LITEMAX
Sunlight Readable LCD!

ENRICH YOUR VISUAL WORLD...

# LITEMAX
# SSD2925
## Spanpixel

## Sunlight Readable 29.3" LCD Display

(2nd Edition 2/18/2011 )

All information is subject to change without notice.

| Approved by | Checked by | Prepared by |
|---|---|---|
| | | |

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## RECORD OF REVISION

| Version | Date | Description | Remark |
|---|---|---|---|
| V11 | 7/5/2010 | Initial Release | |
| V12 | 2/15/2011 | Outline Dimension update | |
| | | | |
| | | | |

## CONTENTS

# 1.0 GENERAL DESCRIPTION

## 1.1 OVERVIEW

The SSD2925 is a 29.3 inch color TFT-LCD display with special aspect ratio 16:6 and XGA wide resolution 1366 x 512 (1366 horizontal by 512 vertical pixel array). It is Litemax's Spanpixel series product which designed for high brightness 1000 nits sunlight readable display, power efficiency LED backlight system and fanless display. The SSD2925 build in AD board supports input ports VGA and DVI-D, optional ports are component (YCbCr), composite (AV) and S-video input.

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. It is intended to support display where wide viewing angle, high color saturation, and high color depth.

## 1.2 FEATURES

- 29.3" Resizing LCD
- Ultra Wide Screen (16:6)
- 1000nits Sunlight Readable
- LED Backlight
- Low Power Consumption
- High Uniformity
- Wide Dimming
- Slim Bezel
- Life Expectancy (70,000/hrs)

## 1.3 APPLICATION

- Out/Indoor Display
- Out/Indoor Digital Signage
- Quick Service Restaurant Display Product
- Transportation

## 1.4 GENERAL SPECIFICATI0NS

| | |
|---|---|
| Model No. | SSD2925 |
| LCD Display | 29.3" Resizing LCD |
| Display Area (mm) | 697.68 (H) x 261.5 (V) |
| Display Surface | Non-glare hard coated |
| Luminance | 1000 cd/$m^2$ |
| Resolution | 1366 x 512(WXGA) |
| Contrast Ratio | 2500 : 1 (Typ) |
| Display Colors | 16.7M colors |
| Pixel Arrangement | RGB (Red, Green, Blue) vertical stripe |
| Pixel Pitch (mm) | 0.51075mm |
| Response Time | 6.5ms (Typ.) |
| Signal Connector | 15 Pin D-sub, 29 Pin DVI |
| F/R Control Button | Power Switch, Menu, Select (+,-) |
| OSD Menu | Brightness, Contrast, H/V Position, Color, Phase, Clock, Language, Management |
| Power Consumption | 70W |
| Option | Touch for customize (Resistive/ Capacitive) |

※ Specifications subject to change without notice.

## 2.0 ELECTRICAL CHARACTERISTICS

### 2.1 ELECTRICAL CHARACTERISTICS

**Control circuit driving**

| Parameter | | Symbol | Values | | | Unit | Notes |
|---|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | | |
| +12V supply voltage | Supply Voltage | Vcc | 11.4 | 12 | 12.6 | Vdc | 1 |
| | Current dissipation | Icc | - | 300 | 600 | mA | 2 |
| | | $I_{RUSH}$ | - | 1500 | 2700 | mA | 5 |
| | | $T_{RUSH}$ | - | 0.5 | - | ms | 5 |
| Permissible input ripple voltage | | $V_{RP}$ | - | - | 100 | mVP-P | Vcc = +12.0V |
| Differential input threshold voltage | High | $V_{TH}$ | - | - | 100 | mV | VCM = +1.2V [Note 4] |
| | Low | $V_{TL}$ | -100 | - | - | mV | |
| Input Low voltage | | $V_{IL}$ | 0 | - | 0.7 | V | [Note 3] |
| Input High voltage | | $V_{IH}$ | 2.6 | - | 3.3 | V | |
| Input leak current (Low) | | $I_{IL}$ | - | - | 400 | μA | VI = 0V [Note 3] |
| Input leak current (High) | | $I_{IH}$ | - | - | 100 | μA | VI =3.3V [Note 3] |
| Terminal resistor | | $R_T$ | - | 100 | - | Ω | Differential input |
| Life Time | | | - | 70,000 | - | Hours | |

[Note] $V_{CM}$: Common mode voltage of LVDS driver.

[Note 1]

Input voltage sequences

$0 < t1 \le 20ms$

$0 < t2\text{-}1 \le 50ms$

$10ms \le t2\text{-}2$

$0 < t3 \le 1s$

$1s \le t4$

$200ms \le t5$

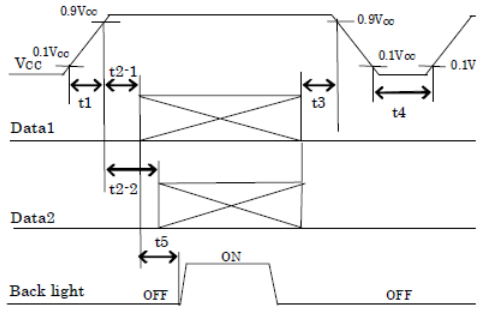
Dip conditions for supply voltage

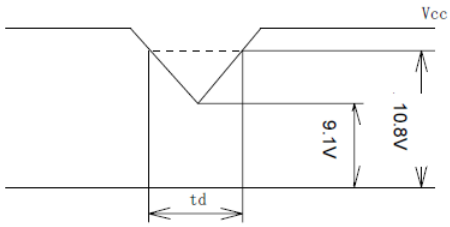
a) $9.1V \le V_{CC} < 10.8V$

$td \le 10ms$

b) $V_{CC} < 9.1V$

Dip conditions for supply voltage is based on input voltage sequence.




※ Data1: CLKIN±,RIN0±,RIN1±, RIN2±, RIN3±

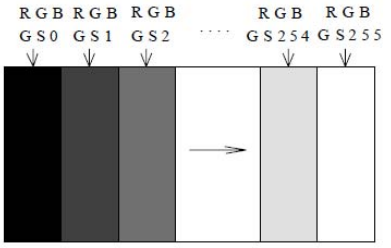
※ Data2: SELLVDS

※ About the relation between data input and back light lighting, please base on the above-mentioned input sequence.

When back light is switched on before panel operation or after a panel operation stop, it may not display normally. But this phenomenon is not based on change of an incoming signal, and does not give damage to a liquid crystal display.

[Note 2]Typical current situation: 256 gray-bar pattern ($V_{CC}$ = +12.0V)

The explanation of RGB gray scale is seen in section 8.

