



# Product Specification

AU OPTRONICS CORPORATION

( ) Preliminary Specifications

( V ) Final Specifications

|                   |   |
|-------------------|---|
| <b>Module</b>     | <b>13.1” FHD 16:9 Color TFT-LCD with LED Backlight design</b> |
| <b>Model Name</b> | B131HW02 V0 (H/W:0A)  |
| <b>Note</b>       | <i>LED Backlight with driving circuit design</i>              |

|  |             |
|--|-------------|
| <b>Customer</b>  | <b>Date</b> |
| <br><br><br><br><br><br>   |             |
| <b>Checked &amp; Approved by</b>                                     | <b>Date</b> |
| <br><br><br><br><br><br>   |             |
| <p>Note: This Specification is subject to change without notice.</p> |             |

|   |                   |
|---|-------------------|
| <b>Approved by</b>  | <b>Date</b>       |
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# Product Specification

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## Record of Revision

| Version and Date | Page | Old description            | New Description                      | Remark  |
|------------------|------|----------------------------|--------------------------------------|---------|
| 0.1 2010/09/01   | All  | First Edition for Customer |                                      |         |
| 0.2 2010/10/18   | 26   | Old EDID setting           | New EDID setting                     | Revised |
| 1.0 2010/12/17   | All  | N/A                        | Final Spec                           |         |
| 1.1 2011/08/30   | 5    | Glass Thickness: 0.5mm     | Glass Thickness: 0.21mm*2=0.42mm     | Revised |
| 1.2 2011/11/04   | 12   |                            | Max Current capacity = 4.0A          |         |
| 1.2 2011/11/04   | 12   |                            | Max LED input reverse voltage = 5V   |         |
| 1.2 2011/11/04   | 12   |                            | Max LED input forward current = 30mA |         |
|                  |      |                            |                                      |         |
|                  |      |                            |                                      |         |
|                  |      |                            |                                      |         |
|                  |      |                            |                                      |         |
|                  |      |                            |                                      |         |

## 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.

## 2. General Description

B131HW02 V0 is a Color Active Matrix Liquid Crystal Display composed of a TFT LCD panel, a driver circuit, and LED backlight system. The screen format is intended to support the 16:9 HD, 1920(H) x1080(V) screen and 16.7M colors (RGB 24-bits data driver) with LED backlight driving circuit. All input signals are display port interface compatible.

B131HW02 V0 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]                 | 331.76   |       |       |       |
| Active Area  | [mm]                 | 289.152X162.648  |       |       |       |
| Pixels H x V   |                      | 1920x3(RGB) x 1080   |       |       |       |
| Pixel Pitch  | [mm]                 | 0.1506X0.1506  |       |       |       |
| Pixel Format   |                      | R.G.B. Vertical Stripe   |       |       |       |
| Display Mode   |                      | Normally White   |       |       |       |
| White Luminance (ILED=19mA)<br>(Note: ILED is LED current) | [cd/m <sup>2</sup> ] | 300 typ. (5 points average, gamma correction off)<br>210 min. (5 points average, gamma correction off) |       |       |       |
| Luminance Uniformity                                       |                      | 1.82 max. (9 points)   |       |       |       |
| Contrast Ratio   |                      | 500 typ  |       |       |       |
| Response Time  | [ms]                 | 16 typ/ 30 Max (gamma correction off)  |       |       |       |
| Nominal Input Voltage VDD                                  | [Volt]               | +2.5 typ.  |       |       |       |
| Power Consumption  | [Watt]               | 4.65 typ. (Include Logic and Blu power)  |       |       |       |
| Weight   | [Grams]              | 158 typ.   |       |       |       |
| Physical Size<br>Include bracket & PCBA                    | [mm]                 |  | Min.  | Typ.  | Max.  |
|  |                      | Length   | 298.6 | 299.1 | 299.6 |
|  |                      | Width  | 183.8 | 184.3 | 184.8 |
|  |                      | Thickness  |       | 2.35  | 2.99  |
| Electrical Interface                                       |                      | eDP 2Lane  |       |       |       |
| Glass Thickness  | [mm]                 | 0.21mm*2=0.42mm  |       |       |       |
| Surface Treatment  |                      | Anti-Glare, Hardness 4H,   |       |       |       |



