| | | | |
|---|---|---|---|
| Product Description: T400HW02 TFT-LCD PANEL with RoHS guarantee | | | |
| | | | |
| AUO Model Name: T400HW02 V3 | | | |
| Customer Part No/Project Name: | | | |
| Customer Signature | **Date** | AUO | **Date** |
| | | Approved By: PM Director / Frank Hsu | |
| | | Reviewed By: RD Director / Hong Jye Hong<br>Reviewed By: Project Leader /Tzuchieh Lai | |
| | | Prepared By: PM /Cynthia Hung | |

*Document Version: 0.0*
*Date:2008/09/30*

# Product Specifications

## 40” Full HD Color TFT-LCD Module
## Model Name: T400HW02 V3

(*) Preliminary Specifications

() Final Specifications

# Contents

# Record of Revision

| Version | Data | No | Old Description | New Decription | Remark |
|---|---|---|---|---|---|
| 0.0 | 2008/09/30 | | First release | | N/A |
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# 1. General Description

This specification applies to the 40.0 inch Color TFT-LCD Module T400HW02 V3. This LCD module has a TFT active matrix type liquid crystal panel 1,920x1,080 pixels, and diagonal size of 40.0 inch. This module supports 1,920x1,080 mode. Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the brightness of the sub-pixel color is determined with a 8-bit gray scale signal for each dot.

The T400HW02 V3 has been designed to apply the 8-bit 2 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.

* General Information

| Items | Specification | Unit | Note |
|---|---|---|---|
| Active Screen Size | 40.00 | inch | |
| Display Area | 885.6(H) x 498.15(V) | mm | |
| Outline Dimension | 952.0(H) x 551.0 (V) x 48.4(D) | mm | With socket cover |
| Driver Element | a-Si TFT active matrix | | |
| Display Colors | 8 bit, 16.7M | Colors | |
| Number of Pixels | 1,920x1,080 | Pixel | |
| Pixel Pitch | 0.46125 (H) x 0.46125(W) | mm | |
| Pixel Arrangement | RGB vertical stripe | | |
| Display Operation Mode | Normally Black | | |
| Surface Treatment | Anti-Glare, 3H | | Haze=11% |

## 2. Absolute Maximum Ratings

The followings are maximum values which, if exceeded, may cause faulty operation or damage to the unit

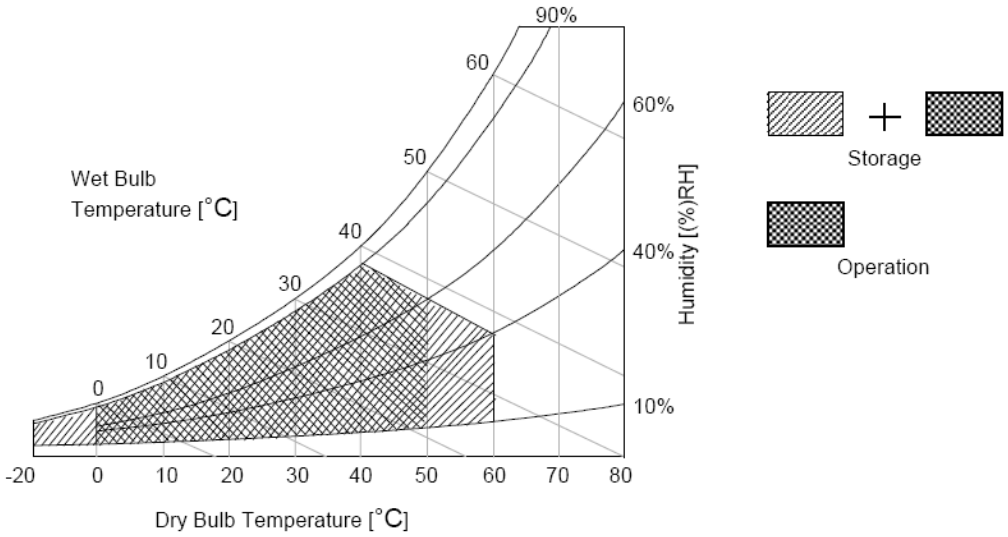
| Item | Symbol | Min | Max | Unit | Conditions |
|---|---|---|---|---|---|
| Logic/LCD Drive Voltage | Vcc | -0.3 | 14 | [Volt] | Note 1 |
| Input Voltage of Signal | Vin | -0.3 | 3.6 | [Volt] | Note 1 |
| Operating Temperature | TOP | 0 | +50 | [°C] | Note 2 |
| Operating Humidity | HOP | 10 | 90 | [%RH] | Note 2 |
| Storage Temperature | TST | -20 | +60 | [°C] | Note 2 |
| Storage Humidity | HST | 10 | 90 | [%RH] | Note 2 |
| Panel Surface Temperature | PST | | 65 | [°C] | Note 3 |

Note 1: Duration:50 msec.

Note 2 : Maximum Wet-Bulb should be 39℃ and No condensation.

The relative humidity must not exceed 90% non-condensing at temperatures of 40℃ or less. At temperatures greater than 40℃, the wet bulb temperature must not exceed 39℃.

Note 3: Surface temperature is measured at 50℃ Dry condition



# 3. Electrical Specification

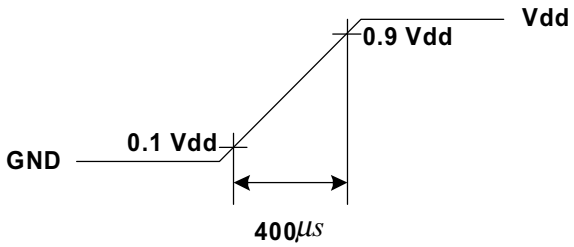
The T400HW02 V3 requires two power inputs. One is employed to power the LCD electronics and to drive the TFT array and liquid crystal. The second input, which powers the CCFL, is typically generated by an integrate power (I/P) system.

## 3.1 Electrical Characteristics

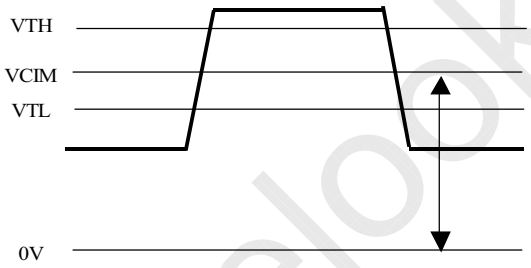
| Parameter | | Symbol | Value | | | Unit | Note |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max | | |
| LCD | | | | | | | |
| Power Supply Input Voltage | | $V_{DD}$ | 10.8 | 12 | 13.2 | $V_{DC}$ | 1 |
| Power Supply Input Current | | $I_{DD}$ | -- | 1.14 | 1.25 | A | 2 |
| Power Consumption | | $P_C$ | -- | 13.68 | 15.0 | Watt | 2 |
| Inrush Current | | $I_{RUSH}$ | -- | -- | 4.5 | A | 3 |
| LVDS Interface | Differential Input High Threshold Voltage | $V_{TH}$ | -- | -- | +100 | $mV_{DC}$ | 4 |
| | Differential Input Low Threshold Voltage | $V_{TL}$ | -100 | -- | -- | $mV_{DC}$ | 4 |
| | Input Common Mode Voltage | $V_{ICM}$ | 0.6 | 1.2 | 1.8 | $V_{DC}$ | 4 |
| CMOS Interface | Input High Threshold Voltage | $V_{IH}$ (High) | 2.4 | -- | 3.3 | $V_{DC}$ | |
| | Input Low Threshold Voltage | $V_{IL}$ (Low) | 0 | -- | 0.7 | $V_{DC}$ | |
| Life Time | | | 50000 | | -- | Hours | |

**Note :**

1. The ripple voltage should be controlled under 10% of $V_{CC}$
2. Vcc=12.0V, $f_v$ =60Hz, fCLK=81.5Mhz , 25℃, Test Pattern : White Pattern
3. Measurement condition :




4. VCIM = 1.2V




5. The performance of the Lamp in LCD panel, for example life time or brightness, is extremely influenced by the characteristics of balanced board and I/P board. All the parameters should be carefully designed as not to produce too much leakage current from high-voltage output. While you design or order the balance board, please make sure unwanted lighting caused by the mismatch of the lamp and the balanced board (no lighting, flicker, etc) never occurs. After confirmation, the LCD panel should be operated in the same condition as installed in your instrument
6. Do not attach a conducting tape to lamp connecting wire. If the lamp wire attach to conducting tape, TFT-LCD Module have a low luminance and the inverter has abnormal action because leakage current occurs between lamp wire and conducting tape.
7. The relative humidity must not exceed 80% non-condensing at temperatures of 40 ℃ or less. At temperatures greater than 40℃, the wet bulb temperature must not exceed 39℃. When operate at low temperatures, the brightness of CCFL will drop and the life time of CCFL will be reduced.