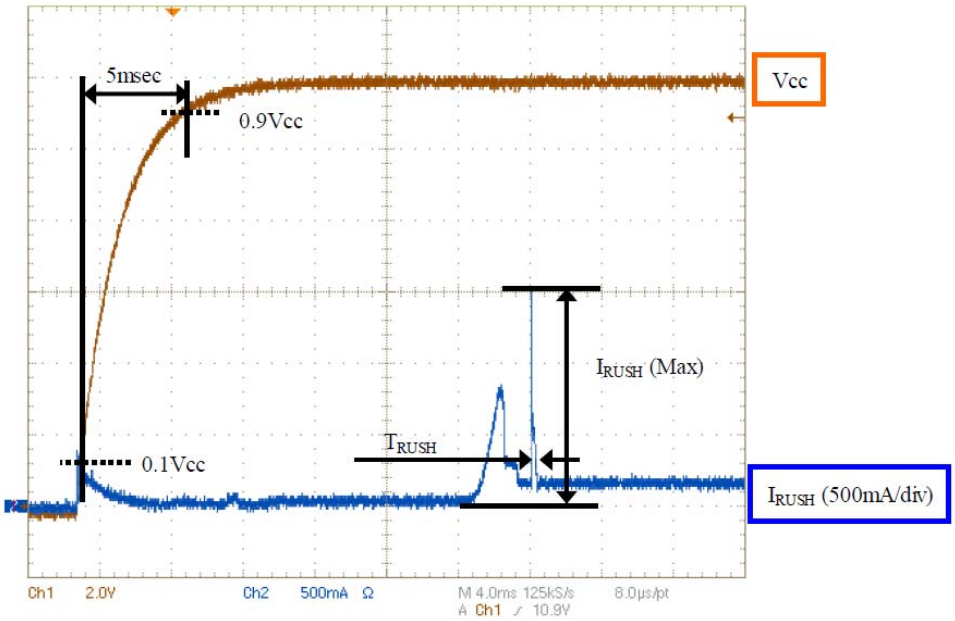



$V_{CC}$ = +12.0V
CK = 82.0MHz
Th = 20.68μs

[Note 3] SELLVDS

[Note 4] CLKIN+/CLKIN-, RIN0+/RIN0-, RIN1+/RIN1-, RIN2+/RIN2-, RIN3+/RIN3-

[Note 5] The Rush current corrugation at the time of power on




4ms/div

## 2.2 LCD PANEL SIGNAL PROCESSING BOARD

CN1 (Interface signals and +12V DC power supply) (Shown in Fig.1)

Using connector：FI-X30SSL-HF (Japan Aviation Electronics Ind., Ltd.)

Matching connector：FI-X30H/FI-X30HL, FI-X30C/FI-X30C2L

or FI-X30M (Japan Aviation Electronics Ind., Ltd.)

Matching LVDS transmitter: THC63LVDM83R (THine) or equivalent device

| Pin No. | Symbol | Function | Remark |
|---|---|---|---|
| 1 | VCC | +12V Power Supply | |
| 2 | VCC | +12V Power Supply | |
| 3 | VCC | +12V Power Supply | |
| 4 | VCC | +12V Power Supply | |
| 5 | GND | Ground | |
| 6 | GND | Ground | |
| 7 | GND | Ground | |
| 8 | GND | Ground | |
| 9 | SELLVDS | Select LVDS data order [Note 1] | Default: Pull up (H:3.3V) [Note 2] |
| 10 | Reserved | Not Available | |
| 11 | GND | Ground | |
| 12 | RIN0- | Negative (-) LVDS differential data input | LVDS |
| 13 | RIN0+ | Positive (+) LVDS differential data input | LVDS |
| 14 | GND | Ground | |
| 15 | RIN1- | Negative (-) LVDS differential data input | LVDS |
| 16 | RIN1+ | Positive (+) LVDS differential data input | LVDS |
| 17 | GND | Ground | |
| 18 | RIN2- | Negative (-) LVDS differential data input | LVDS |
| 19 | RIN2+ | Positive (+) LVDS differential data input | LVDS |
| 20 | GND | Ground | |
| 21 | CLKIN- | Clock Signal(-) | LVDS |
| 22 | CLKIN+ | Clock Signal(+) | LVDS |
| 23 | GND | Ground | |
| 24 | RIN3- | Negative (-) LVDS differential data input | LVDS |
| 25 | RIN3+ | Positive (+) LVDS differential data input | LVDS |
| 26 | GND | Ground | |
| 27 | Reserved | Not Available | |
| 28 | Reserved | Not Available | |
| 29 | GND | Ground | |
| 30 | GND | Ground | |

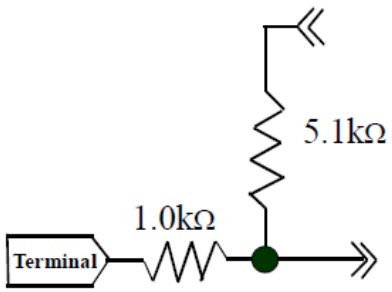
[Note1] SELLVDS

| Transmitter | | SELLVDS | |
|---|---|---|---|
| Pin No | Data | = L(GND) | = H(3.3V) or Open |
| 51 | TA0 | R0(LSB) | R2 |
| 52 | TA1 | R1 | R3 |
| 54 | TA2 | R2 | R4 |
| 55 | TA3 | R3 | R5 |
| 56 | TA4 | R4 | R6 |
| 3 | TA5 | R5 | R7(MSB) |
| 4 | TA6 | G0(LSB) | G2 |
| 6 | TB0 | G1 | G3 |
| 7 | TB1 | G2 | G4 |
| 11 | TB2 | G3 | G5 |
| 12 | TB3 | G4 | G6 |
| 14 | TB4 | G5 | G7(MSB) |
| 15 | TB5 | B0(LSB) | B2 |
| 19 | TB6 | B1 | B3 |
| 20 | TC0 | B2 | B4 |
| 22 | TC1 | B3 | B5 |
| 23 | TC2 | B4 | B6 |
| 24 | TC3 | B5 | B7(MSB) |
| 27 | TC4 | NA | NA |
| 28 | TC5 | NA | NA |
| 30 | TC6 | DE(*) | DE(*) |
| 50 | TD0 | R6 | R0(LSB) |
| 2 | TD1 | R7(MSB) | R1 |
| 8 | TD2 | G6 | G0(LSB) |
| 10 | TD3 | G7(MSB) | G1 |
| 16 | TD4 | B6 | B0(LSB) |
| 18 | TD5 | B7(MSB) | B1 |
| 25 | TD6 | NA | NA |