# Product Specification

AU OPTRONICS CORPORATION

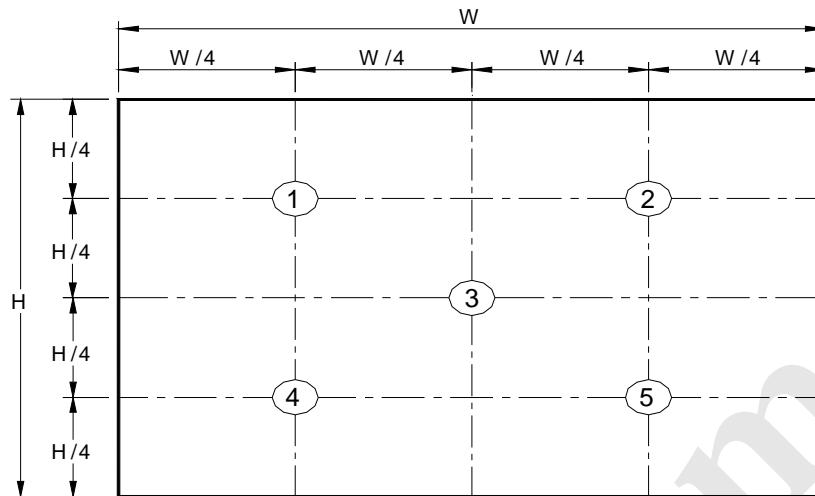
|   |              |                             |
|---|--------------|-----------------------------|
| Support Color   |              | 16.7M colors ( RGB 24-bit ) |
| Temperature Range<br>Operating<br>Storage (Non-Operating) | [°C]<br>[°C] | 0 to +50<br>-20 to +60      |
| RoHS Compliance   |              | RoHS Compliance             |

## 2.2 Optical Characteristics

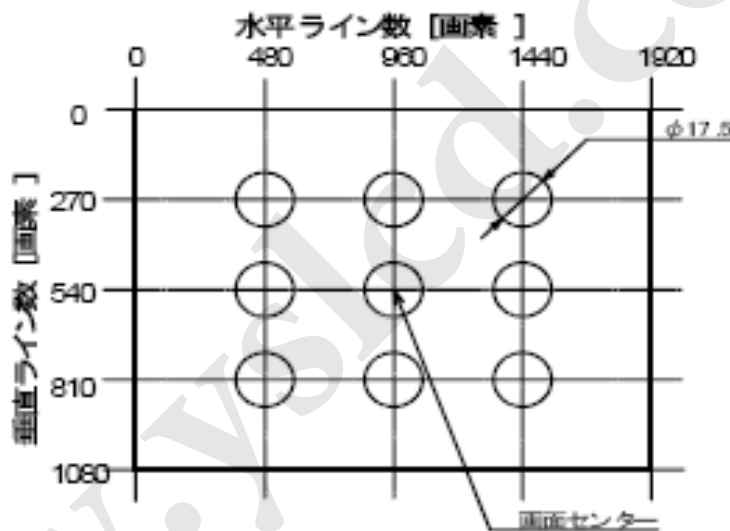
The optical characteristics are measured under stable conditions at 25°C (Room Temperature) :

