |                      | 1 channel LVDS   |       |       |     |



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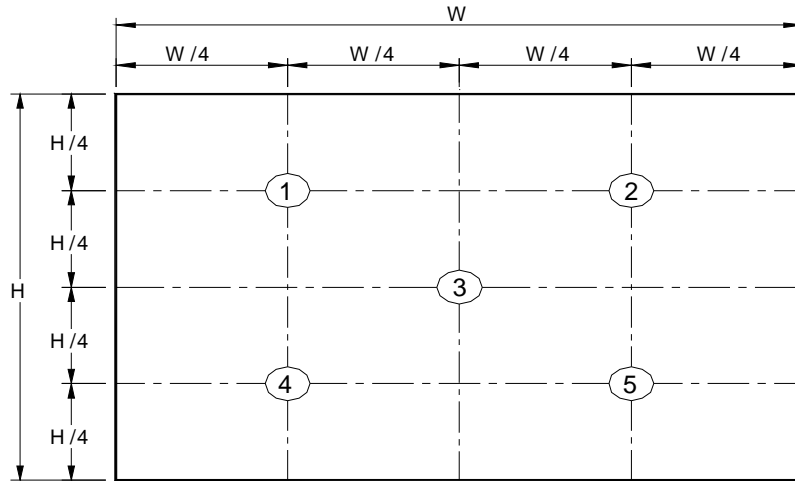
|   |              |   |
|---|--------------|---|
| Surface Treatment   |              | Anti-glare (Haze=42%(typ.))<br>-Anti-reflection<br>-Anti-electrostatic<br>-Hardness (2H ) |
| Support Color   |              | 262K colors ( RGB 6-bit )   |
| Temperature Range<br>Operating<br>Storage (Non-Operating) | [°C]<br>[°C] | 0 to +50<br>-20 to +60  |
| RoHS Compliance   |              | RoHS Compliance   |

### 2.2 Optical Characteristics

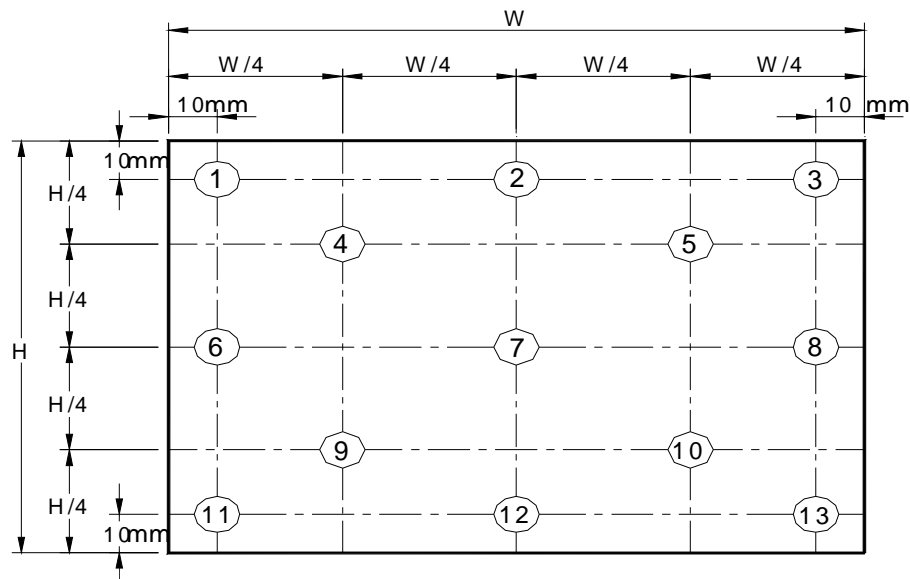
The optical characteristics are measured under stable conditions at 25°C (Room Temperature) :

| Item                                      | Symbol          | Conditions         | Min.  | Typ.  | Max.  | Unit              | Note     |
|---|-----------------|--------------------|-------|-------|-------|-------------------|----------|
| White Luminance<br>I <sub>LED</sub> =20mA |                 | 5 points average   | 187   | 220   | -     | cd/m <sup>2</sup> | 1, 4, 5. |
| Viewing Angle                             | $\theta_R$      | Horizontal (Right) | 40    | 45    | -     | degree            | 4, 9     |
|   | $\theta_L$      | CR = 10 (Left)     | 40    | 45    | -     |                   |          |
|   | $\phi_H$        | Vertical (Upper)   | 10    | 20    | -     |                   |          |
|   | $\phi_L$        | CR = 10 (Lower)    | 30    | 40    | -     |                   |          |
| Luminance Uniformity                      | $\delta_{5P}$   | 5 Points           | -     | -     | 1.25  |                   | 1, 3, 4  |
| Luminance Uniformity                      | $\delta_{13P}$  | 13 Points          | -     | -     | 1.54  |                   | 2, 3, 4  |
| Contrast Ratio                            | CR              |                    |       | 300   | -     |                   | 4, 6     |
| Cross talk                                | %               |                    |       |       | 4     |                   | 4, 7     |
| Response Time                             | T <sub>r</sub>  | Rising             | -     | —     | -     | msec              | 4, 8     |
|   | T <sub>f</sub>  | Falling            | -     | —     | -     |                   |          |
|   | T <sub>RT</sub> | Rising + Falling   | -     | 16    | 25    |                   |          |
| Color / Chromaticity Coordinates          | Red             | R <sub>x</sub>     | 0.530 | 0.560 | 0.590 |                   | 4        |
|   |                 | R <sub>y</sub>     | 0.320 | 0.350 | 0.380 |                   |          |
|   | Green           | G <sub>x</sub>     | 0.315 | 0.345 | 0.375 |                   |          |
|   |                 | G <sub>y</sub>     | 0.530 | 0.560 | 0.590 |                   |          |
|   | Blue            | B <sub>x</sub>     | 0.120 | 0.150 | 0.180 |                   |          |
|   |                 | B <sub>y</sub>     | 0.075 | 0.105 | 0.135 |                   |          |
|   | White           | W <sub>x</sub>     | 0.283 | 0.313 | 0.343 |                   |          |
|   |                 | W <sub>y</sub>     | 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. Length unit

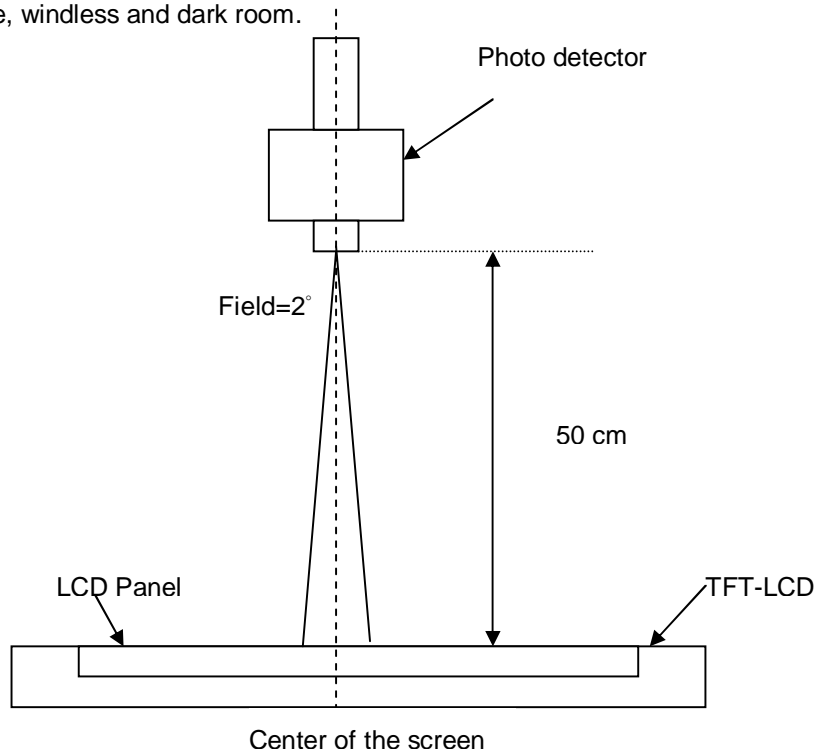
$$\delta_{W5} = \frac{\text{Maximum Brightness of five points}}{\text{Minimum Brightness of five points}}$$

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

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.



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.