NA: Not Available

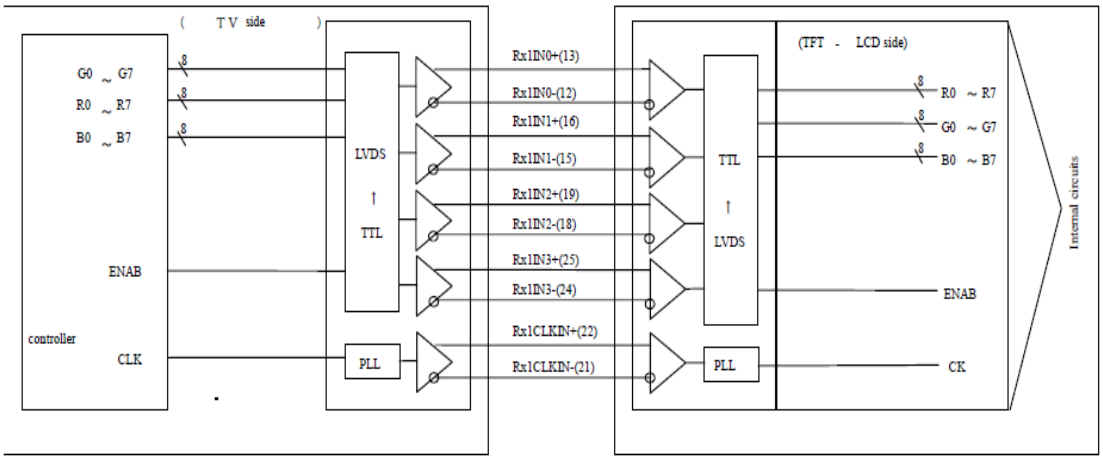
(*) Since the display position is prescribed by the rise of DE (Display Enable) signal, please do not fix DE signal during operation at "High."

[Note 2] The equivalent circuit figure of the terminal

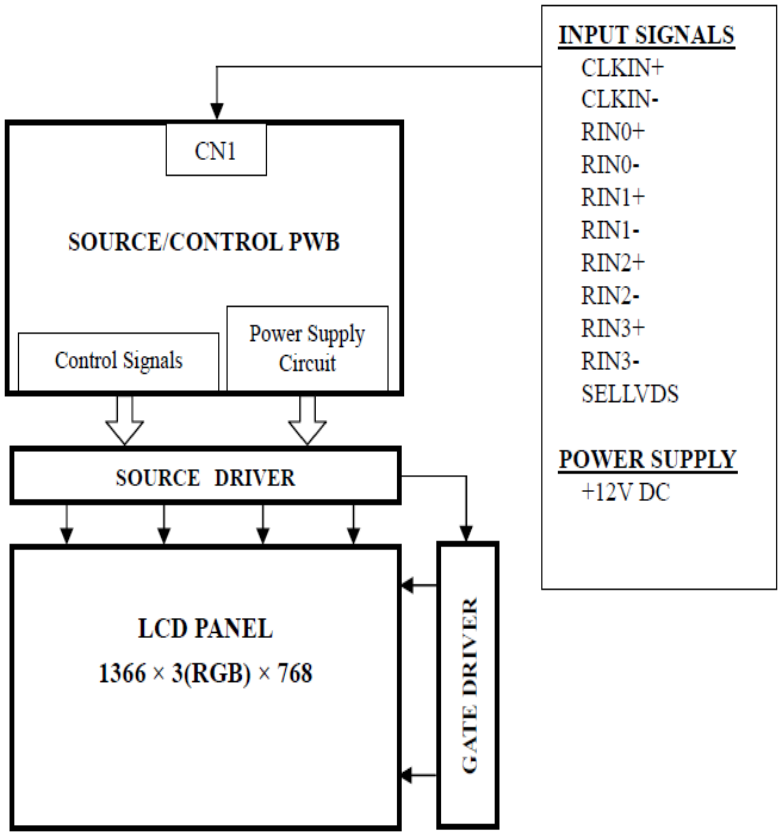


• Interface block diagram

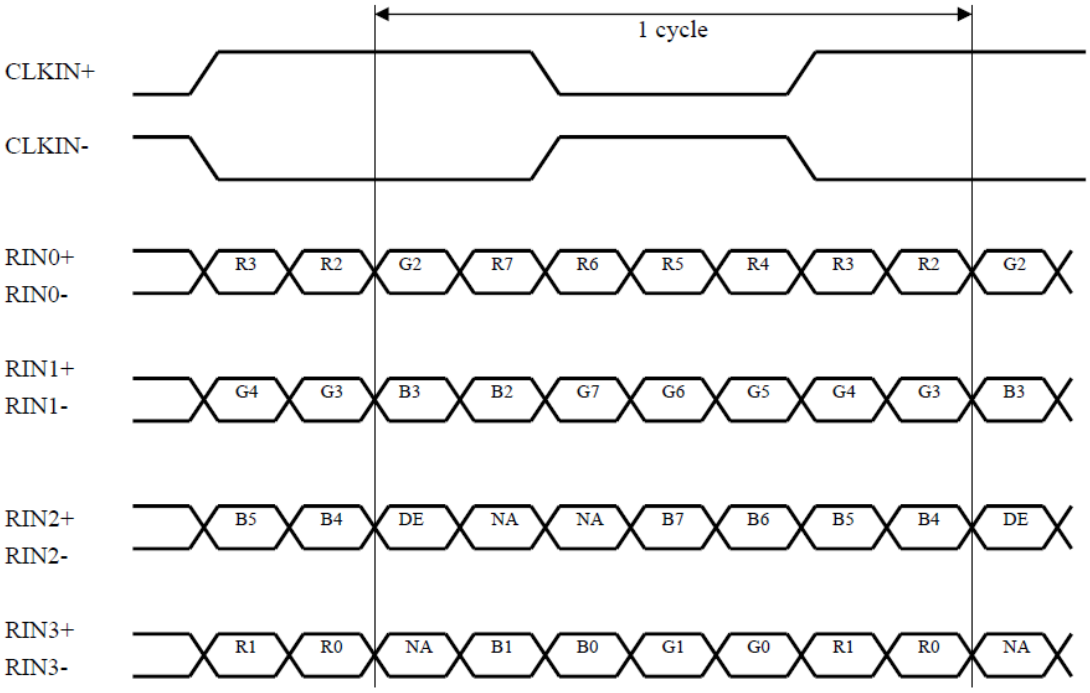
Corresponding Transmitter: THC63LVDM83R (THine) or equivalent device