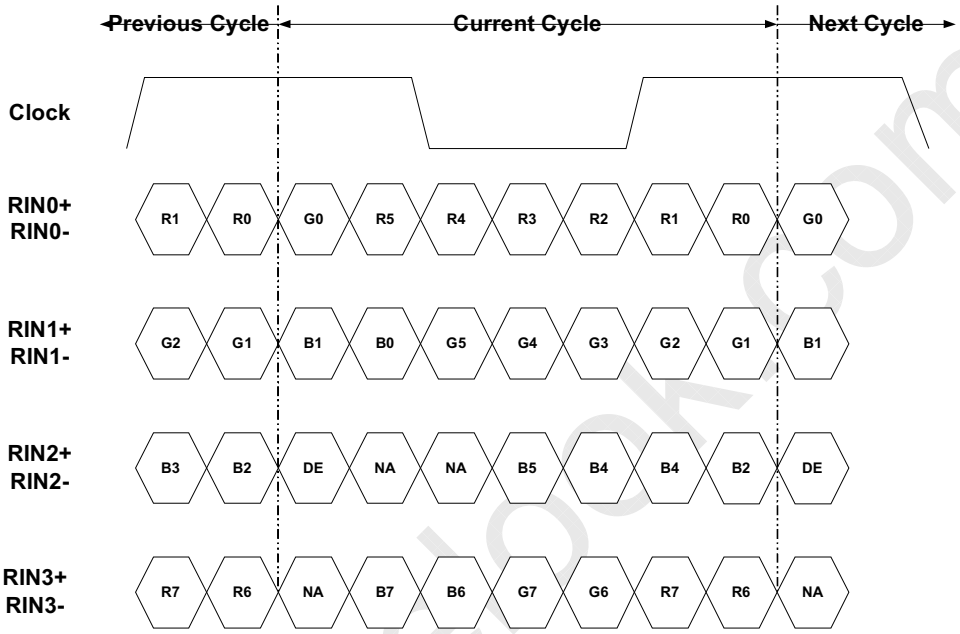
### 3.2 Interface Connections

- LCD connector: FI-RE51S-HF (JAE)
- Mating connector: FI-RE51S-HL (JAE)

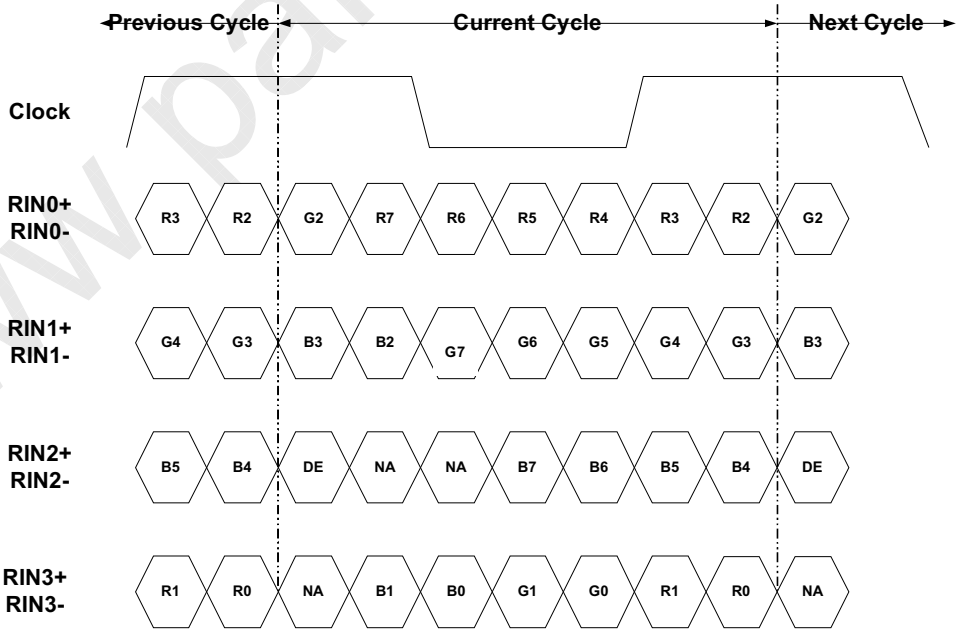
| PIN # | Signal Name | Description |
|---|---|---|
| 1 | $V_{DD}$ | 12V power supply |
| 2 | $V_{DD}$ | 12V power supply |
| 3 | $V_{DD}$ | 12V power supply |
| 4 | $V_{DD}$ | 12V power supply |
| 5 | $V_{DD}$ | 12V power supply |
| 6 | GND | Ground |
| 7 | GND | Ground |
| 8 | GND | Ground |
| 9 | GND | Ground |
| 10 | RO_0- | Negative(-) LVDS differential data input |
| 11 | RO_0+ | Positive(+) LVDS differential data input |
| 12 | RO_1- | Negative(-) LVDS differential data input |
| 13 | RO_1+ | Positive(+) LVDS differential data input |
| 14 | RO_2- | Negative(-) LVDS differential data input |
| 15 | RO_2+ | Positive(+) LVDS differential data input |
| 16 | GND | Ground |
| 17 | RO_CLK- | Clock Signal(-) |
| 18 | RO_CLK+ | Clock Signal(+) |
| 19 | GND | Ground |
| 20 | RO_3- | Negative(-) LVDS differential data input |
| 21 | RO_3+ | Positive(+) LVDS differential data input |
| 22 | NC | No connection |
| 23 | NC | No connection |
| 24 | GND | Ground |
| 25 | RE_0- | Negative(-) LVDS differential data input |
| 26 | RE_0+ | Positive(+) LVDS differential data input |
| 27 | RE_1- | Negative(-) LVDS differential data input |
| 28 | RE_1+ | Positive(+) LVDS differential data input |
| 29 | RE_2- | Negative(-) LVDS differential data input |
| 30 | RE_2+ | Positive(+) LVDS differential data input |

| | | |
|---|---|---|
| 31 | GND | Ground |
| 32 | RE_CLK- | Clock Signal(-) |
| 33 | RE_CLK+ | Clock Signal(+) |
| 34 | GND | Ground |
| 35 | RE_3- | Negative(-) LVDS differential data input |
| 36 | RE_3+ | Positive(+) LVDS differential data input |
| 37 | NC | No connection |
| 38 | NC | No connection |
| 39 | GND | Ground |
| 40 | SCL | EEPROM Serial Clock |
| 41 | Reserved | Please leave it open |
| 42 | Reserved | Please leave it open |
| 43 | Reserved | Please leave it open |
| 44 | Reserved | Please leave it open |
| 45 | LVDS | Select LVDS data order (NS: High/Open, JEIDA: Low) |
| 46 | Reserved | Please leave it open |
| 47 | Reserved | Please leave it open |
| 48 | Reserved | Please leave it open |
| 49 | Reserved | Please leave it open |
| 50 | Reserved | Please leave it open |
| 51 | Reserved | Please leave it open |

**LVDS Option = High/Open➔NS**




**LVDS Option = Low➔JEIDA**



### 3.3 Signal Timing Specification

This is the signal timing required at the input of the user connector. All of the interface signal timing should be satisfied with the following specifications for its proper operation.