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

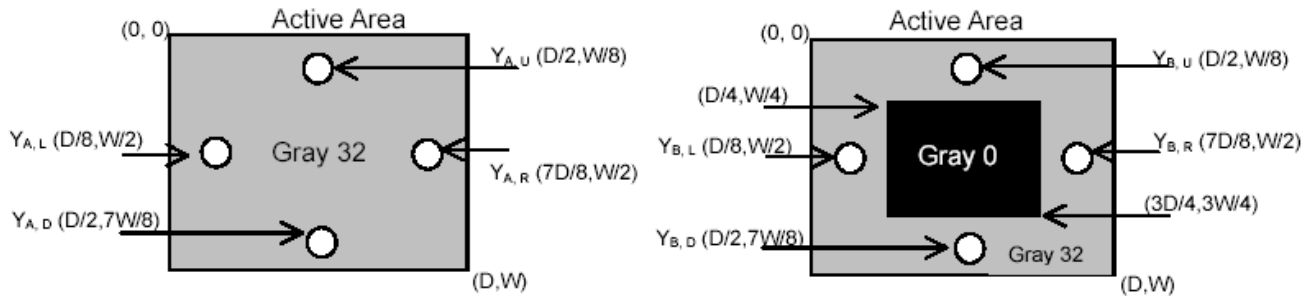
Note 7 : Definition of Cross Talk (CT)

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

Where

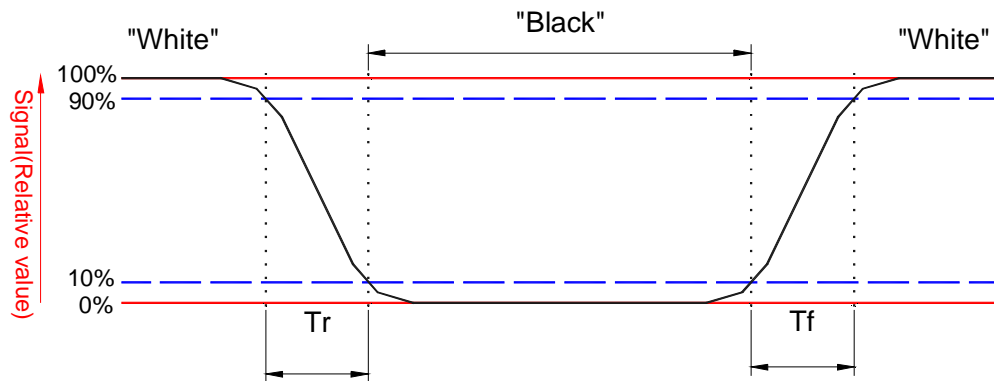
$Y_A$  = Luminance of measured location without gray level 0 pattern (cd/m<sup>2</sup>)

$Y_B$  = Luminance of measured location with gray level 0 pattern (cd/m<sup>2</sup>)



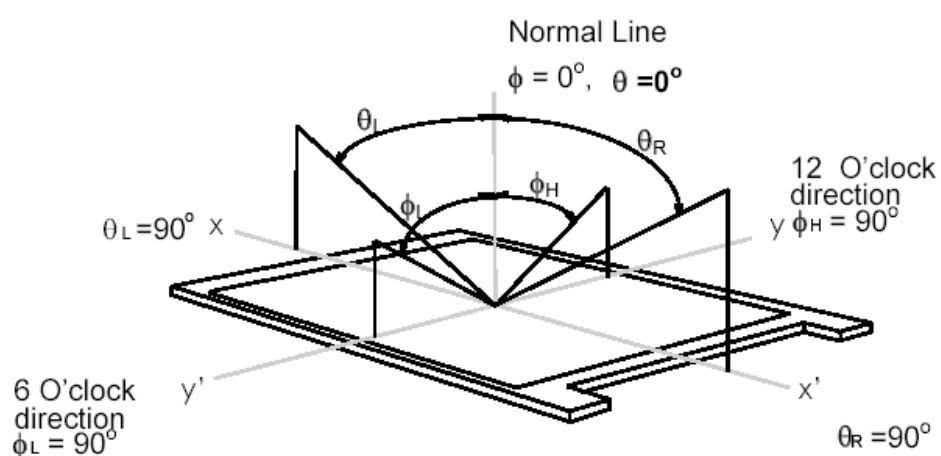
Note 8: Definition of response time:

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.



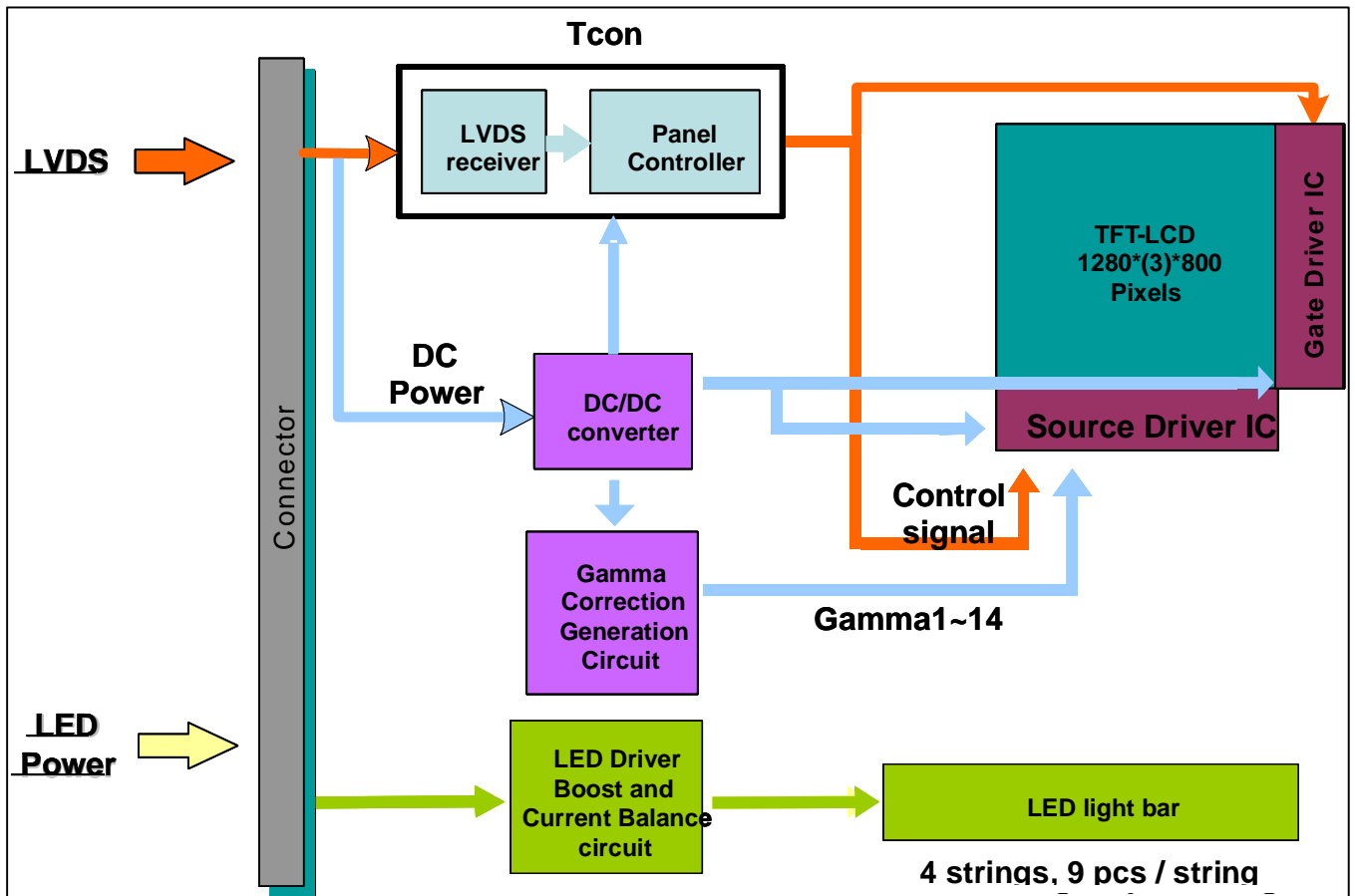
## Note 8. Definition of viewing angle

Viewing angle is the measurement of contrast ratio  $\geq 10$ , at the screen center, over a  $180^\circ$  horizontal and  $180^\circ$  vertical range (off-normal viewing angles). The  $180^\circ$  viewing angle range is broken down as follows;  $90^\circ$  ( $\theta$ ) horizontal left and right and  $90^\circ$  ( $\Phi$ ) 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.