| Item                                      | Symbol          | Conditions                           | Min.     | Typ.  | Max.  | Unit              | Note     |
|---|-----------------|--------------------------------------|----------|-------|-------|-------------------|----------|
| White Luminance<br>I <sub>LED</sub> =19mA |                 | 5 points average                     | 210      | 300   | -     | cd/m <sup>2</sup> | 1, 4, 5. |
| Viewing Angle                             | $\theta_R$      | Horizontal (Right)<br>CR = 10 (Left) | 40       | 55    | -     | degree            | 4, 9     |
|   | $\theta_L$      |                                      | 40       | 55    | -     |                   |          |
|   | $\phi_H$        | Vertical (Upper)<br>CR = 10 (Lower)  | 30       | 50    | -     |                   |          |
|   | $\phi_L$        |                                      | 40       | 55    | -     |                   |          |
| Luminance Uniformity                      | $\delta_{9P}$   | 9 Points                             | -        | -     | 1.82  |                   | 2, 3, 4  |
| Contrast Ratio                            | CR              |                                      | 300      | 500   | -     |                   | 4, 6     |
| Cross talk                                | %               |                                      |          |       | TBD   |                   | 4, 7     |
| Response Time                             | T <sub>r</sub>  | Rising                               | -        | 3     | 6     | msec              | 4, 8     |
|   | T <sub>f</sub>  | Falling                              | -        | 13    | 24    |                   |          |
|   | T <sub>RT</sub> | Rising + Falling                     | -        | 16    | 30    |                   |          |
| Color /<br>Chromaticity<br>Coordinates    | Red             | R <sub>x</sub>                       | CIE 1931 | 0.639 | 0.685 | 0.731             | 4        |
|   |                 | R <sub>y</sub>                       |          | 0.283 | 0.338 | 0.394             |          |
|   | Green           | G <sub>x</sub>                       |          | 0.184 | 0.230 | 0.276             |          |
|   |                 | G <sub>y</sub>                       |          | 0.642 | 0.697 | 0.753             |          |
|   | Blue            | B <sub>x</sub>                       |          | 0.109 | 0.155 | 0.201             |          |
|   |                 | B <sub>y</sub>                       |          | 0.020 | 0.076 | 0.131             |          |
|   | White           | W <sub>x</sub>                       |          | 0.268 | 0.311 | 0.353             |          |
|   |                 | W <sub>y</sub>                       |          | 0.278 | 0.332 | 0.387             |          |
|   | Adobe           | %                                    |          |       | -     | 96                |          |

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



**Note 2:** 9 points position (Ref: Active area)



**Note 3:** The luminance uniformity of 5 or 9 points is defined by dividing the maximum luminance values by the minimum test point luminance

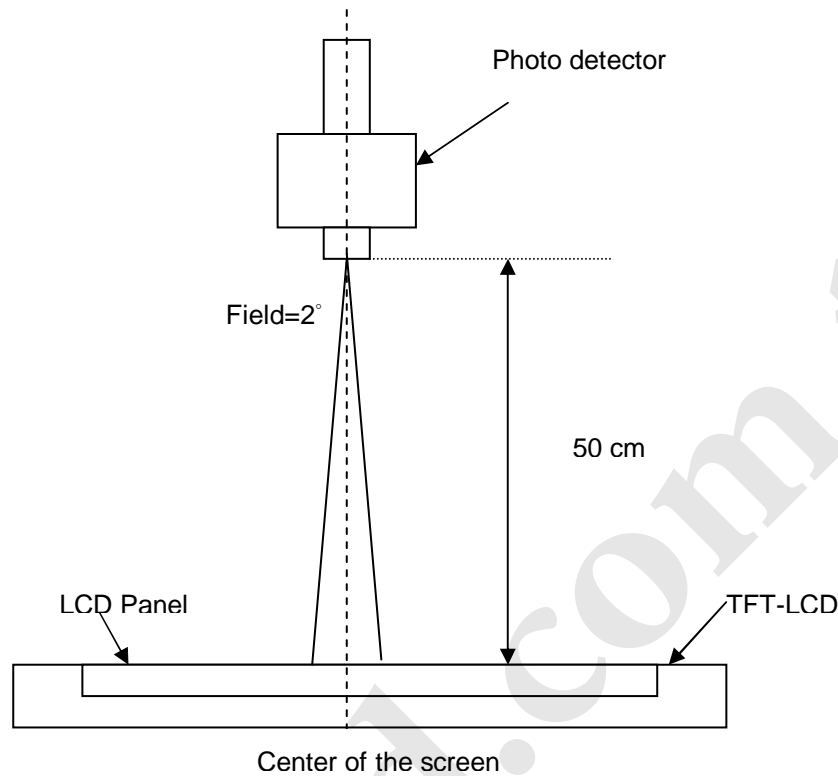
$$\delta_{w5} = \frac{\text{Maximum Brightness of five points}}{\text{Minimum Brightness of five points}}$$

$$\delta_{w9} = \frac{\text{Maximum Brightness of thirteen points}}{\text{Minimum Brightness of thirteen points}}$$

**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 60 minutes in a stable, windless and dark room, and it should be measured in the center

of screen.