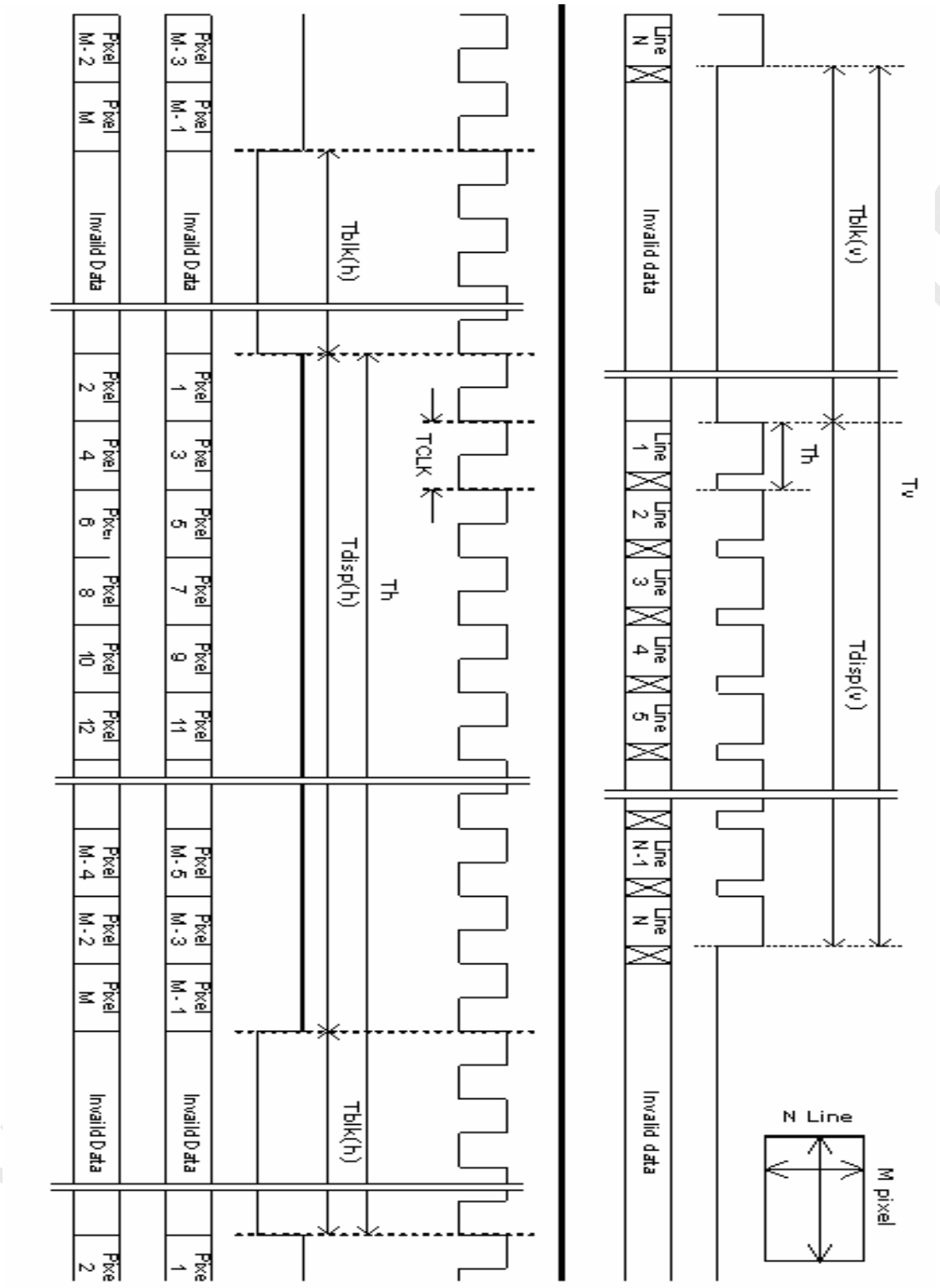
Timing Table (DE only Mode)

For 60Hz

| Signal | Item | Symbol | Min. | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Vertical Section | Period | $T_V$ | 1090 | 1125 | 1480 | $T_H$ |
| | Active | $T_{DISP}$ (V) | | 1080 | | $T_H$ |
| | Blanking | $T_{BLK}$ (V) | 10 | 45 | 400 | $T_H$ |
| Horizontal Section | Period | $T_H$ | 1030 | 1100 | 1300 | $T_{CLK}$ |
| | Active | $T_{DISP}$ (H) | | 960 | | $T_{CLK}$ |
| | Blanking | $T_{BLK}$ (H) | 70 | 140 | 340 | $T_{CLK}$ |
| Clock | Frequency | $1/T_{CLK}$ | 50 | 74.25 | 82 | MHz |
| Vertical Frequency | Frequency | $F_V$ | 47 | 60 | 63 | Hz |
| Horizontal Frequency | Frequency | $F_H$ | 60 | 67.5 | 73 | KHz |

Notes:
1.) Display position is specific by the rise of DE signal only.
Horizontal display position is specified by the rising edge of 1st DCLK after the rise of 1st DE, is displayed on the left edge of the screen.
Vertical display position is specified by the rise of DE after a "Low" level period equivalent to eight times of horizontal period. The 1st data corresponding to one horizontal line after the rise the of 1st DE is displayed at the top line of screen.
3.) If a period of DE "High" is less than 1366 DCLK or less than 768 lines, the rest of the screen displays black.
4.) The display position does not fit to the screen if a period of DE "High" and the effective data period do not synchronize with each other.

### 3.4 Signal Timing Waveforms



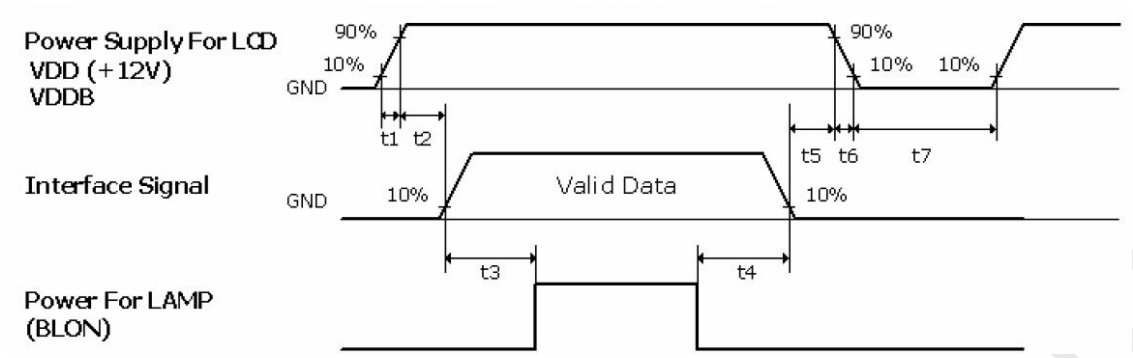
### 3.5 Color Input Data Reference

The brightness of each primary color (red, green and blue) is based on the 8 bit gray scale data input for the color; the higher the binary input, the brighter the color. The table below provides a reference for color versus data input.

COLOR DATA REFERENCE

| Color | | Input Color Data | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | RED | | | | | | | | GREEN | | | | | | | | BLUE | | | | | | | |
| | | MSB | | | | | | | LSB | MSB | | | | | | | LSB | MSB | | | | | | | LSB |
| | | R7 | R6 | R5 | R4 | R3 | R2 | R1 | R0 | G7 | G6 | G5 | G4 | G3 | G2 | G1 | G0 | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |
| Basic Color | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(255) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(255) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blue(255) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Cyan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Magenta | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Yellow | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | White | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| RED | RED(000) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | RED(001) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ---- | | | | | | | | | | | | | | | | | | | | | | | | |
| | RED(254) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | RED(255) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GREEN | GREEN(000) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | GREEN(001) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ---- | | | | | | | | | | | | | | | | | | | | | | | | |
| | GREEN(254) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | GREEN(255) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BLUE | BLUE(000) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | BLUE(001) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | ------- | | | | | | | | | | | | | | | | | | | | | | | | |
| | BLUE(254) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| | BLUE(255) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

### 3.6 Power Sequence




| Parameter | Values | | | Unit |
|---|---|---|---|---|
| | Min. | Typ. | Max. | |
| t1 | 0.4 | -- | 30 | ms |
| t2 | 0.1 | -- | 50 | ms |
| t3 | 300 | -- | -- | ms |
| t4 | 10 | -- | -- | ms |
| t5 | 0.1 | -- | 50 | ms |
| t6 | -- | -- | 300 | ms |
| t7 | 500 | -- | -- | ms |

Note:

The timing controller will not be damaged in case of TV set AC input power suddenly shut down.