## 3. Functional Block Diagram

The following diagram shows the functional block of the 12.1 inches wide Color TFT/LCD 30 Pin (One ch/connector Module)



## 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 | V <sub>in</sub> | -0.3 | +4.0 | [Volt] | Note 1,2   |

### 4.2 Absolute Ratings of Backlight Unit

| Item                | Symbol           | Min | Max | Unit     | Conditions |
|---------------------|------------------|-----|-----|----------|------------|
| LED Driving Voltage | V <sub>LED</sub> | -   | 36  | [Volt]   | Note 1,2,3 |
| LED Driving Current | I <sub>LED</sub> | -   | 30  | [mA] rms | Note 1,2,3 |

### 4.3 Absolute Ratings of Environment

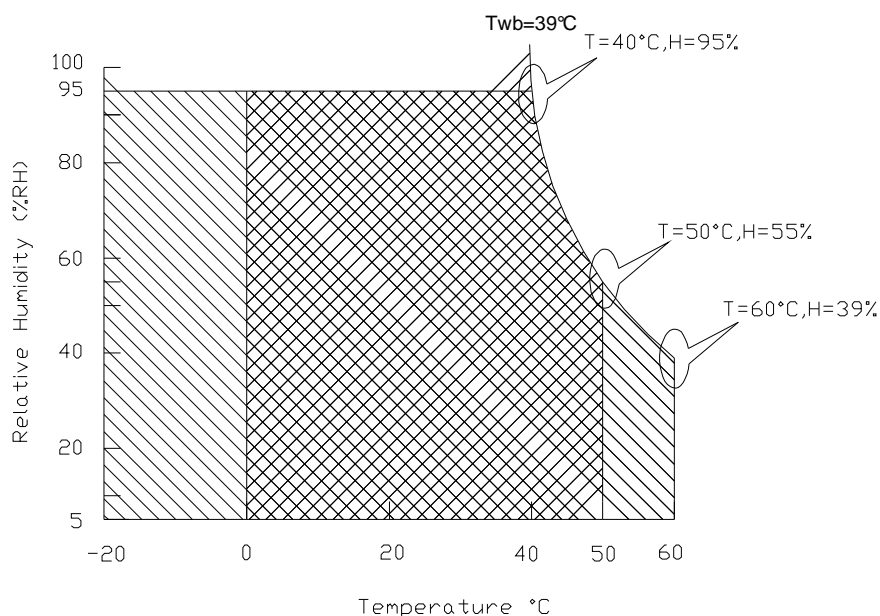
| Item                  | Symbol | Min | Max | Unit  | Conditions |
|-----------------------|--------|-----|-----|-------|------------|
| Operating Temperature | TOP    | 0   | +50 | [°C]  | Note 4     |
| Operation Humidity    | HOP    | 5   | 90  | [%RH] | Note 4     |
| Storage Temperature   | TST    | -20 | +60 | [°C]  | Note 4     |
| Storage Humidity      | HST    | 5   | 90  | [%RH] | Note 4     |

Note 1: At T<sub>a</sub> (25°C )

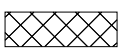

Note 2: Permanent damage to the device may occur if exceed maximum values

Note 3: LED specification refer to section 5.2

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



Operating Range 

Storage Range  + 



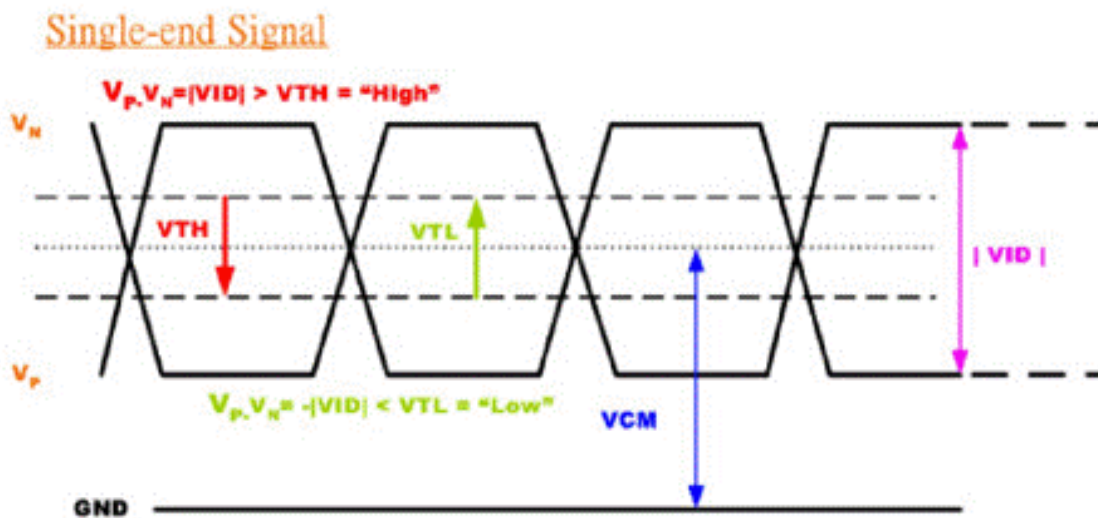
## 5.1.2 Signal Electrical Characteristics

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

Signal electrical characteristics are as follows;

| Parameter  | Condition  | Min   | Max   | Unit |
|------------|--|-------|-------|------|
| $V_{TH}$   | Differential Input High Threshold ( $V_{cm}=+1.2V$ ) |       | 100   | [mV] |
| $V_{TL}$   | Differential Input Low Threshold ( $V_{cm}=+1.2V$ )  | -100  | -     | [mV] |
| $ V_{ID} $ | Differential Input Voltage                           | 100   | 600   | [mV] |
| $V_{CM}$   | Differential Input Common Mode Voltage               | 1.125 | 1.375 | [V]  |

Note: LVDS Signal Waveform



## 5.2 Backlight Unit

LED Parameter guideline for LED driving selection (Ref. Remark 1)

| Parameter           | Symbol | Min | Typ | Max | Units  | Condition            |
|---------------------|--------|-----|-----|-----|--------|----------------------|
| LED Forward Voltage | $V_F$  | 3.0 | 3.2 | 3.4 | [Volt] | ( $T_a=25^\circ C$ ) |

|                       |           |        |      |      |        |   |
|-----------------------|-----------|--------|------|------|--------|---|
| LED Forward Current   | $I_F$     |        | 20   |      | [mA]   | (Ta=25°C)                                 |
| LED Power consumption | $P_{LED}$ |        | 2.71 | 2.97 | [Watt] | (Ta=25°C)<br>Note 1                       |
| LED Life-Time         | N/A       | 12,000 | -    | -    | Hour   | (Ta=25°C)<br>$I_F=20\text{ mA}$<br>Note 2 |
| Output PWM frequency  | FPWM      | 100    | 200  | 20K  | Hz     |   |
| Duty ratio            | --        | 5      | --   | 100  | %      | Note 3                                    |

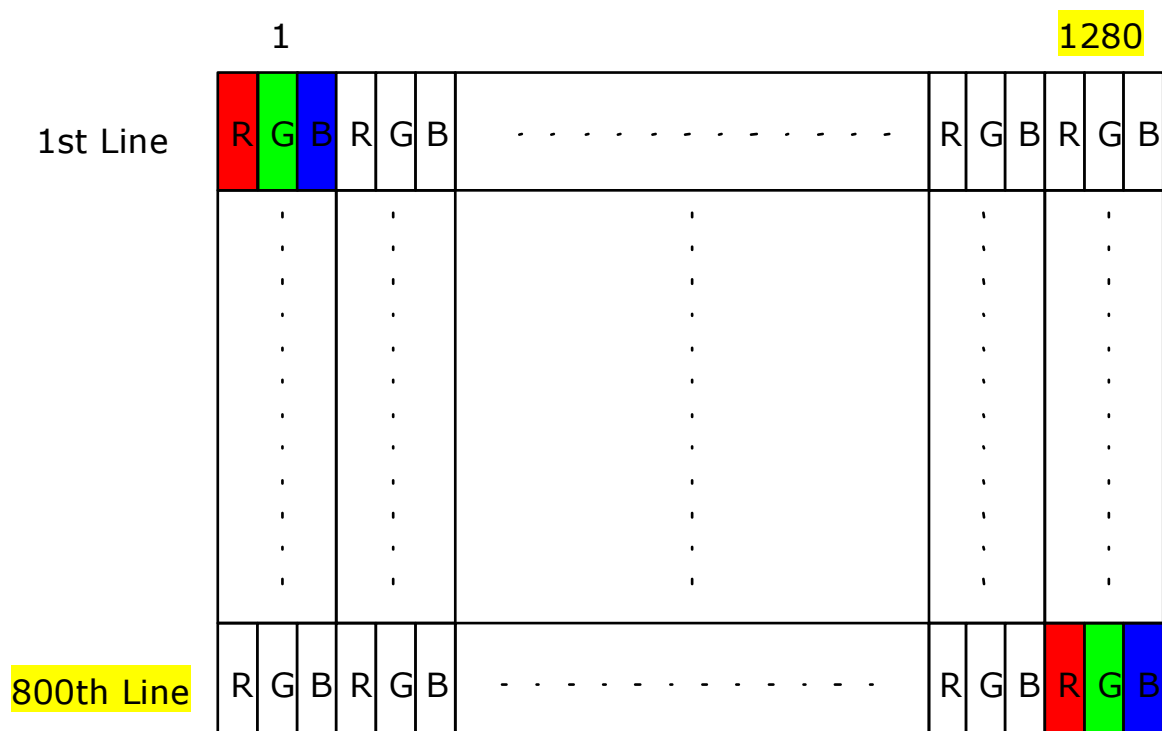
**Note 1:** Calculator value for reference  $I_F \times V_F \times 36 / \text{efficiency (85\%)} = P$  (typ.);  $P$  (max) estimated with  $I_F$  and  $V_F$  tolerance.