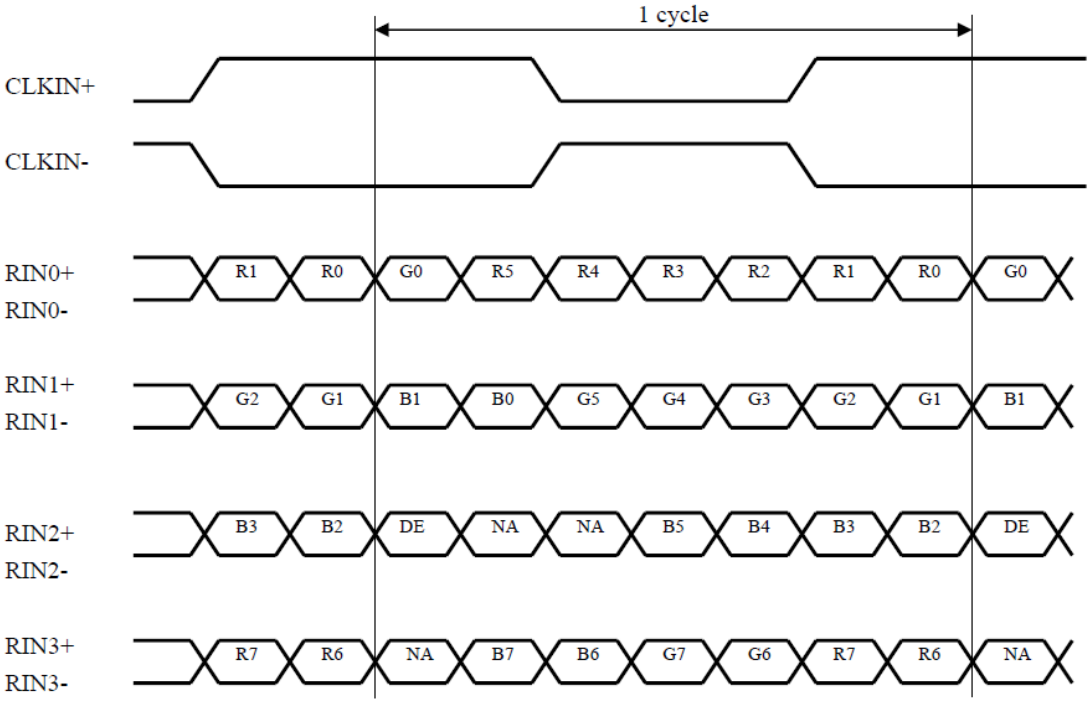

• Block Diagram (LCD Cell)



**SELLVDS= High (3.3V) or Open**




**SELLVDS= Low (GND)**




DE: Display Enable

NA: Not Available (Fixed Low)

## 2.3 Absolute Maximum Ratings

### Absolute Maximum ratings

| Parameter | Symbol | Condition | Ratings | Unit | Remark |
|---|---|---|---|---|---|
| Input voltage (for Control) | $V_I$ | Ta=25°C | -0.3 ~ 3.6 | V | [Note 1] |
| +12V supply voltage (for Control) | $V_{CC}$ | Ta=25°C | 0 ~ +15 | V | |
| Storage temperature | Tstg | - | -25 ~ +60 | °C | [Note 2] |
| Operation temperature (Ambient) | Topa | - | 0 ~ +50 | °C | |

[Note 1] SELLVDS

[Note 2] Humidity 95%RH Max. (Ta ≤ 40°C)

Maximum wet-bulb temperature at 39°C or less. (Ta > 40°C), No condensation.

### Absolute Maximum ratings of environment

- Storage condition: With shipping package
- Storage temperature: 25.5 ±5°C
- Storage humidity: 50±10%RH
- Shelf life: a month

## 2.4 SIGNAL TIMING SPECIFICATIONS

Timing diagrams of input signal

| Parameter | | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Clock | Frequency | 1/Tc | 72 | 82 | 85 | MHz |
| Data enable signal | Horizontal period | TH | 1540 | 1696 | 1940 | clock |
| | | | 19.84 | 20.68 | - | µs |
| | Horizontal period (High) | THd | 1366 | 1366 | 1366 | clock |
| | Vertical period | TV | 778 | 806 | 972 | line |
| | Vertical period (High) | TVd | 768 | 768 | 768 | line |

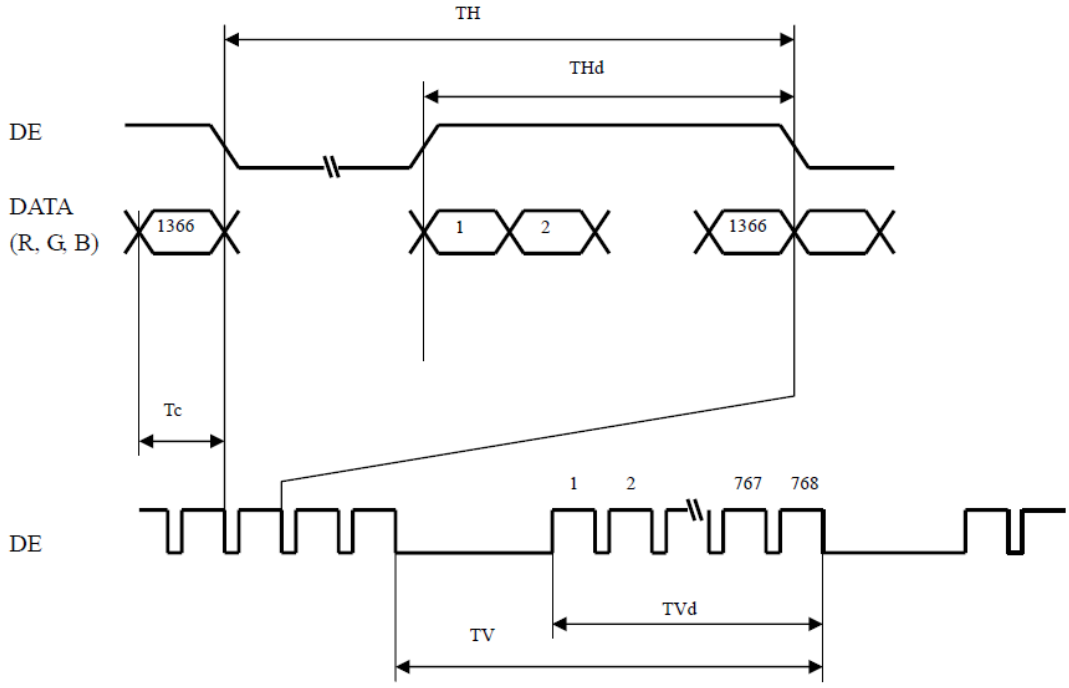
[Note] When vertical period is very long, flicker may occur.

Please turn off the module after it shows the black screen.