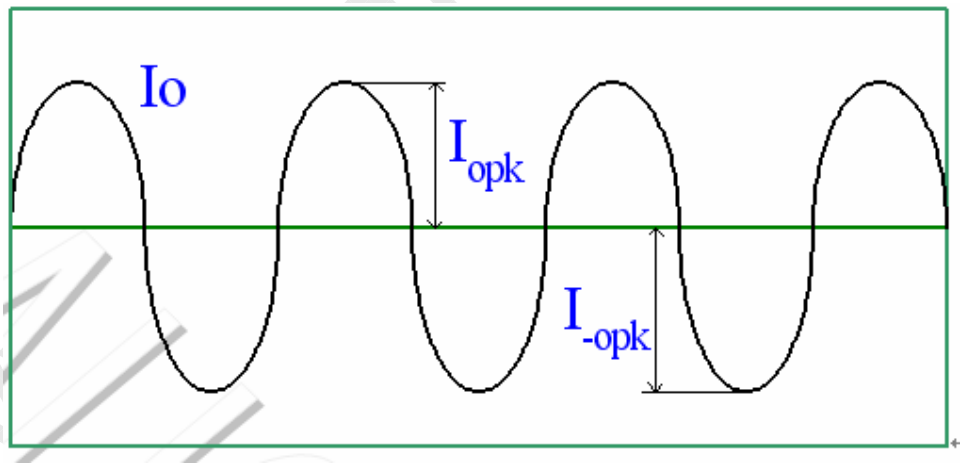
Once power reset, it should follow power sequence as spec. definition.

(1) Apply the lamp voltage within the LCD operation range. When the back-light turns on before the LCD operation or the LCD turns off before the back-light turns off, the display may momentarily become abnormal screen.

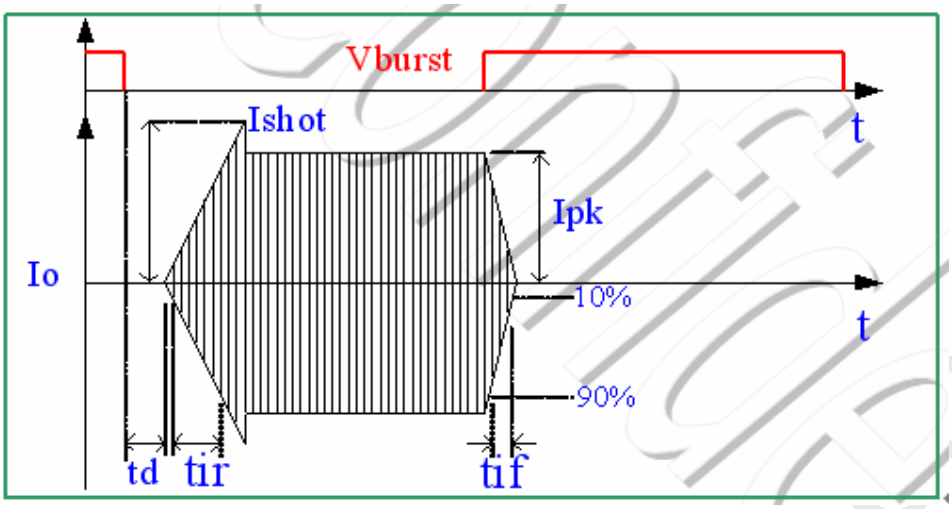
## 3.7 Backlight Connector Pin Configuration

| No | Item | Symbol | Condition | | Description | Specification | | | | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dimming | Temp. (℃) | | Min | Typ | Max | unit | |
| 1 | Output current | Io | Max | 25 | Output current of each lamp (HV terminal) | 10.0 | TBD | 11.0 | mA | |
| 2 | Output current variation | IVAR | Max | 25 | IVAR=Imax-Imin, Imax and Imin are max and min lamp current within whole backlight | _ | _ | 1 | mA | |
| 3 | Output working voltage | VL | Max | 25 | Lamp voltage of one lamp | 950 | TBD | 1000 | Volt (rms) | |
| 4 | Power consumption | Pin | Max | 25 | Pin spec on max brightness | 135 | 150 | 165 | W | |
| 5 | Lamp current DC bias | Idc | Max | 25 | $Idc=\frac{I_{opk}-\lvert I_{-opk}\rvert}{(I_{opk}+\lvert I_{-opk}\rvert)/2}$ | -5 | _ | 5 | % | (1) |
| 6 | Lamp current harmonic | HR | Max | 25 | $HR=\frac{\sqrt{I_1^2-I_2^2+I_3^2+I_4^2}}{I_1}$ | _ | _ | 20 | % | |
| 7 | Burst mode dimming waveform of lamp current | Over ratio | Max | 25 | Over Ratio=(Ishot-Ipk)/Ipk | _ | _ | 10 | % | (2) |
| | | tir | | | tir: Lamp current rising time | _ | 450 | 500 | us | |
| | | tif | | | tif: Lamp current falling time | _ | _ | 100 | us | |
| 8 | Lamp current vibration and brightness flicker | VBR | Max | 25 | VBR=(Iomax-Iomin) /(Iomax+Iomin)/2 | -20 | _ | 20 | % | (3) |
| | | flicker | | | Brightness flicker | No flicker | | | | |
| 9 | Lamp striking voltage | Vstirke | Max | 0 | $V_{strike}$ : trigger voltage of one lamp | 1.44 | 1.64 | 1.835 | kVolt (rms) | |
| | | tstrike | | | $t_{strike}$: trigger time of one lamp | 1 | 1.5 | _ | ms | |
| 11 | LTS | | 20% | -20 | Turn on inverter at -20℃ temperature (5hrs at least) | No Flicker phenomenon | | | | |

**Note 1**



**Note 2**


Vburst
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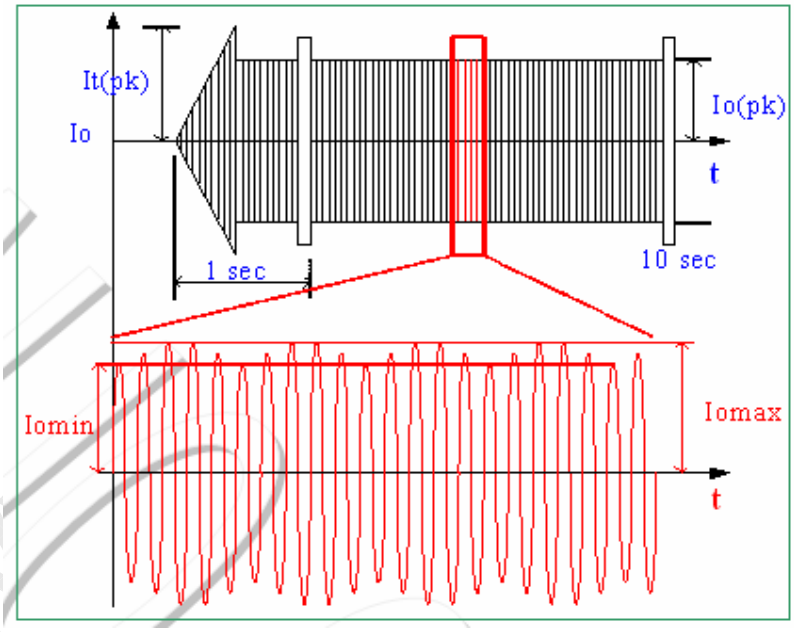
**Note 3**