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

## 6. Signal Characteristic

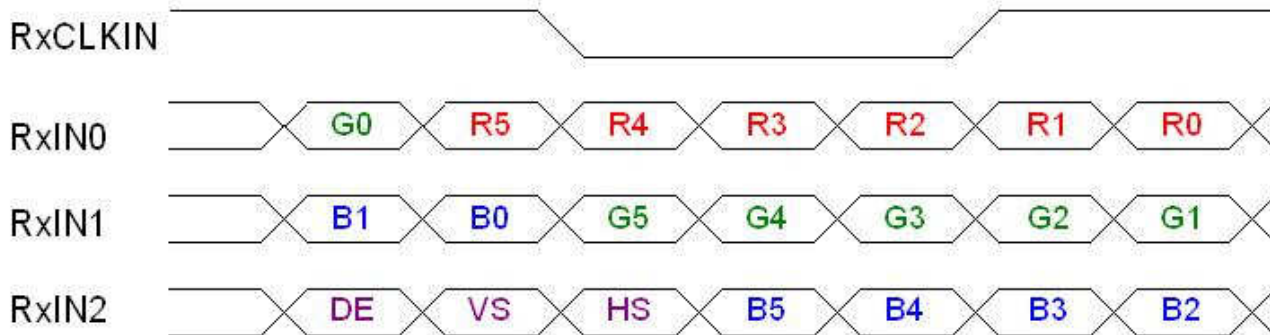
### 6.1 Pixel Format Image

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





## 6.2 The input data format



| Signal Name                      | Description  |  |
|----------------------------------|--|--|
| R5<br>R4<br>R3<br>R2<br>R1<br>R0 | Red Data 5 (MSB)<br>Red Data 4<br>Red Data 3<br>Red Data 2<br>Red Data 1<br>Red Data 0 (LSB)             | Red-pixel Data<br>Each red pixel's brightness data consists of these 6 bits pixel data.  |
| G5<br>G4<br>G3<br>G2<br>G1<br>G0 | Green Data 5 (MSB)<br>Green Data 4<br>Green Data 3<br>Green Data 2<br>Green Data 1<br>Green Data 0 (LSB) | Green-pixel Data<br>Each green pixel's brightness data consists of these 6 bits pixel data.  |
| B5<br>B4<br>B3<br>B2<br>B1<br>B0 | Blue Data 5 (MSB)<br>Blue Data 4<br>Blue Data 3<br>Blue Data 2<br>Blue Data 1<br>Blue Data 0 (LSB)       | Blue-pixel Data<br>Each blue pixel's brightness data consists of these 6 bits pixel data.  |
| RxCLKIN                          | Data Clock   | The typical frequency is 69.3 MHZ. The signal is used to strobe the pixel data and DE signals. All pixel data shall be valid at the falling edge when the DE signal is high. |
| DE                               | Display Timing   | This signal is strobed at the falling edge of RxCLKIN. When the signal is high, the pixel data shall be valid to be displayed.   |
| VS                               | Vertical Sync  | The signal is synchronized to RxCLKIN .  |
| HS                               | Horizontal Sync  | The signal is synchronized to RxCLKIN .  |

Note: Output signals from any system shall be low or High-impedance state when VDD is off.

## 6.3 Signal Description/Pin Assignment

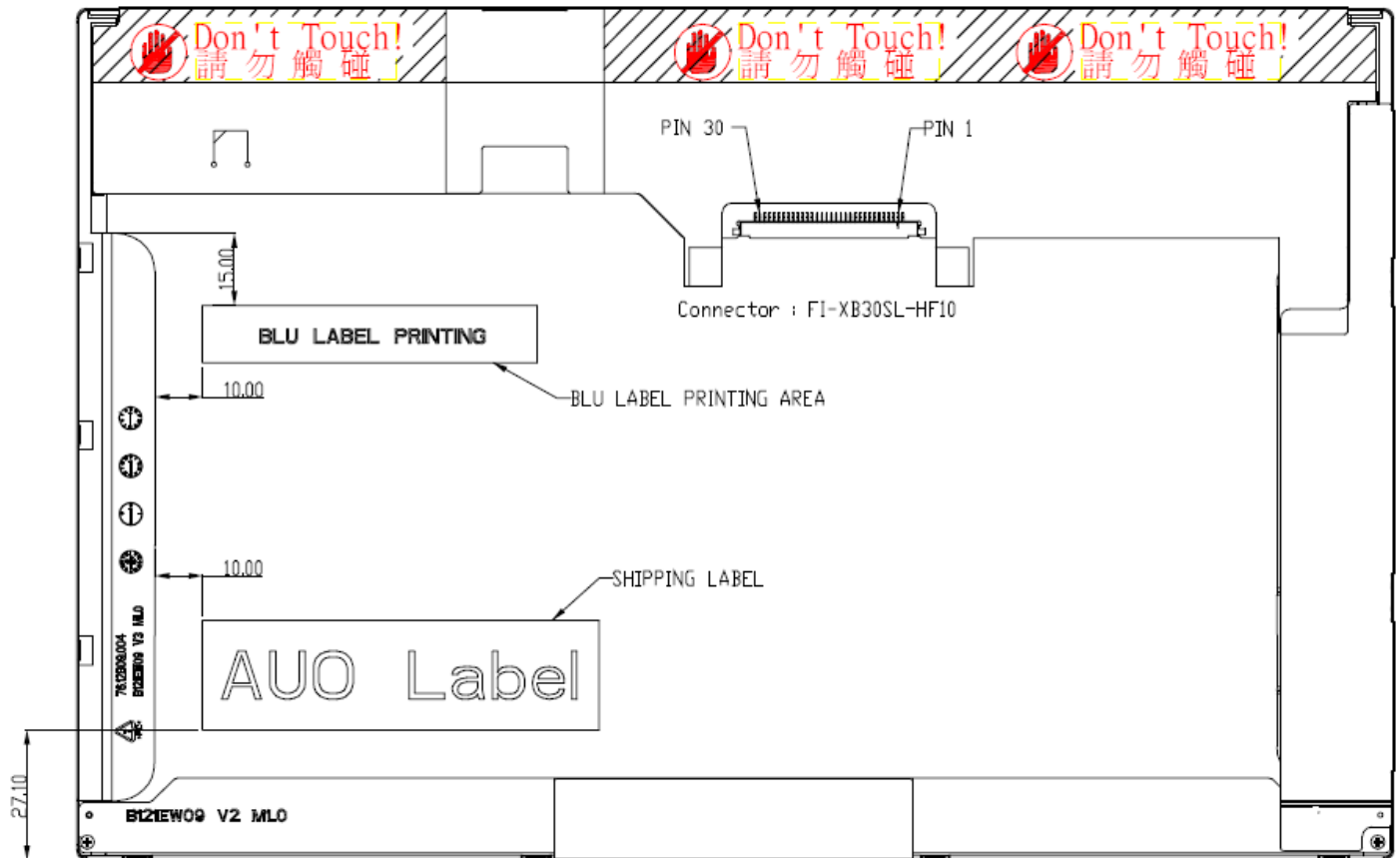
LVDS is a differential signal technology for LCD interface and high speed data transfer device.

Connector PN: FI-XB30SL-HF10

| Pin# | Signal Name                        | Pin# | Signal Name                |
|------|------------------------------------|------|----------------------------|
| 1    | NC                                 | 16   | GND                        |
| 2    | VDD                                | 17   | Odd RxCLKIN- (Clock Input) |
| 3    | VDD                                | 18   | Odd RxCLKIN+ (Clock Input) |
| 4    | V <sub>EDID</sub>                  | 19   | GND                        |
| 5    | Reserved (for supplier test point) | 20   | GND                        |
| 6    | Ck <sub>EDID</sub>                 | 21   | VBL- (GND)                 |
| 7    | Data <sub>EDID</sub>               | 22   | VBL- (GND)                 |
| 8    | Odd RxIN0- (R0-R5,G0)              | 23   | VBL- (GND)                 |
| 9    | Odd RxIN0+ (R0-R5,G0)              | 24   | NC                         |
| 10   | GND                                | 25   | VBL+ (7~21V)               |
| 11   | Odd RxIN1- (G1-G5, B0-B1)          | 26   | VBL+ (7~21V)               |
| 12   | Odd RxIN1+ (G1-G5, B0-B1)          | 27   | VBL+ (7~21V)               |
| 13   | GND                                | 28   | PWM                        |
| 14   | Odd RxIN2- (B2-B5,HS,VS,DE)        | 29   | BL_ON                      |
| 15   | Odd RxIN2+ (B2-B5,HS,VS,DE)        | 30   | NC                         |