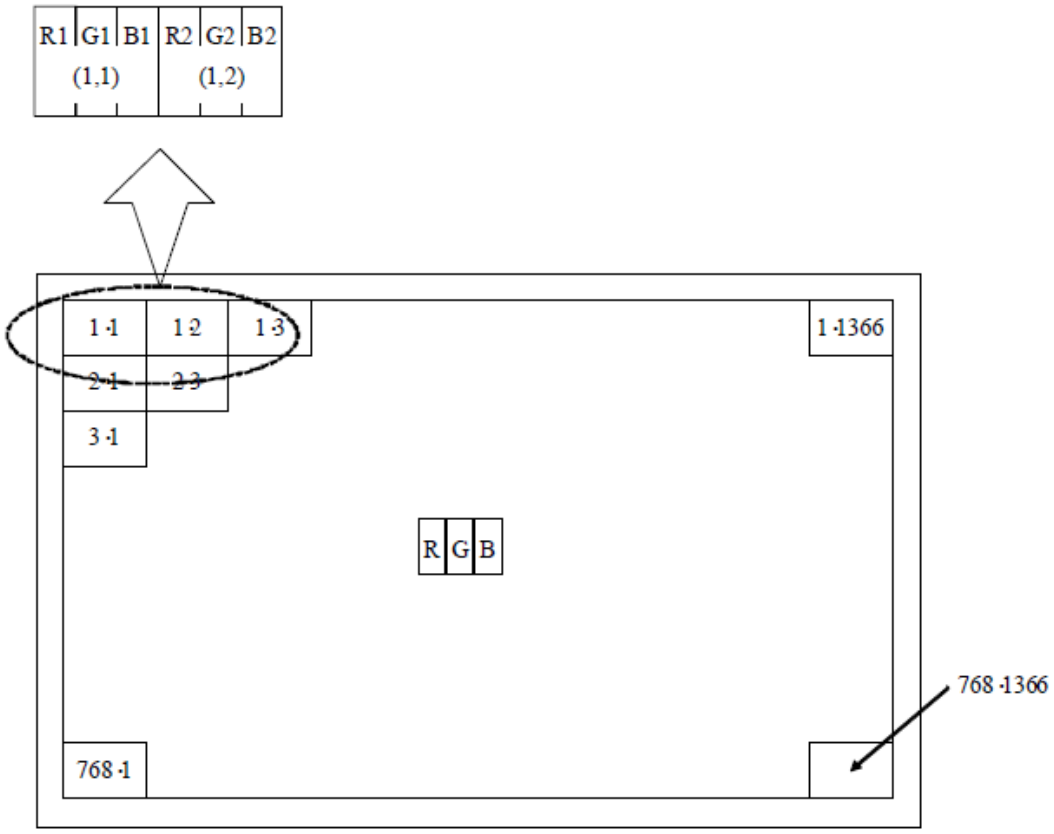
Please make sure that length of vertical period should become of an integral multiple of horizontal length of period. Otherwise, the screen may not display properly.

As for your final setting of driving timing, we will conduct operation check test at our side, please inform your final setting.

## 2.5 SIGNAL TIMING WAVEFORMS



## 2.6 COLOR INPUT DATA REFERENCE




Display Position of Data (V,H)

**Input Signal, Basic Display Colors and Gray Scale of Each Color**

| | Colors & Gray scale | Gray Scale | Data signal | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R0 | R1 | R2 | R3 | R4 | R5 | R6 | R7 | G0 | G1 | G2 | G3 | G4 | G5 | G6 | G7 | B0 | B1 | B2 | B3 | B4 | B5 | B6 | B7 |
| 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 |
| | Blue | – | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Green | – | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 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 |
| | Red | – | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 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 |
| Gray Scale of Red | Black | GS0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ⇑ | GS1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Darker | GS2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ⇑ | ↓ | | | | | ↓ | | | | | | | | ↓ | | | | | | | | ↓ | | | |
| | ⇓ | ↓ | | | | | ↓ | | | | | | | | ↓ | | | | | | | | ↓ | | | |
| | Brighter | GS253 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ⇓ | GS254 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red | GS255 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gray Scale of Green | Black | GS0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ⇑ | GS1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Darker | GS2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ⇑ | ↓ | | | | | ↓ | | | | | | | | ↓ | | | | | | | | ↓ | | | |
| | ⇓ | ↓ | | | | | ↓ | | | | | | | | ↓ | | | | | | | | ↓ | | | |
| | Brighter | GS253 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ⇓ | GS254 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green | GS255 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gray Scale of Blue | Black | GS0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ⇑ | GS1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Darker | GS2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ⇑ | ↓ | | | | | ↓ | | | | | | | | ↓ | | | | | | | | ↓ | | | |
| | ⇓ | ↓ | | | | | ↓ | | | | | | | | ↓ | | | | | | | | ↓ | | | |
| | Brighter | GS253 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| | ⇓ | GS254 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Blue | GS255 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

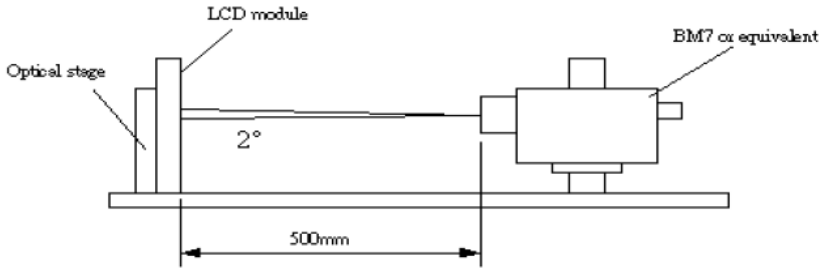
0: Low level voltage, 1: High level voltage.

Each basic color can be displayed in 256 gray scales from 8 bit data signals. According to the combination of total 24 bit data signals, the 16,777,216 colors display can be achieved on the screen.

## 3.0 OPTICAL CHARACTERISTICS

### 3.1 TEST CONDITIONS

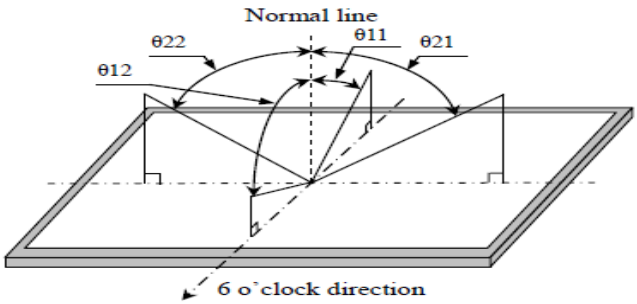
Optical characteristics are determined after the unit has been 'ON' and stable for approximately 45 minutes in a dark environment at 25 . The values specified are at an approximate distance 50cm ℃ from the LCD surface at a viewing angle of Φ and θequal to 0°.