It(pk)
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Io(pk)
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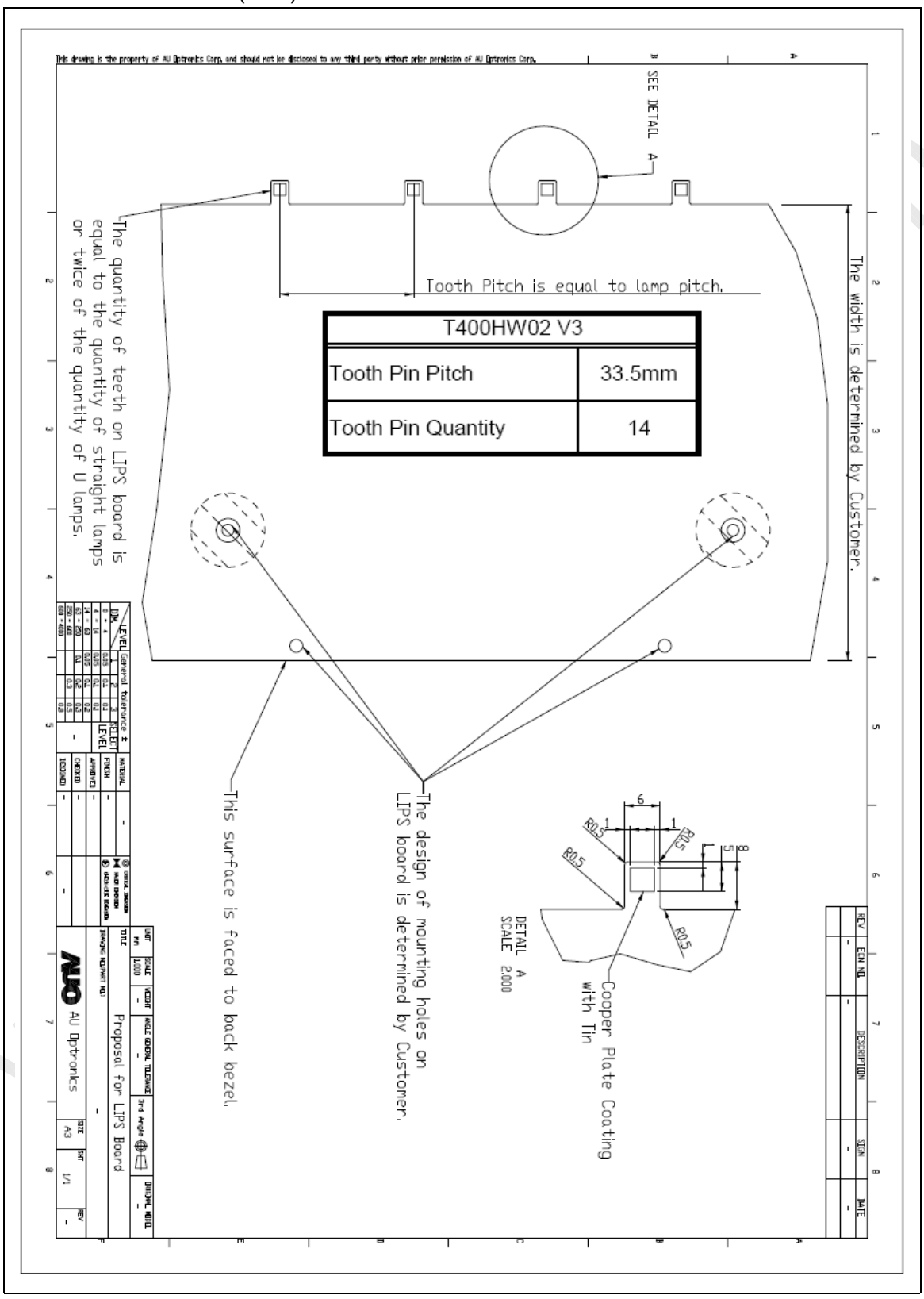
10 sec
Iomin
Iomax
t

# Input Interface for LIPS board

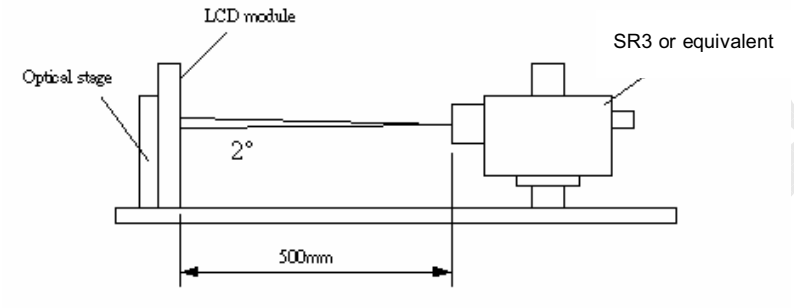
CN1 :EL7H001ZZ2 (JAE)



# 4. Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 45 minutes in a dark environment at 25°C. The values specified are at an approximate distance 50cm from the LCD surface at a viewing angle of φ and θ equal to 0°.

**Fig.1 presents additional information concerning the measurement equipment and method.**




| Parameter | Symbol | Values | | | Unit | Notes |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max | | |
| Contrast Ratio | CR | 4000 | 5000 | -- | | 1 |
| Surface Luminance (White) | $L_{WH}$ | 400 | 500 | -- | $cd/m^2$ | 2 |
| Luminance Variation | $\delta_{WHITE(9P)}$ | -- | -- | 1.3 | | 3 |
| Response Time (G to G) | Tγ | -- | 8 | -- | Ms | 4 |
| Color Gamut | NTSC | | 72 | | % | |
| Color Coordinates | | | | | | |
| Red | $R_X$ | Typ.-0.03 | 0.637 | Typ.+0.03 | | |
| | $R_Y$ | | 0.336 | | | |
| Green | $G_X$ | | 0.277 | | | |
| | $G_Y$ | | 0.590 | | | |
| Blue | $B_X$ | | 0.145 | | | |
| | $B_Y$ | | 0.057 | | | |
| White | $W_X$ | | 0.280 | | | |
| | $W_Y$ | | 0.290 | | | |
| Viewing Angle | | | | | | 5 |
| x axis, right(φ=0°) | $\theta_r$ | -- | 89 | -- | degree | |
| x axis, left(φ=180°) | $\theta_l$ | -- | 89 | -- | degree | |
| y axis, up(φ=90°) | $\theta_u$ | -- | 89 | -- | degree | |
| y axis, down (φ=270°) | $\theta_d$ | -- | 89 | -- | degree | |

Note:

1. Contrast Ratio (CR) is defined mathematically as:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance of } L_{on5}}{\text{Surface Luminance of } L_{off5}}$$

2. Surface luminance is luminance value at point 5 across the LCD surface 50cm from the surface with all pixels displaying white. From more information see FIG 2. When lamp current $I_H$ = 11mA. $L_{WH}$=Lon5 where Lon5 is the luminance with all pixels displaying white at center 5 location.

3. The variation in surface luminance, δWHITE is defined (center of Screen) as:

$$\delta_{WHITE(9P)} = \text{Maximum}(L_{on1}, L_{on2}, \ldots, L_{on9}) / \text{Minimum}(L_{on1}, L_{on2}, \ldots L_{on9})$$

4. Response time Tγ is the average time required for display transition by switching the input signal for five luminance ratio (0%,25%,50%,75%,100% brightness matrix) and is based on $f_v$=60Hz to optimize.

| | 0% | 25% | 50% | 75% | 100% |
|---|---|---|---|---|---|
| 0% | | t:0%-25% | t:0%-50% | t:0%-75% | t:0%-100% |
| 25% | t:25%-0% | | t:25%-50% | t:25%-75% | t:25%-100% |
| 50% | t:50%-0% | t:50%-25% | | t:50%-75% | t:50%-100% |
| 75% | t:75%-0% | t:75%-25% | t:75%-50% | | t:50%-100% |
| 100% | t:100%-0% | t:100%-25% | t:100%-50% | t:100%-75% | |

5. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG4.