NC: Not connected

Note1: Signal Start from right side



## 6.4 Interface Timing

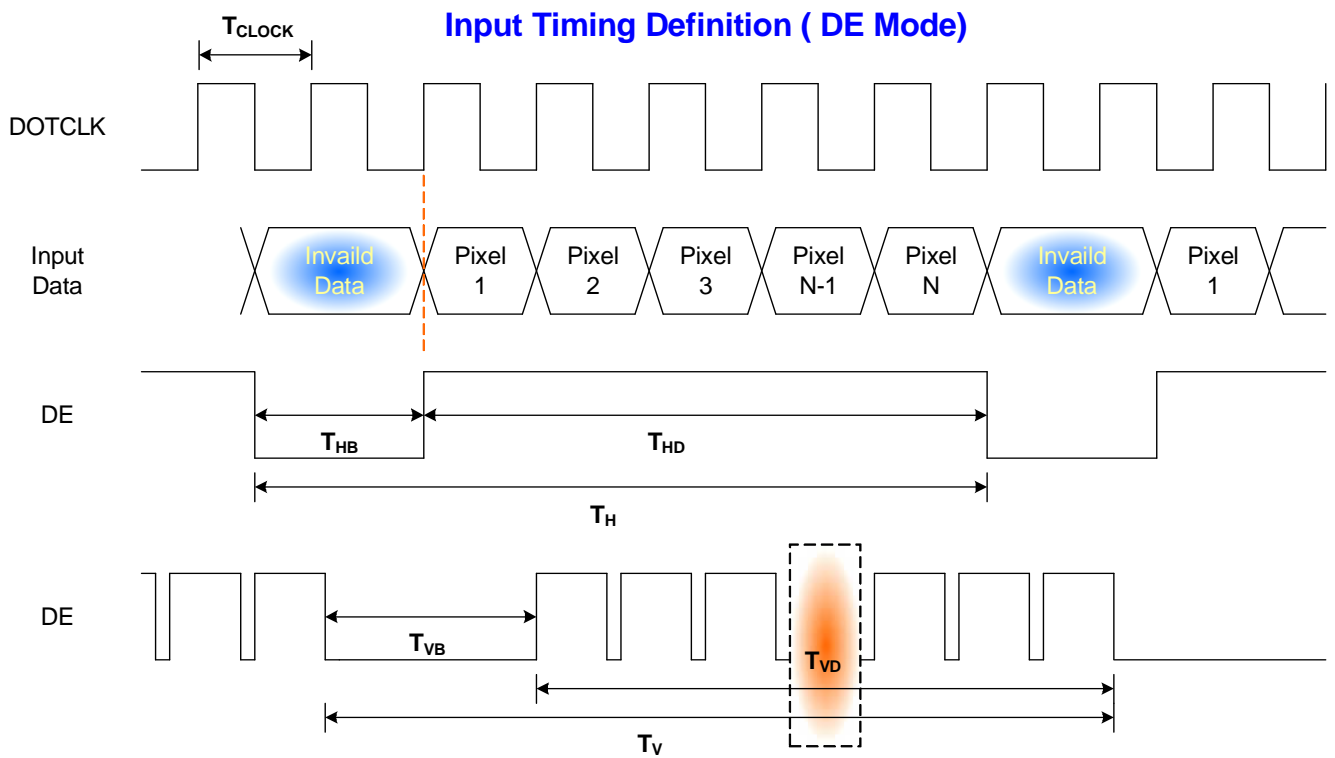
### 6.4.1 Timing Characteristics

Basically, interface timings should match the 1280x800 /60Hz manufacturing guide line timing.

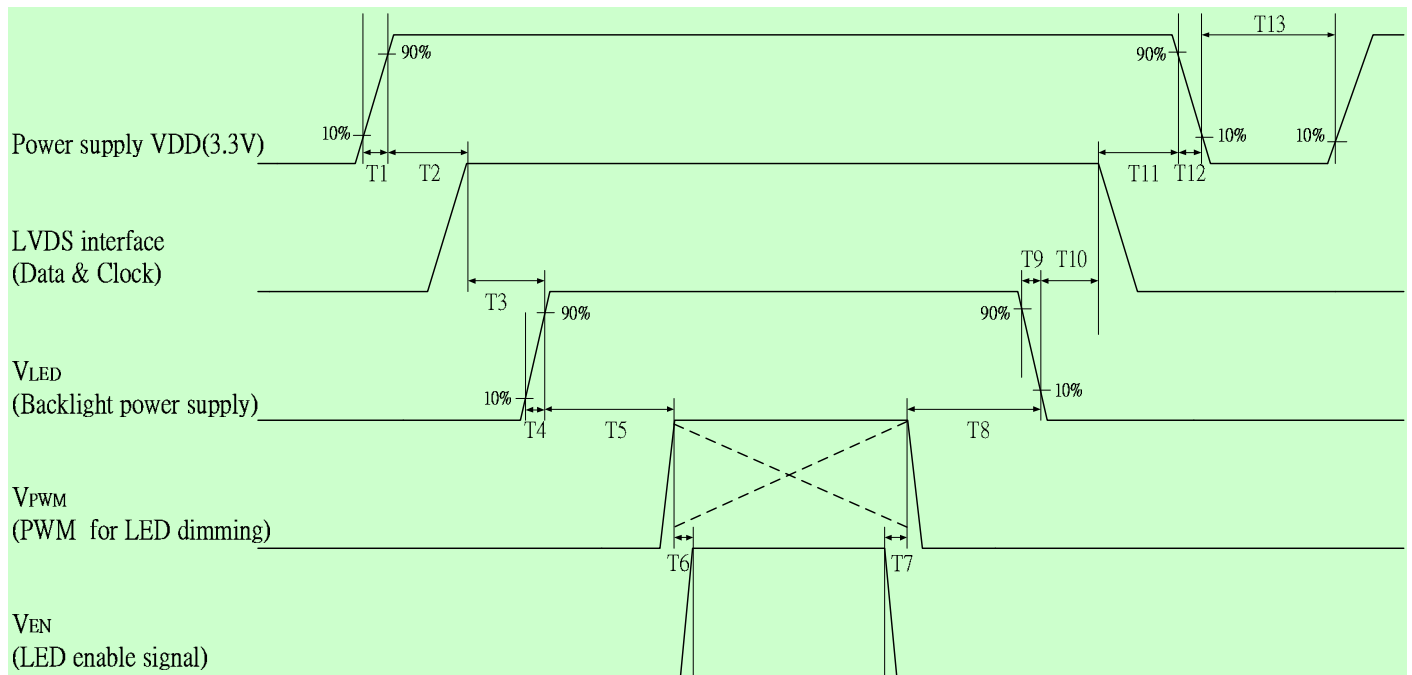
| Parameter          |          | Symbol               | Min. | Typ. | Max. | Unit               |
|--------------------|----------|----------------------|------|------|------|--------------------|
| Frame Rate         |          | -                    | -    | 60   | -    | Hz                 |
| Clock frequency    |          | $1/T_{\text{Clock}}$ | 50-  | 69.3 | 80-  | MHz                |
| Vertical Section   | Period   | $T_V$                | 808  | 816  | 1023 | $T_{\text{Line}}$  |
|                    | Active   | $T_{VD}$             | 800  | 800  | 800  |                    |
|                    | Blanking | $T_{VB}$             | 8    | 16   | 223  |                    |
| Horizontal Section | Period   | $T_H$                | 1310 | 1408 | 2047 | $T_{\text{Clock}}$ |
|                    | Active   | $T_{HD}$             | 1280 | 1280 | 1280 |                    |
|                    | Blanking | $T_{HB}$             | 30   | 128  | 767  |                    |

Note : DE mode only

## 6.4.2 Timing diagram



## 6.5 Power ON /OFF Sequence



| Power Sequence Timing |       |      |      |       |
|-----------------------|-------|------|------|-------|
| Parameter             | Value |      |      | Units |
|                       | Min.  | Typ. | Max. |       |
| T1                    | 0.5   | -    | 10   | ms    |
| T2                    | 0     | -    | 50   |       |
| T3                    | 200   | -    | -    |       |
| T4                    | 0.5   | -    | 10   |       |
| T5                    | 10    | -    | -    |       |
| T6                    | 10    | -    | -    |       |
| T7                    | 0     | -    | -    |       |
| T8                    | 10    | -    | -    |       |
| T9                    | 0     | -    | 10   |       |
| T10                   | 200   | -    | -    |       |
| T11                   | 0.5   | -    | 50   |       |
| T12                   | 0     | -    | 10   |       |
| T13                   | 400   | -    | -    |       |

Note: If T3, T5, T6 couldn't match above specifications, must request  $T3+T5+T6 > 200\text{ms}$  at least



## 7. 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.

### 7.1 TFT LCD Module

| Connector Name / Designation | For Signal Connector                     |
|------------------------------|--|
| Manufacturer                 | Japan Aviation Electronics Industry, LTD |
| Type / Part Number           | FI-XB30SL-HF10                           |
| Mating Housing/Part Number   | FI-XB30SRL-HF11                          |



## 8. 8. LED Driving Specification

### 8.1 Connector Description

It is a integrative interface and comibe into LVDS connector. The type and mating refer to section 7.