### 3.2 OPTICAL SPECIFICATIONS

| Item | | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|---|
| Contrast Ratio | | CRn | 2000 | 2500 | - | - | [2,4] |
| Luminance of White | | $L_{AVE}$ | - | 1000 | - | $cd/m^2$ | [4] |
| Response Time | | $\tau_{DRV}$ | - | 6.5 | - | ms | [3,4,5] |
| Chromaticity | Red | Rx | Typ.-0.03 | 0.642 | Typ.+0.03 | - | [4] |
| | | Ry | | 0.344 | | - | |
| | Green | Gx | | 0.280 | | - | |
| | | Gy | | 0.606 | | - | |
| | Blue | Bx | | 0.143 | | - | |
| | | By | | 0.075 | | - | |
| | White | Wx | | 0.285 | | - | |
| | | Wy | | 0.293 | | - | |
| Viewing Angle | x axis, right(φ=0°) | $\theta_r$ | 70 | 88 | - | Degree | [4] |
| | x axis, left(φ=180°) | $\theta_l$ | 70 | 88 | - | | |
| | y axis, up(φ=90°) | $\theta_u$ | 70 | 88 | - | | |
| | y axis, down (φ=0°) | $\theta_d$ | 70 | 88 | - | | |

[Note 1] Definitions of viewing angle range:




[Note 2] Definition of contrast ratio:

The contrast ratio is defined as the following.

$$\text{Contrast Ratio} = \frac{\text{Luminance (brightness) with all pixels white}}{\text{Luminance (brightness) with all pixels black}}$$

[Note 3] Definition of response time

The response time ($\tau_{DRV}$) is defined as the following figure and shall be measured by switching the input signal for "any level of gray (0%, 25%, 50%, 75% and 100%)" and "any level of gray (0%, 25%, 50%, 75% and 100%)".

| | 0% | 25% | 50% | 75% | 100% |
|---|---|---|---|---|---|
| 0% | | tr: 0%-25% | tr: 0%-50% | tr: 0%-75% | tr: 0%-100% |
| 25% | td: 25%-0% | | tr: 25%-50% | tr: 25%-75% | tr: 25%-100% |
| 50% | td: 50%-0% | td: 50%-25% | | tr: 50%-75% | tr: 50%-100% |
| 75% | td: 75%-0% | td: 75%-25% | td: 75%-50% | | tr: 75%-100% |
| 100% | td: 100%-0% | td: 100%-25% | td: 100%-50% | td: 100%-75% | |

t*: x-y...response time from level of gray(x) to level of gray(y)

$\tau_{DRV} = \Sigma (t^*: x\text{-}y)/20$

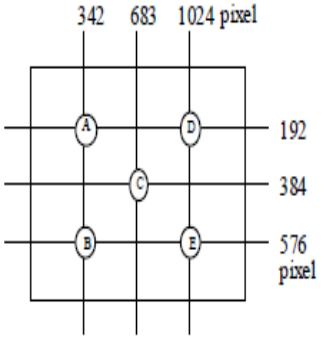
[Note 4] This shall be measured at center of the screen.

[Note 5] This value is valid when O/S driving is used at typical input time value.

[Note 6] Definition of white uniformity;

White uniformity is defined as the following with five measurements. (A~E)

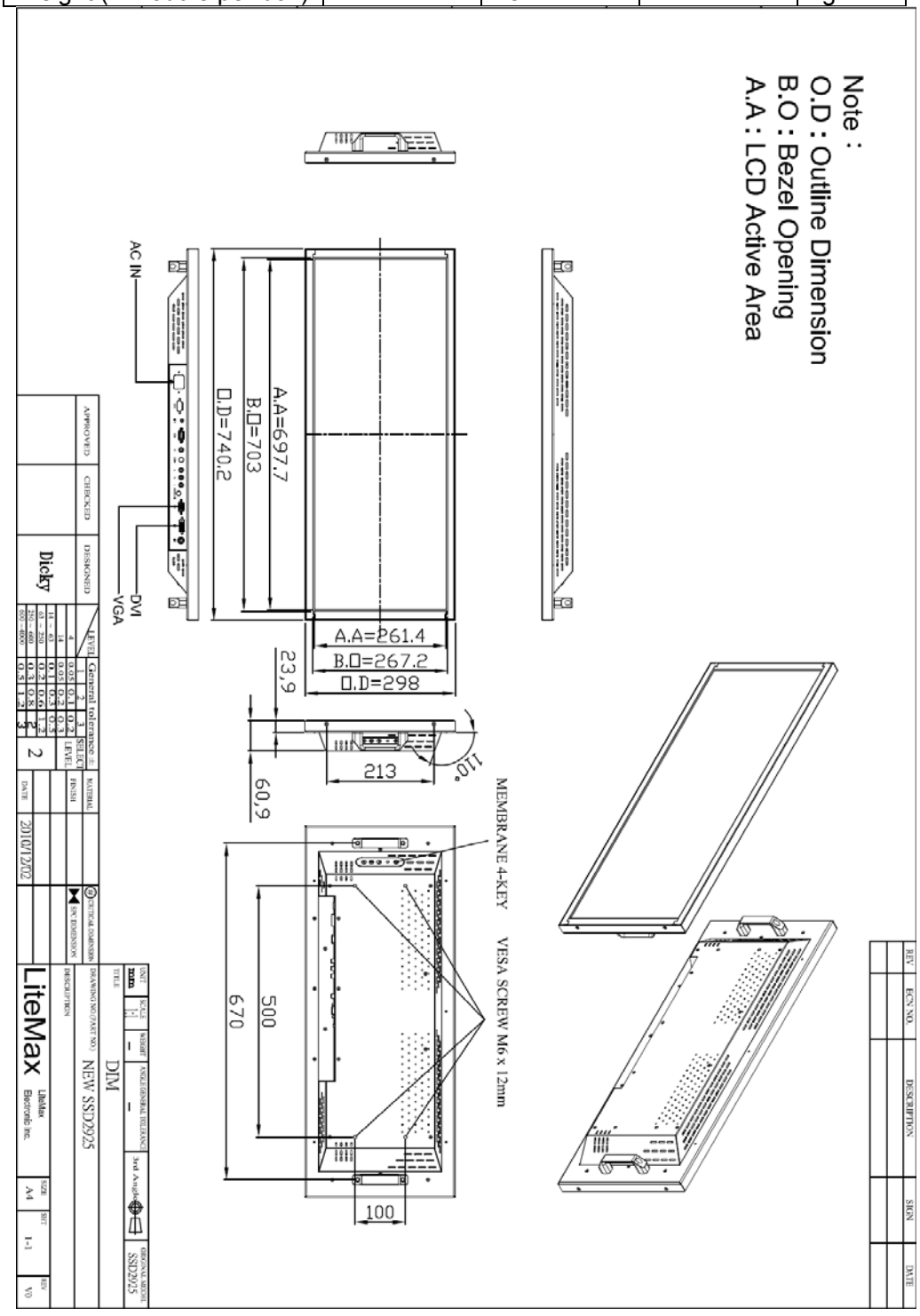
$$\delta W = \frac{\text{Maximum luminance of five points (brightness)}}{\text{Minimum luminance of five points (brightness)}}$$



## 4.0 MECHANICAL CHARACTERISTICS

### SSD2925 MECHANICAL SPECIFICATION

| Item | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Module Size | Horizontal(H) | - | 740.2 | - | mm |
| | Vertical(V) | - | 298 | - | mm |
| | Depth(D) | - | 60.9 | - | mm |
| Weight (Module only) | | - | 6.94 | - | kg |
| Weight (2 module per box) | | - | 18 | - | kg |



## 5.0 PRECAUTIONS

### 5.1 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.

### 5.2 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 ºC. For example, the response time will become slowly, and the starting voltage of lamp will be higher than the room temperature.