**FIG. 2 Luminance**

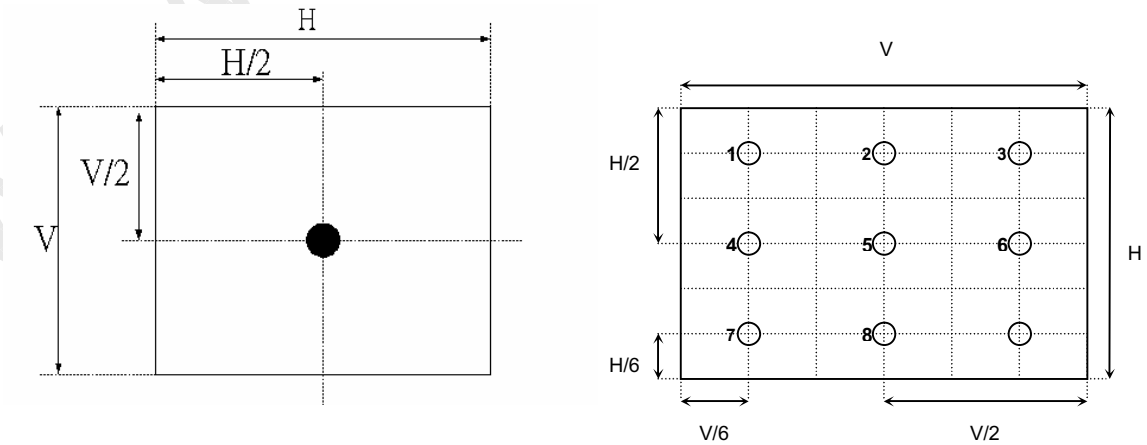


**FIG.3 Response Time**

The response time is defined as the following figure and shall be measured by switching the input signal for "any level of gray(bright) " and "any level of gray(dark)".

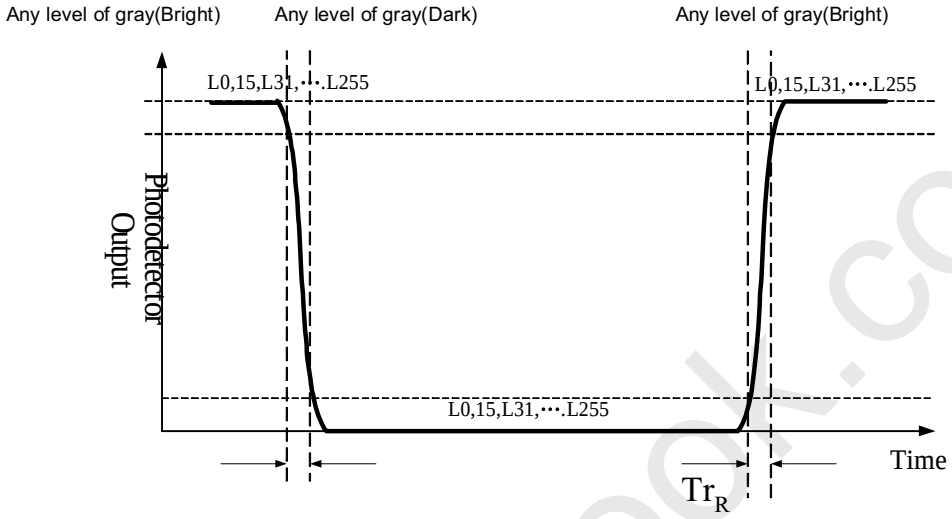
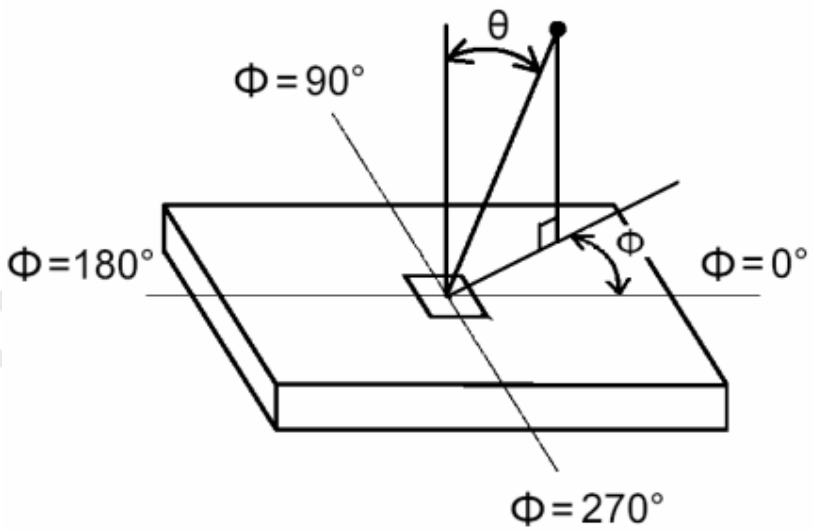



**FIG.4 Viewing angle**

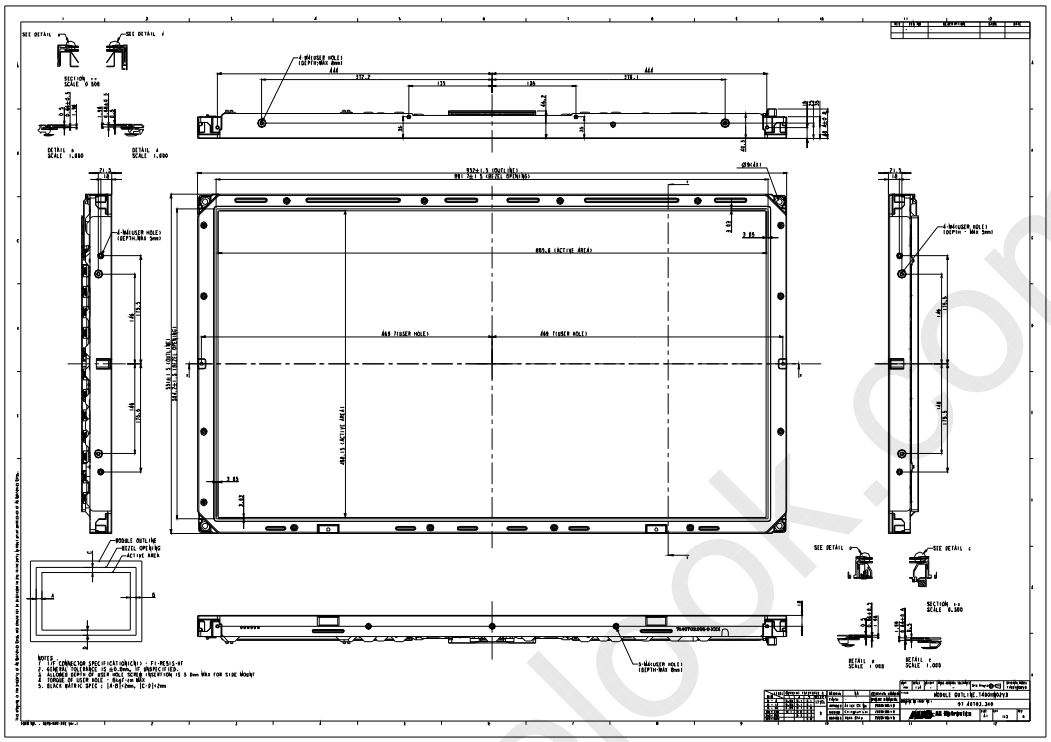


## 5. Mechanical Characteristics

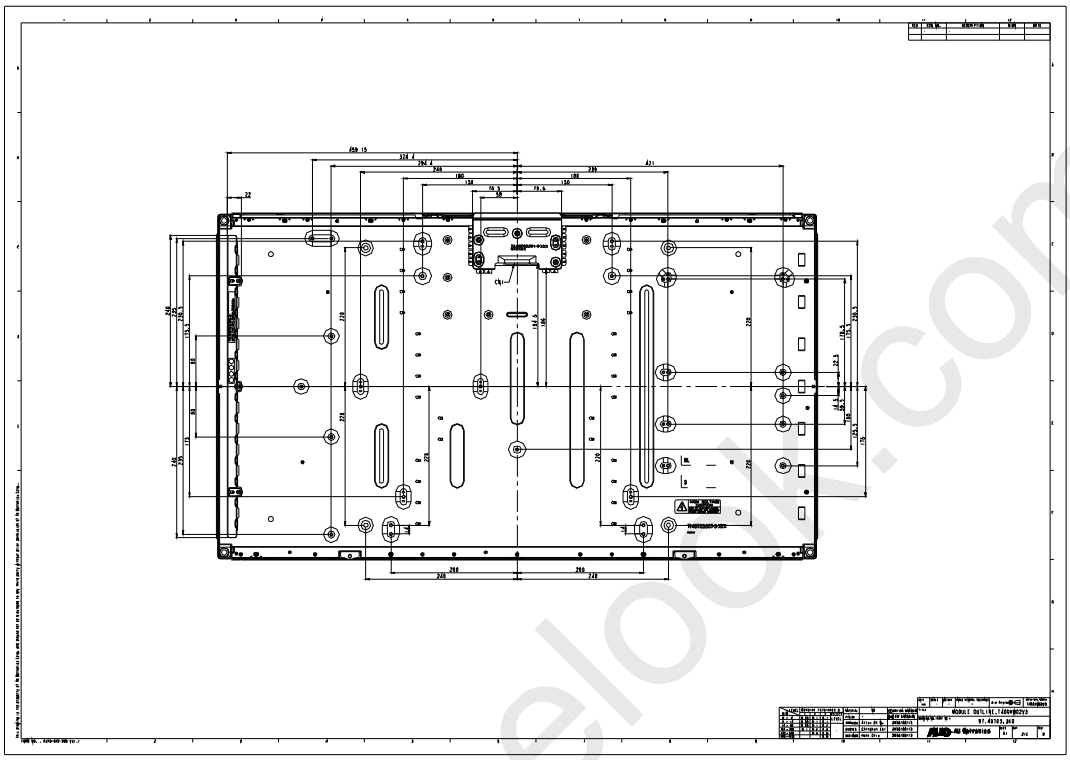
The contents provide general mechanical characteristics for the model T400HW02 V3. In addition the figures in the next page are detailed mechanical drawing of the LCD.