### 8.2 Pin Assignment

Ref. to 6.3





## 9. Vibration and Shock Test

### 9.1 Vibration Test

**Test Spec:**

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

### 9.2 Shock Test Spec:

**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

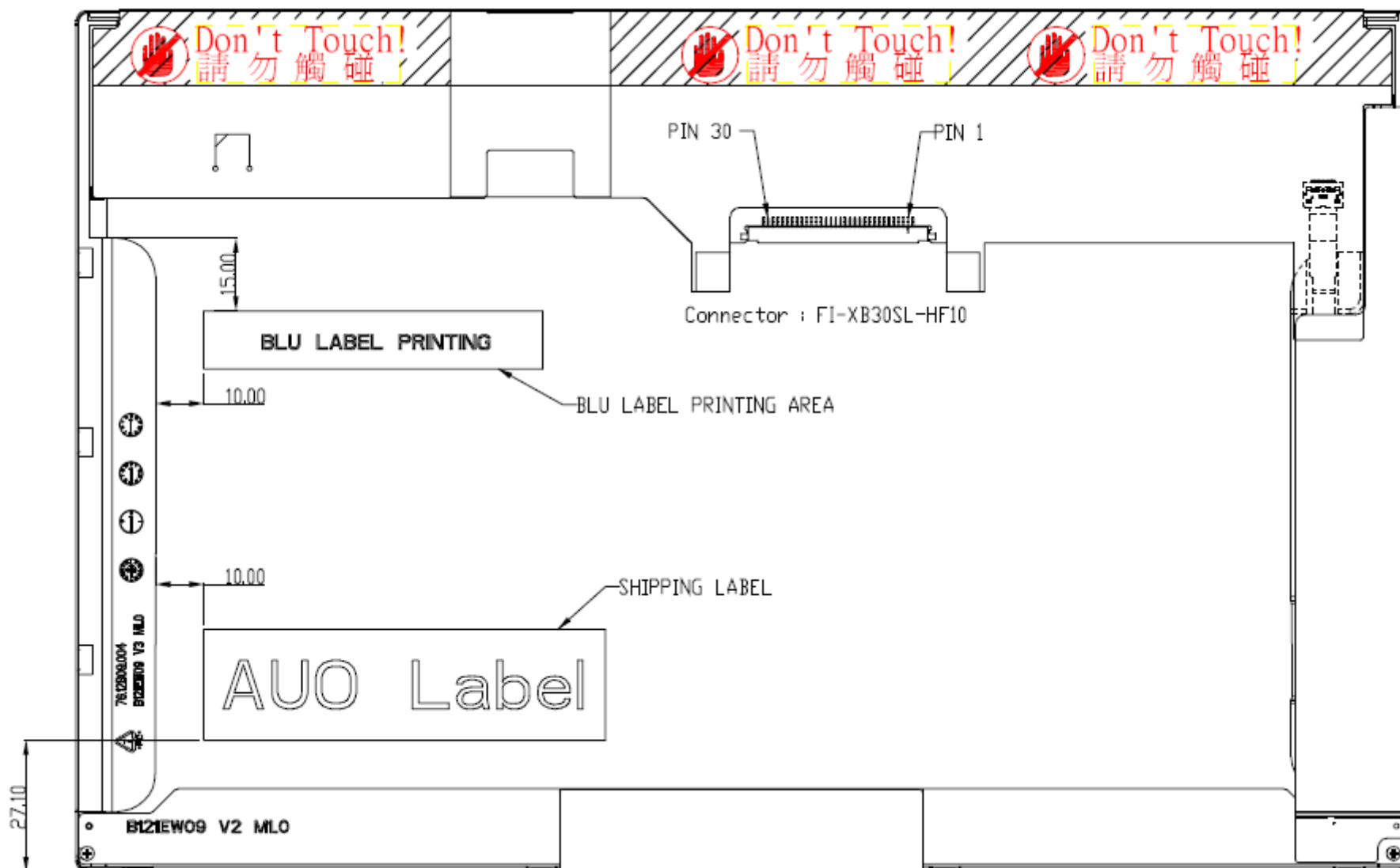
## 10. Reliability

| 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, 300h                                  |        |
| Thermal Shock Test         | Ta=-20°C to 60°C, Duration at 30 min, 100 cycles |        |
| ESD                        | Contact : ±8 KV<br>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%





## 11.2 Screw Hole Depth and Center Position

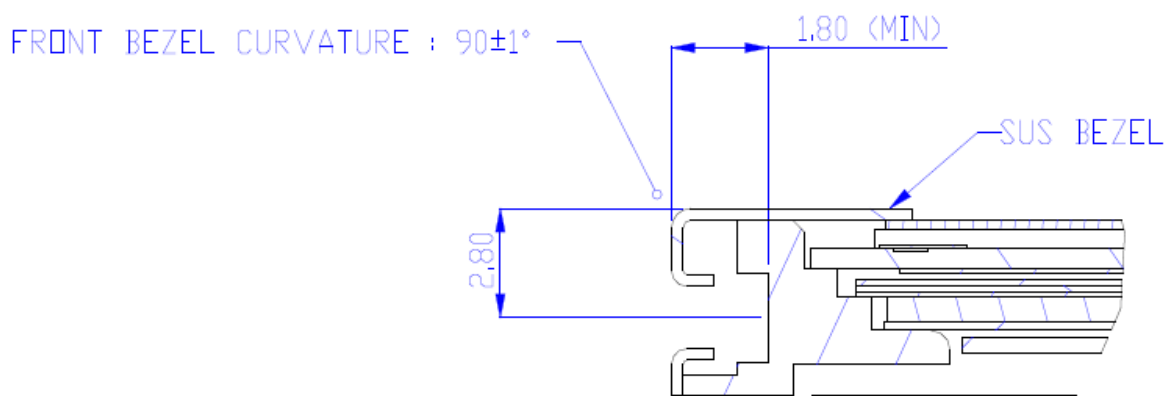
Screw hole minimum depth, from side surface = 1.8 mm (See drawing)

Screw hole center location, from front surface = 2.8mm (See drawing)

Screw Torque:

2.3 ~ 2.5 kgf-cm Max (Rework 6 times)

3.0 kgf-cm max Max (Rework 3 times)





## Product Specification

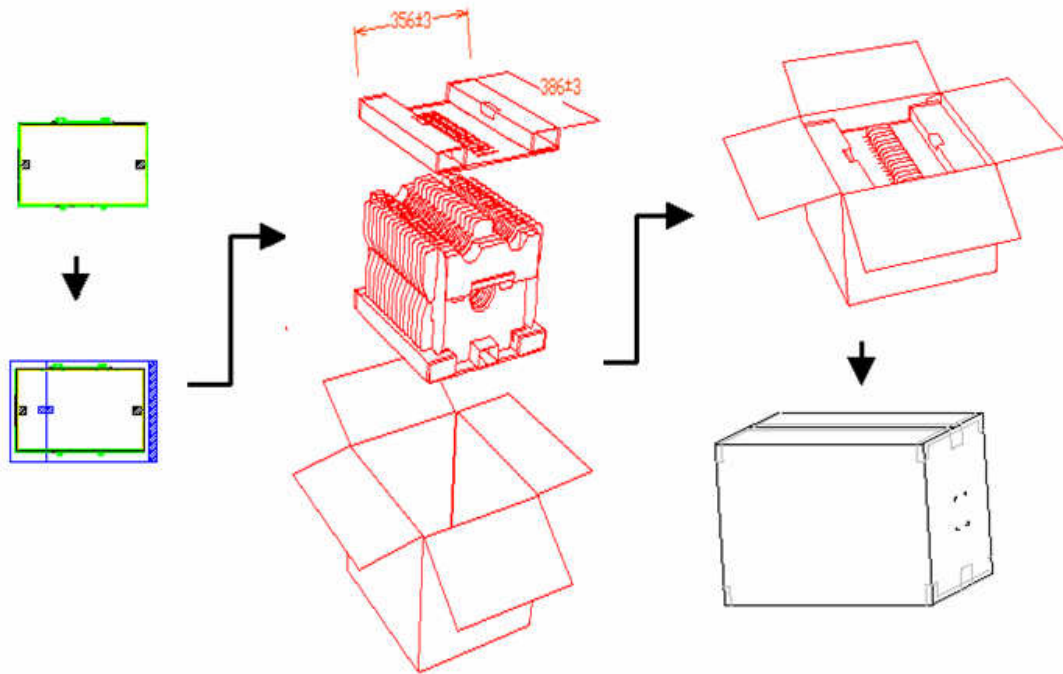
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### 12. Shipping and Package