### 5.3 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.

## 6.0 AD Board & OSD Functions

### 6.1 AD BOARD GENERAL SPECIFICATIONS

- Max Resolution Up To Full HD 1920x1080
- Analog RGB Input
- ULTRA-RELIABLE DVI INPUT
- CBVS, S-VIDEO, Ycbcr INPUT (optional)
- 1.5Wx2 Audio Out
- Dual/single LVDS interface
- Support Panel DC5V or 3.3V, 12V Output
- Automatic External Fan Control
- OSD Control
- Inverter 0~5V Dimming Control
- *External V.R. brightness control (optional)
- *External light sensor brightness control (optional)
- *External RS232 control (optional)
- Input Power 12Vdc

### 6.2 SUPPORTED TIMING (*by your panel resolution)

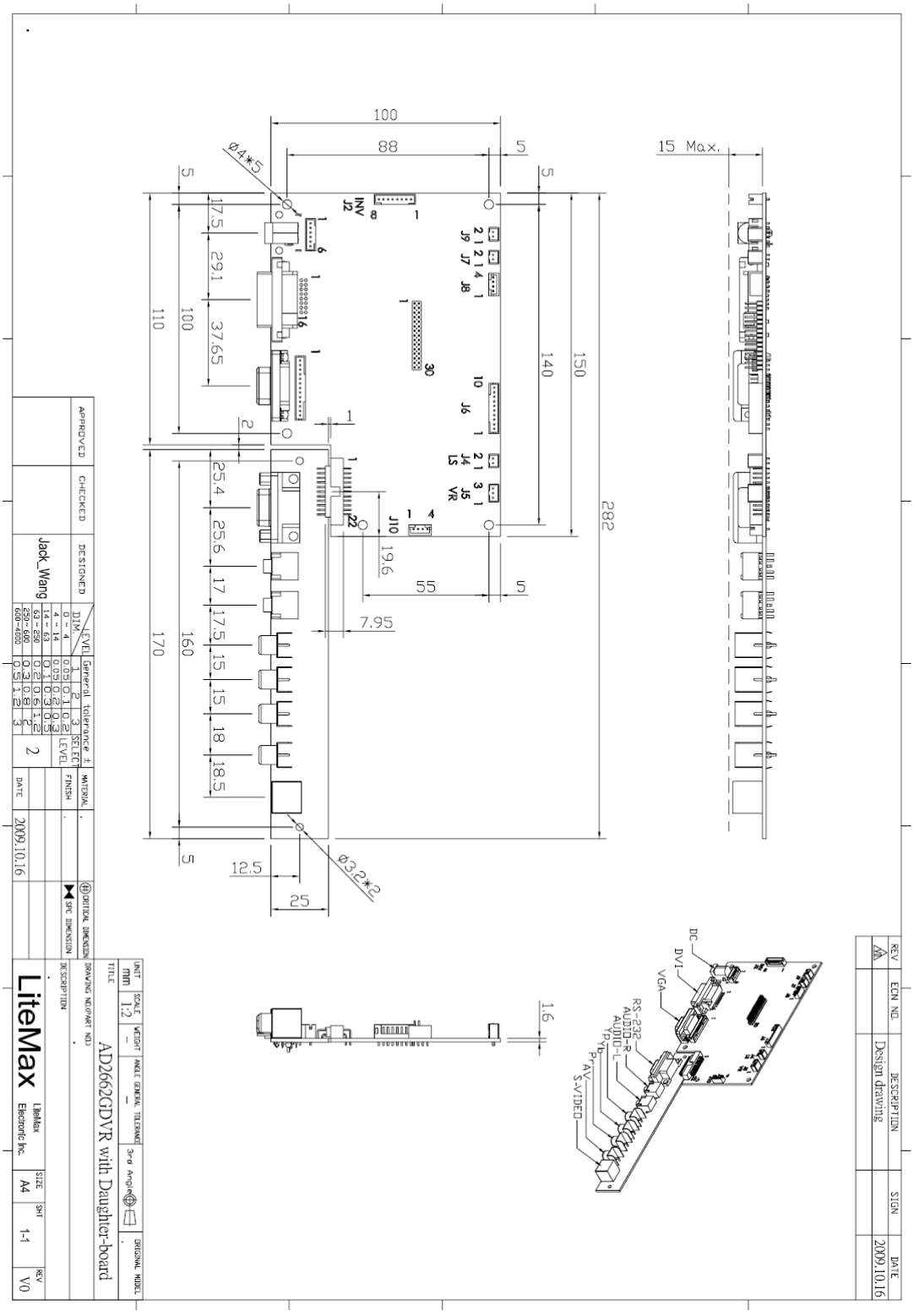
The following table displays optimum quality modes that the LCD monitor provides. If the other video modes are used, the monitor will stop working or display a poor quality picture.

| TIMMING | |
|---|---|
| MODE | RESOLUTION |
| VGA | 640x480@60Hz |
| | 640x480@72Hz |
| | 640x480@75Hz |
| SVGA | 800x600@56Hz |
| | 800x600@60Hz |
| | 800x600@72Hz |
| | 800x600@75Hz |
| XGA | 1024x768@60Hz |
| | 1024x768@70Hz |
| | 1024x768@75Hz |
| SXGA | 1280x1024@60Hz |
| | 1280x1024@70Hz |
| | 1280x1024@75Hz |
| WXGA | 1366x768@60Hz |

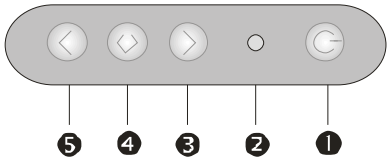
| | |
|---|---|
| WSXGA+ | 1680x1050@60Hz |
| SXGA+ | 1400x1050@60Hz(Pixel f 101.000MHz) |
| | 1400x1050@60Hz(Pixel f 121.750MHz) |
| | 1400x1050@75Hz |
| UXGA | 1600X1200@60Hz |
| | 1600x1200@65Hz |
| | 1600x1200@75Hz |
| FHD | 1920X1080@60Hz |
| | 1920X1080@65Hz |
| | 1920X1080@75Hz |

## 6.3 AD BOARD OUTLINE DIMENSION

**unit: mm**



### 6.4 MEMBRANE CONTROL BUTTOM




❶**POWER SWITCH:** Pushing the power switch will turn the monitor on. Pushing it again to turn the monitor off.

❷**Power LED:** Power ON-Green / Power off-No.

❸**Up Key >:** Increase item number or value of the selected item.

❹**Menu Key:** Enter to the OSD adjustment menu. It also used for go back to previous menu for sub-menu, and the change data don't save to memory.