| | | |
|---|---|---|
| Outline Dimension | Horizontal | 952.0 mm |
| | Vertical | 551.0 mm |
| | Depth | 48.4 mm(to socket cover) |
| Bezel Opening | Horizontal | 891.7 mm |
| | Vertical | 504.2 mm |
| Active Display Area | Horizontal | 885.6mm |
| | Vertical | 498.15 mm |
| Weight | 10500g (Typ.) | |
| Surface Treatment | Anti-Glare, 3H | |

## Front view



## Rear view



## 6. Reliability Test Items

| | Test Item | Q'ty | Condition |
|---|---|---|---|
| 1 | High temperature storage test | 3 | 60℃, 300hrs |
| 2 | Low temperature storage test | 3 | -20℃, 300hrs |
| 3 | High temperature operation test | 3 | 50℃, 300hrs |
| 4 | Low temperature operation test | 3 | -5℃, 300hrs |
| 5 | Vibration test (non-operation) | 3 | (10~300Hz/1.5G/11min SR, XYZ 30,im/axis)<br>Vibration level : 1.5G RMS, Bandwidth: 10-300Hz,<br>Duration: X, Y, Z 30min |
| 6 | Shock test (non-operation) | 3 | Shock level: 50G<br>Waveform: half since wave, 11ms<br>Direction: ±X, ±Y, ±Z, One time each direction |
| 7 | Vibration test (With carton) | 3 | Random wave (1.5G RMS, 10-200Hz)<br>30mins/ Per each X,Y,Z axes |
| 8 | Drop test (With carton) | 3 | Height: 38.1cm<br>1 corner, 3 edges, 6 surfaces<br>(ASTMD4169-I) |

# 7. International Standard

## 7.1 Safety

(1) UL1950 Third Edition, Underwriters Laboratories, Inc. Jan. 28, 1995
Standard for Safety of Information Technology Equipment Including electrical Business Equipment.

(2) CAN/CSA C22.2 No. 950-95/60950 Third Edition, Canadian Standards Association,
Standard for Safety of Information Technology Equipment Including Electrical Business Equipment.

(3) EN60950: 1992+A2: 1993+A2: 1993+C3: 1995+A4: 1997+A11: 1997
IEC 950: 1991+A1: 1992+A2: 1993+C3: 1995+A4:1996
European Committee for Electrotechnical Standardization (CENELEC)
EUROPEAN STANDARD for Safety of Information Technology Equipment Including Electrical Business Equipment.

## 7.2 EMC

a) ANSI C63.4 “Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electrical Equipment in the Range of 9kHz to 40GHz. “American National standards Institute(ANSI), 1992

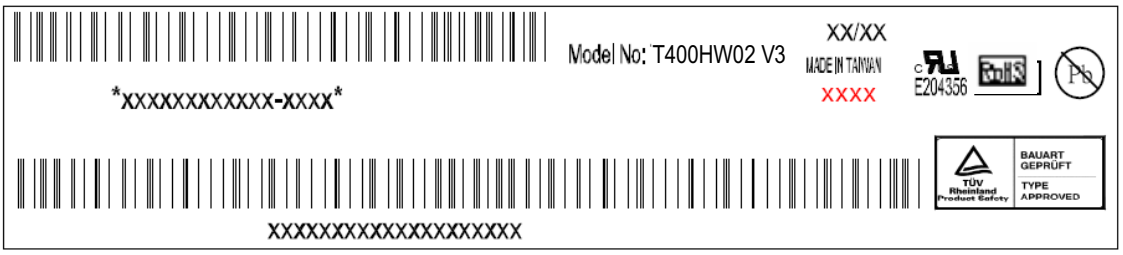
b) C.I.S.P.R “Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment.” International Special committee on Radio Interference.

c) EN 55022 “Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment.” European Committee for Electrotechnical Standardization. (CENELEC), 1998

# 8. Packing

## 8-1 DEFINITION OF LABEL:

### A. Panel Label:



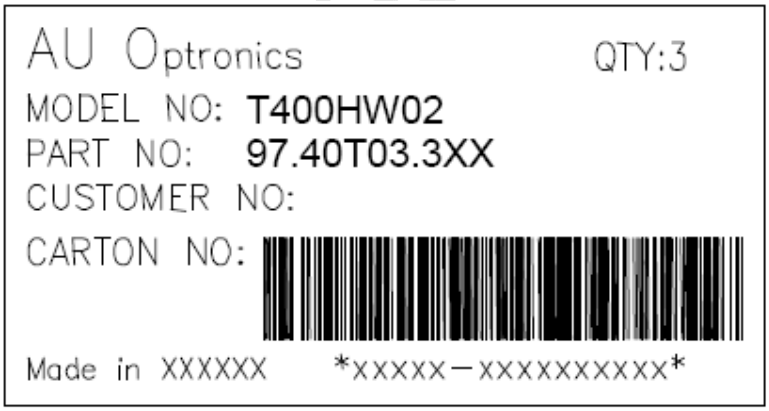

Green mark description

For Pb Free Product, AUO wil add for identification.