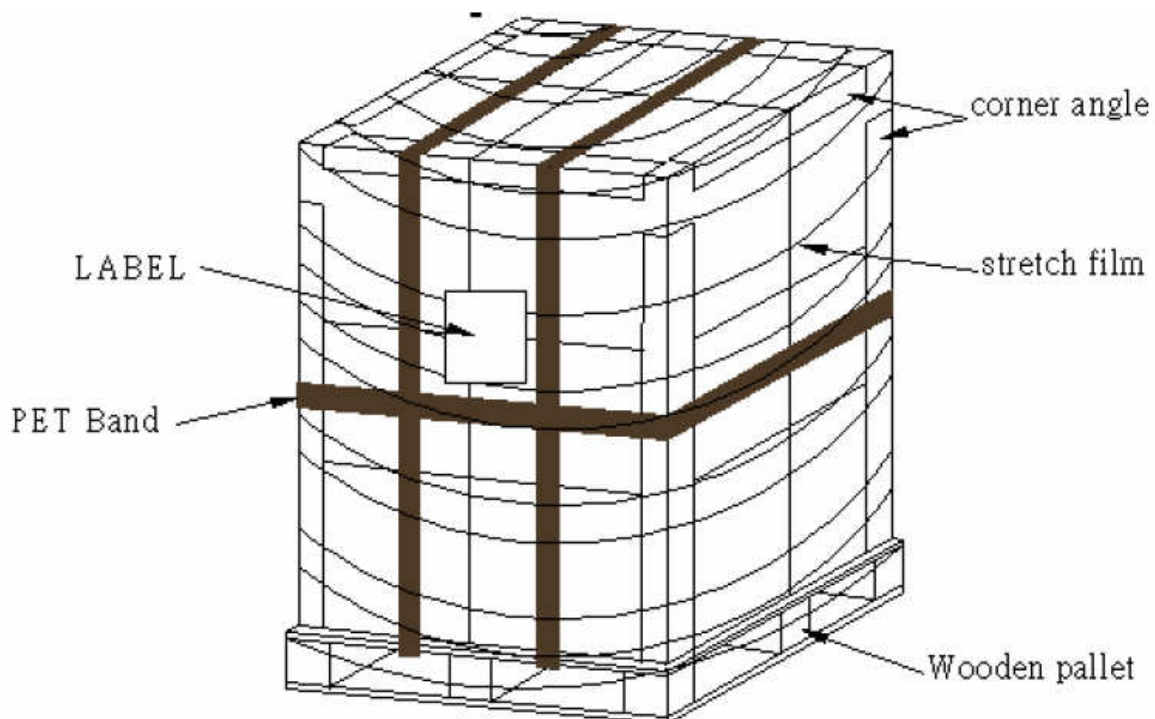
#### 12.1 Shipping Label Format

|  |   |  |
|--|---|--|
| <br>*XXXXXXXXXXXX-XXXX* | Manufactured 06/35<br>Model No: B121EW09 V3<br>AU Optronics<br>MADE IN CHINA (S03)<br><br>H/W: 1A F/W:1 | <br><br><br> |
|                         | 11S42T0708Z1ZH8TXXXXXX YMM P/N 42T0708 FRU 42T0709  |  |

## 12.2 Carton package



## 12.3 Shipping package of palletizing sequence





# Product Specification

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## 13. Appendix: EDID description

| Byte#<br>(decimal) | Byte#<br>(HEX) | Field Name and Comments                    | Value<br>(HEX) | Remarks                            | Value<br>(Hex) | Value<br>(Decimal) | Value<br>(Binary) |
|--------------------|----------------|--|----------------|------------------------------------|----------------|--------------------|-------------------|
| 0                  | 00             | Header                                     | 00             | EDID VESA Spec Fixed               | 00             | 0                  | 00000000          |
| 1                  | 01             | Header                                     | FF             | EDID VESA Spec Fixed               | FF             | 255                | 11111111          |
| 2                  | 02             | Header                                     | FF             | EDID VESA Spec Fixed               | FF             | 255                | 11111111          |
| 3                  | 03             | Header                                     | FF             | EDID VESA Spec Fixed               | FF             | 255                | 11111111          |
| 4                  | 04             | Header                                     | FF             | EDID VESA Spec Fixed               | FF             | 255                | 11111111          |
| 5                  | 05             | Header                                     | FF             | EDID VESA Spec Fixed               | FF             | 255                | 11111111          |
| 6                  | 06             | Header                                     | FF             | EDID VESA Spec Fixed               | FF             | 255                | 11111111          |
| 7                  | 07             | Header                                     | 00             | EDID VESA Spec Fixed               | 00             | 0                  | 00000000          |
| 8                  | 08             | ID Manufacturer Name                       | 30             | LEN                                | 30             | 48                 | 00110000          |
| 9                  | 09             |  | AE             |                                    | AE             | 174                | 10101110          |
| 10                 | 0A             | ID Product Code                            | 11             | 12" 16:10 WXGA 1280x800<br>LED B/L | 11             | 17                 | 00010001          |
| 11                 | 0B             |  | 40             |                                    | 40             | 64                 | 01000000          |
| 12                 | 0C             | ID Serial Number (32-bit<br>serial number) | 00             | not used                           | 00             | 0                  | 00000000          |
| 13                 | 0D             |  | 00             | not used                           | 00             | 0                  | 00000000          |
| 14                 | 0E             |  | 00             | not used                           | 00             | 0                  | 00000000          |
| 15                 | 0F             |  | 00             | not used                           | 00             | 0                  | 00000000          |
| 16                 | 10             | Week of Manufacture                        |                |                                    | 01             | 1                  | 00000001          |
| 17                 | 11             | Year of Manufacture                        |                |                                    | 13             | 19                 | 00010011          |
| 18                 | 12             | EDID Structure version                     | 01             | Ver. 1.3                           | 01             | 1                  | 00000001          |
| 19                 | 13             | EDID Revision                              | 03             |                                    | 03             | 3                  | 00000011          |
| 20                 | 14             | Video Input Definition                     | 80             | Digital                            | 80             | 128                | 10000000          |
| 21                 | 15             | Max H Image Size(cm)                       |                |                                    | 1A             | 26                 | 00011010          |
| 22                 | 16             | Max V Image Size(cm)                       |                |                                    | 10             | 16                 | 00010000          |
| 23                 | 17             | Display gamma (gamma x<br>100)-100         | 78             | 2.2                                | 78             | 120                | 01111000          |
| 24                 | 18             | Feature support(DPMS)                      | EA             | Lenovo Spec fixed                  | EA             | 234                | 11101010          |
| 25                 | 19             | Red/Green Low Bits                         |                |                                    | 65             | 101                | 01100101          |
| 26                 | 1A             | Blue/White Low Bits                        |                |                                    | 85             | 133                | 10000101          |
| 27                 | 1B             | Red x                                      |                |                                    | 8F             | 143                | 10001111          |
| 28                 | 1C             | Red y                                      |                |                                    | 59             | 89                 | 01011001          |
| 29                 | 1D             | Green x                                    |                |                                    | 58             | 88                 | 01011000          |
| 30                 | 1E             | Green y                                    |                |                                    | 8F             | 143                | 10001111          |
| 31                 | 1F             | Blue x                                     |                |                                    | 26             | 38                 | 00100110          |
| 32                 | 20             | Blue y                                     |                |                                    | 1B             | 27                 | 00011011          |
| 33                 | 21             | White x                                    |                |                                    | 50             | 80                 | 01010000          |
| 34                 | 22             | White y                                    |                |                                    | 54             | 84                 | 01010100          |
| 35                 | 23             | Established Timing 1                       | 00             | Lenovo Spec fixed                  | 00             | 0                  | 00000000          |
| 36                 | 24             | Established Timing 2                       | 00             | Lenovo Spec fixed                  | 00             | 0                  | 00000000          |