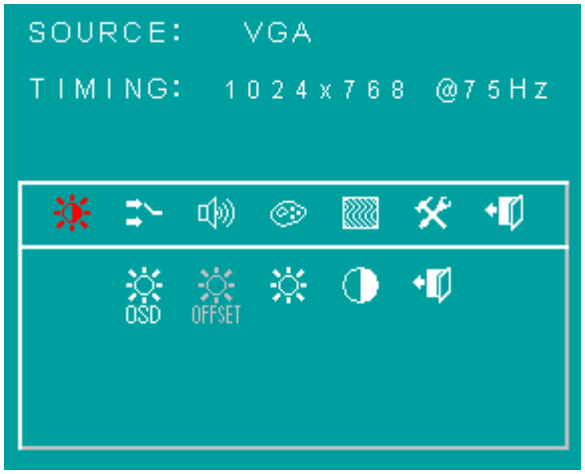
❺**Down Key <:** Decrease item number or item value when OSD is on.
When OSD is off, it is hot key for input switch between VGA, AV,
and S-video.

**Screen Adjustment Operation Procedure**

1. **Entering the screen adjustment**
   The setting switches are normally at stand-by. Push the **Menu Key** once to display the main menu of the screen adjustment. The adjustable items will be displayed in the main menu.
2. **Entering the settings**
   Use the **Down Key <** and **Up Key >** buttons to select the desired setting icon and push the SELECT button to enter sub-menu.
3. **Change the settings**
   After the sub-menu appears, use the **Down Key <** and **Up Key >** buttons to change the setting values.
4. **Save**
   After finishing the adjustment, push the SELECT button to memorize the setting.
5. **Return & Exit the main menu**
   Exit the screen adjustment; push the "MENU" button. When no operation is done around 30 sec (default OSD timeout), it goes back to the stand-by mode and no more switching is accepted except MENU to restart the setting.

### 6.5 OSD FUNCTIONS

Here are some instructions for you to use the OSD (On Screen Display). By pressing the “menu”, you will see the below picture.
Timing shows resolution, H-frequency,and V-frequency of the panel.Version shows the firmware control version. This 2 information is not changeable by user.




There are 7 sub pages inside the OSD manual, Brightness, Signal select, Sound, Color, Image, Tools, and Exit.

When you press “menu” button, you enter the “Brightness” sub page. You will see 5 selections:

press ’’menu’’

press ’’menu

press ’’menu’’

**OSD Brightness:**

press ’’right’’ key


press “menu” once, you can go into adjust the brightness. Press “left” you can dim down the brightness to “0”, while press “right” you can increase the brightness to “100”.

**Ambient light sensor:** press this Icon, must to accompany with Litemax ambient light sensor to auto dimming.(OPTION)

**Potentiometer:** press this icon, adjust VR function.(OPTION)

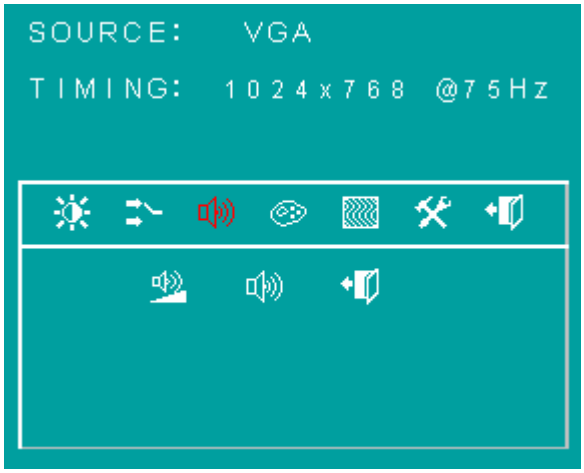
**Ambient light sensor with OSD offset**: press this Icon

Press ’menu’’ once, you can adjust min. luminance to fit your application (OPTION)


**Contrast:** Press “menu” and “right” you can adjust the contrast from “0” to “100” by pressing the “left” and “right”.

**Exit:** You can exit this sub menu back to normal screen.

**Sound :**




There are 3 options for “Sound” sub page.

**Audio Volume:** Audio volume adjustment.

**Mute:** You can mute the speaker by pressing this option.

**Exit:** back to the normal screen.


**Auto Color:** by press this “Auto Color” option, you can get the optimal color performance.

**SRGB:** Windows standard color setting.


**Color Tempture:** You can have 3 options in this selection.

**Color Tempture User**

**Color Tempture_6500K**

**Color Tempture_93OOK**

“user mode”, “6500K” (Warm color scheme), “9300K (Cold color scheme).
Def ault is “user”, and inside all “R”, “G”, and “B” are set “100”

**Exit:** back to the normal screen.

**Image :**
Go into the “Image” page, you can see below picture.


**Auto just:** Pressing this option, the AD5621 will adjust the optimal frequency of horizontal and vertical. You will see “Auto tune….” On the screen for around 3 seconds.

**Clock:** If you are not satisfied about the Autotune result, you can adjust manually by “Clock”.

The screen will be “wider” if you adjust this function.

**Phase:** If you see “double image” on characters, you can adjust “Phase” to make it perfect image.

**HPos:** You can shift the screen horizontally by this function.

**Vpos:** You can shift the screen vertically by this function.

**Exit:** Back to normal screen.

**TOOLS :**

On the “Tools” sub menu, you will see 5 icons.


**Osd Control:** Select this option, you will see 4 more options:


**Osd_time:** You can selection the time of OSD from 2 sec. to 16 sec.

**Osd_HPos:** You can move the OSD horizontally over the screen.

**Osd_VPos:** You can move the OSD Vertically over the screen.

**Exit:** back to main menu.

**Factory_Reset:** By pressing this, the screen will be back to the factory setting on very beginning and lost all the personal settings.

**Sharpness:** You can make the characters looks sharper.

**LCD SIZE:** Select this option, you can control LCD size 3 type,1.Bottom mode , 2.Top mode,3.Compress mode.


**Exit**

**BURNIN MODE :**

Factory Burn-in mode: While your VGA cable is connected on the monitor, press “Menu” and Left and Right <” simultaneously, you will see “BURN IN MODE” on the center of the screen for 3 sec. Then unplug the VGA cable, the screen will show Red, Green, Blue, White, and Black in sequence automatically.

You can plug in the VGA signal cable, and re-plug the power connector to exit the burn-in mode.

**KEY LOCK MODE :**

OSD Lock Function: It is possible to lock all the OSD buttons to prevent unauthorized changes to occur by pressing “Menu” and “right >” buttons simultaneously. You will see the “lock” icon below on the center of the screen for 3 seconds. If any button is pushed after the lock function is initiated, the below icon will appear on the screen.'


To release the OSD lock, press “Menu” and “Right >”.  The below icon will appear on the center of the screen for 3 seconds.  Now all OSD keys are active again.