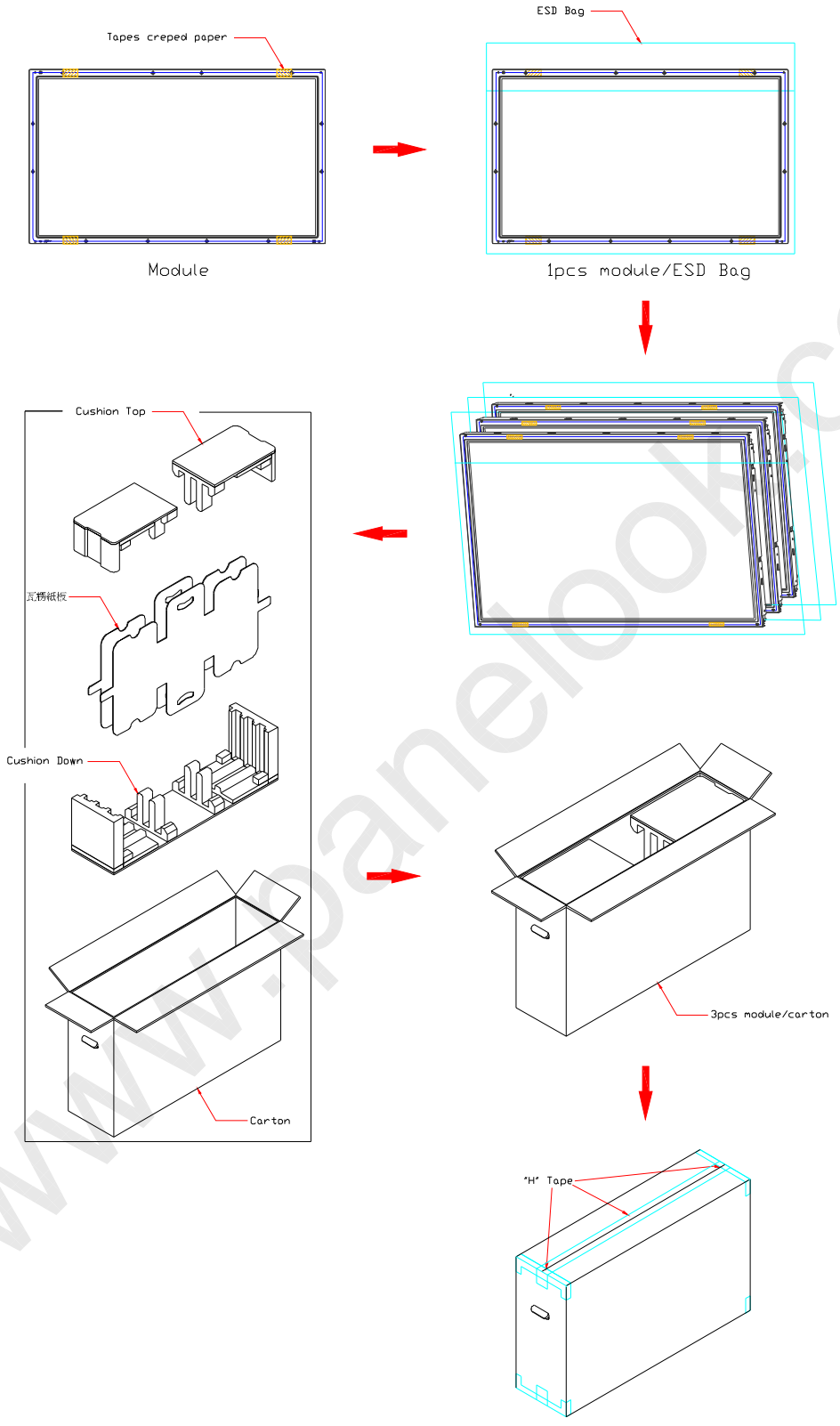
For RoHs compatible products, AUO will add for identification.

**Note:** The green Mark will be present only when the green documents have been ready by AUO internal green team. (The definition of green design follows the AUO green design checklist.)

### B. Carton Label:

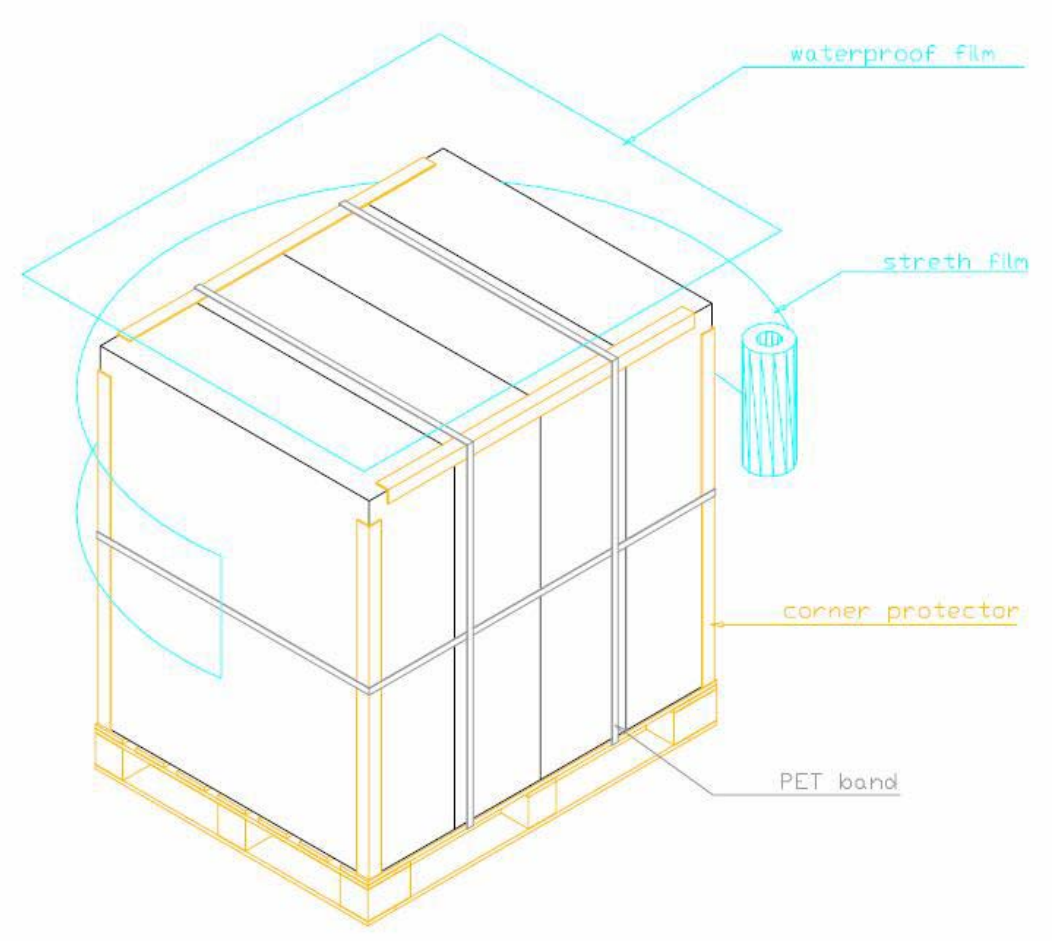


## 8-2 PACKING METHODS:



## 8-3 Pallet and Shipment Information

| | Item | Specification | | | Packing Remark |
|---|---|---|---|---|---|
| | | Qty. | Dimension | Weight (kg) | |
| 1 | Packing BOX | 3pcs/box | 1050(L)*280(W)*650(H) | 38 | |
| 2 | Pallet | 1 | 1140(L)*1060(W)*138(H) | 16 | |
| 3 | Boxes per Pallet | 8 boxes/pallet | | | |
| 4 | Panels per Pallet | 24pcs/pallet | | | |
| | Pallet after packing | 24 | 1140(L)*1060(W)*1438(H) | 320 | |



# 9. PRECAUTIONS

Please pay attention to the followings when you use this TFT LCD module.

## 9-1 MOUNTING PRECAUTIONS

(1) You must mount a module using holes arranged in four corners or four sides.
(2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
(3) Please attach the surface transparent protective plate to the surface in order to protect the polarizer. Transparent protective plate should have sufficient strength in order to the resist external force.
(4) You should adopt radiation structure to satisfy the temperature specification.
(5) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.
(6) Do not touch, push or rub the exposed polarizer with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment. Do not touch the surface of polarizer for bare hand or greasy cloth. (Some cosmetics are detrimental to the polarizer.)
(7) When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach front/ rear polarizer. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.
(8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
(9) Do not open the case because inside circuits do not have sufficient strength.

## 9-2 OPERATING PRECAUTIONS

(1) The device listed in the product specification sheets was designed and manufactured for TV application
(2) The spike noise causes the mis-operation of circuits. It should be lower than following voltage: V=±200mV(Over and under shoot voltage)
(3) Response time depends on the temperature. (In lower temperature, it becomes longer..)
(4) Brightness of CCFL depends on the temperature. (In lower temperature, it becomes lower.) And in lower temperature, response time (required time that brightness is stable after turned on) becomes longer.
(5) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
(6) When fixed patterns are displayed for a long time, remnant image is likely to occur.
(7) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interface.

## 9-3 ELECTROSTATIC DISCHARGE CONTROL

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wristband etc. And don't touch interface pin directly.

## 9-4 PRECAUTIONS FOR STRONG LIGHT EXPOSURE

Strong light exposure causes degradation of polarizer and color filter.

## 9-5 STORAGE

When storing modules as spares for a long time, the following precautions are necessary.

(1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5℃ and 35℃ at normal humidity.

(2) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

## 9-6 HANDLING PRECAUTIONS FOR PROTECTION FILM

(1) The protection film is attached to the bezel with a small masking tape. When the protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.

(2) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of flue still on the Bezel after the protection film is peeled off.

(3) You can remove the glue easily. When the glue remains on the Bezel or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.