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|    |    |   |    |                   |    |     |          |
|----|----|---|----|-------------------|----|-----|----------|
| 37 | 25 | Manufacturer's Timings                            | 00 |                   | 00 | 0   | 00000000 |
| 38 | 26 | Standard Timing Identification #1                 | 01 | Lenovo Spec fixed | 01 | 1   | 00000001 |
| 39 | 27 |   | 01 | Lenovo Spec fixed | 01 | 1   | 00000001 |
| 40 | 28 | Standard Timing Identification #2                 | 01 | Lenovo Spec fixed | 01 | 1   | 00000001 |
| 41 | 29 |   | 01 | Lenovo Spec fixed | 01 | 1   | 00000001 |
| 42 | 2A | Standard Timing Identification #3                 |    |                   | 01 | 1   | 00000001 |
| 43 | 2B |   |    |                   | 01 | 1   | 00000001 |
| 44 | 2C | Standard Timing Identification #4                 |    |                   | 01 | 1   | 00000001 |
| 45 | 2D |   |    |                   | 01 | 1   | 00000001 |
| 46 | 2E | Standard Timing Identification #5                 |    |                   | 01 | 1   | 00000001 |
| 47 | 2F |   |    |                   | 01 | 1   | 00000001 |
| 48 | 30 | Standard Timing Identification #6                 |    |                   | 01 | 1   | 00000001 |
| 49 | 31 |   |    |                   | 01 | 1   | 00000001 |
| 50 | 32 | Standard Timing Identification #7                 |    |                   | 01 | 1   | 00000001 |
| 51 | 33 |   |    |                   | 01 | 1   | 00000001 |
| 52 | 34 | Standard Timing Identification #8                 |    |                   | 01 | 1   | 00000001 |
| 53 | 35 |   |    |                   | 01 | 1   | 00000001 |
| 54 | 36 | Pixel Clock/10,000 (LSB)                          |    | Refresh rate 60Hz | 12 | 18  | 00010010 |
| 55 | 37 | Pixel Clock/10,000 (MSB) /                        |    |                   | 1B | 27  | 00011011 |
| 56 | 38 | Horizontal Active                                 |    |                   | 00 | 0   | 00000000 |
| 57 | 39 | Horizontal Blanking                               |    |                   | 7B | 123 | 01111011 |
| 58 | 3A | Horizontal Active : Horizontal Blanking           |    |                   | 50 | 80  | 01010000 |
| 59 | 3B | Vertical Active                                   |    |                   | 20 | 32  | 00100000 |
| 60 | 3C | Vertical Blanking                                 |    |                   | 15 | 21  | 00010101 |
| 61 | 3D | Vertical Active : Vertical Blanking               |    |                   | 30 | 48  | 00110000 |
| 62 | 3E | Horizontal Sync. Offset                           |    |                   | 30 | 48  | 00110000 |
| 63 | 3F | Horizontal Sync Pulse Width                       |    |                   | 20 | 32  | 00100000 |
| 64 | 40 | Vertical Sync Offset : Sync Width                 |    |                   | 36 | 54  | 00110110 |
| 65 | 41 | Horizontal Vertical Sync Offset/Width upper 2bits |    |                   | 00 | 0   | 00000000 |
| 66 | 42 | Horizontal Image Size                             |    |                   | 05 | 5   | 00000101 |
| 67 | 43 | Vertical Image Size                               |    |                   | A3 | 163 | 10100011 |
| 68 | 44 | Horizontal & Vertical Image Size                  |    |                   | 10 | 16  | 00010000 |
| 69 | 45 | Horizontal Border                                 |    |                   | 00 | 0   | 00000000 |
| 70 | 46 | Vertical Border                                   |    |                   | 00 | 0   | 00000000 |
| 71 | 47 | Flags   |    |                   | 18 | 24  | 00011000 |
| 72 | 48 | Pixel Clock/10,000 (LSB) (Slow Refresh rate)      |    | Refresh rate 50Hz | 7F | 127 | 01111111 |
| 73 | 49 | Pixel Clock/10,000 (MSB) / (Slow Refresh rate)    |    |                   | 16 | 22  | 00010110 |



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|     |    |   |    |                   |    |     |          |
|-----|----|---|----|-------------------|----|-----|----------|
| 74  | 4A | Horizontal Active                                     |    |                   | 00 | 0   | 00000000 |
| 75  | 4B | Horizontal Blanking                                   |    |                   | 7B | 123 | 01111011 |
| 76  | 4C | Horizontal Active : Horizontal Blanking               |    |                   | 50 | 80  | 01010000 |
| 77  | 4D | Vertical Active                                       |    |                   | 20 | 32  | 00100000 |
| 78  | 4E | Vertical Blanking                                     |    |                   | 15 | 21  | 00010101 |
| 79  | 4F | Vertical Active : Vertical Blanking                   |    |                   | 30 | 48  | 00110000 |
| 80  | 50 | Horizontal Sync. Offset                               |    |                   | 30 | 48  | 00110000 |
| 81  | 51 | Horizontal Sync Pulse Width                           |    |                   | 20 | 32  | 00100000 |
| 82  | 52 | Vertical Sync Offset : Sync Width                     |    |                   | 36 | 54  | 00110110 |
| 83  | 53 | Horizontal Vertical Sync Offset/Width upper 2bits = 0 |    |                   | 00 | 0   | 00000000 |
| 84  | 54 | Horizontal Image Size                                 |    |                   | 05 | 5   | 00000101 |
| 85  | 55 | Vertical Image Size                                   |    |                   | A3 | 163 | 10100011 |
| 86  | 56 | Horizontal & Vertical Image Size                      |    |                   | 10 | 16  | 00010000 |
| 87  | 57 | Horizontal Border                                     |    |                   | 00 | 0   | 00000000 |
| 88  | 58 | Vertical Border                                       |    |                   | 00 | 0   | 00000000 |
| 89  | 59 | Flags   |    |                   | 18 | 24  | 00011000 |
| 90  | 5A | Flag  | 00 | VESA Spec Fixed   | 00 | 0   | 00000000 |
| 91  | 5B | Flag  | 00 | VESA Spec Fixed   | 00 | 0   | 00000000 |
| 92  | 5C | Flag  | 00 | VESA Spec Fixed   | 00 | 0   | 00000000 |
| 93  | 5D | Data Type Tag   | 0F | Lenovo Spec fixed | 0F | 15  | 00001111 |
| 94  | 5E | Flag  | 00 | VESA Spec Fixed   | 00 | 0   | 00000000 |
| 95  | 5F | (Horizontal active pixel /8)-31                       | 81 | 129               | 81 | 129 | 10000001 |
| 96  | 60 | Image Aspect Ratio                                    | 0A | 16 : 10           | 0A | 10  | 00001010 |
| 97  | 61 | Middle Refresh Rate                                   | 3C | 60                | 3C | 60  | 00111100 |
| 98  | 62 | (Horizontal active pixel /8)-31                       | 81 | 129               | 81 | 129 | 10000001 |
| 99  | 63 | Image Aspect Ratio                                    | 0A | 16 : 10           | 0A | 10  | 00001010 |
| 100 | 64 | Low Refresh Rate                                      | 32 | 50                | 32 | 50  | 00110010 |
| 101 | 65 | Brightness(1/10nit)                                   |    |                   | 16 | 22  | 00010110 |
| 102 | 66 | Feature flag  | 09 | TN LED B/L        | 09 | 9   | 00001001 |
| 103 | 67 | Reserved  | 00 | Lenovo Spec fixed | 00 | 0   | 00000000 |
| 104 | 68 | LCD Supplier manufacture                              |    |                   | 06 | 6   | 00000110 |
| 105 | 69 | Code (3 character ID)                                 |    |                   | AF | 175 | 10101111 |
| 106 | 6A | LCD Supplier Product code                             |    |                   | 56 | 86  | 01010110 |
| 107 | 6B | LCD Supplier Product code                             |    |                   | 33 | 51  | 00110011 |
| 108 | 6C | Flag  | 00 | VESA Spec Fixed   | 00 | 0   | 00000000 |
| 109 | 6D | Flag  | 00 | VESA Spec Fixed   | 00 | 0   | 00000000 |
| 110 | 6E | Flag  | 00 | VESA Spec Fixed   | 00 | 0   | 00000000 |
| 111 | 6F | Data Type Tag   | FE | Lenovo Spec fixed | FE | 254 | 11111110 |
| 112 | 70 | Flag  | 00 | VESA Spec Fixed   | 00 | 0   | 00000000 |
| 113 | 71 | Model Name  |    |                   | 42 | 66  | 01000010 |



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|     |    |                |    |                 |    |     |          |
|-----|----|----------------|----|-----------------|----|-----|----------|
| 114 | 72 | Model Name     |    |                 | 31 | 49  | 00110001 |
| 115 | 73 | Model Name     |    |                 | 32 | 50  | 00110010 |
| 116 | 74 | Model Name     |    |                 | 31 | 49  | 00110001 |
| 117 | 75 | Model Name     |    |                 | 45 | 69  | 01000101 |
| 118 | 76 | Model Name     |    |                 | 57 | 87  | 01010111 |
| 119 | 77 | Model Name     |    |                 | 30 | 48  | 00110000 |
| 120 | 78 | Model Name     |    |                 | 39 | 57  | 00111001 |
| 121 | 79 | Model Name     |    |                 | 20 | 32  | 00100000 |
| 122 | 7A | Model Name     |    |                 | 56 | 86  | 01010110 |
| 123 | 7B | Model Name     |    |                 | 33 | 51  | 00110011 |
| 124 | 7C | Model Name     |    |                 | 20 | 32  | 00100000 |
| 125 | 7D | Model Name     |    |                 | 0A | 10  | 00001010 |
| 126 | 7E | Extension flag | 00 | VESA Spec Fixed | 00 | 0   | 00000000 |
| 127 | 7F | Checksum       |    |                 | 9B | 155 | 10011011 |