**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)

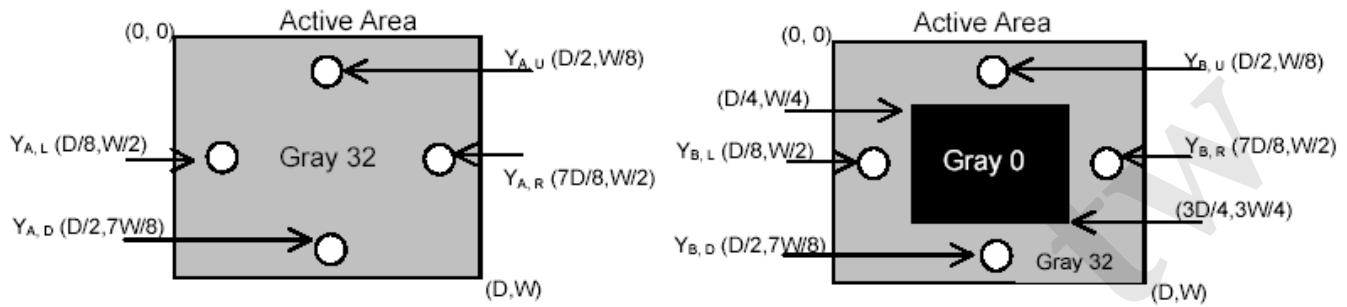
$$CT = |Y_B - Y_A| / Y_A \times 100 (\%)$$

Where

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

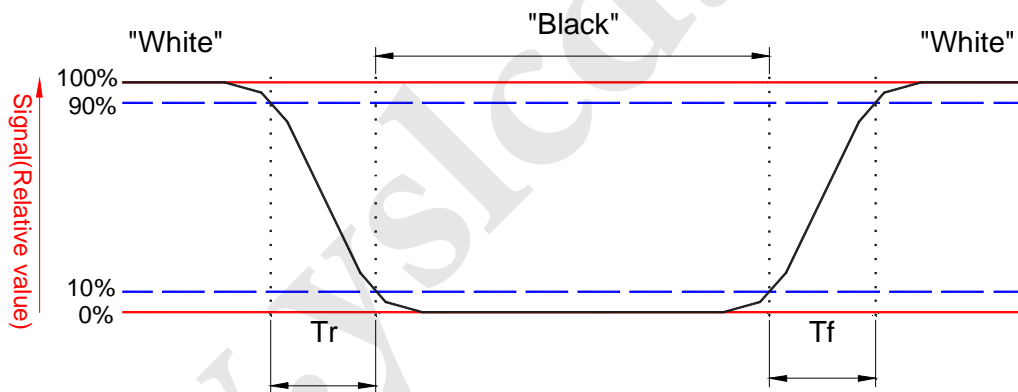
$Y_B$  = Luminance of measured location with gray level 0 pattern ( $cd/m^2$ )





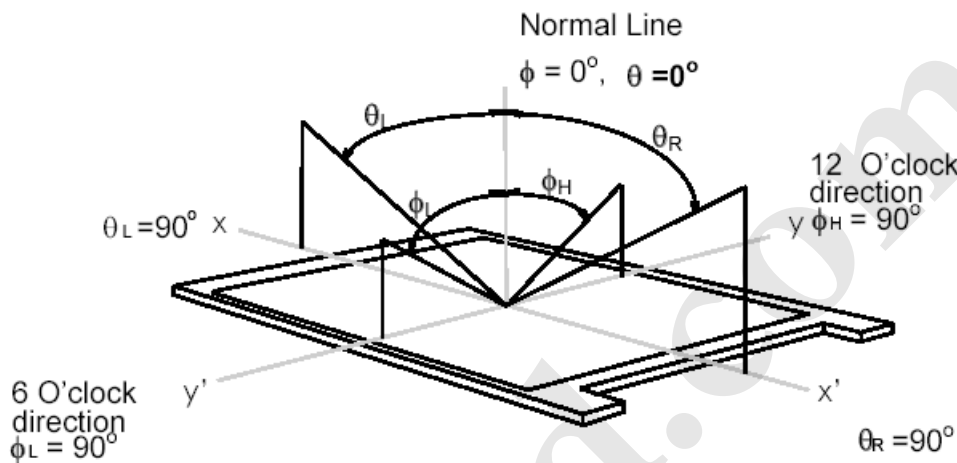
**Note 8:** Definition of response time:

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.



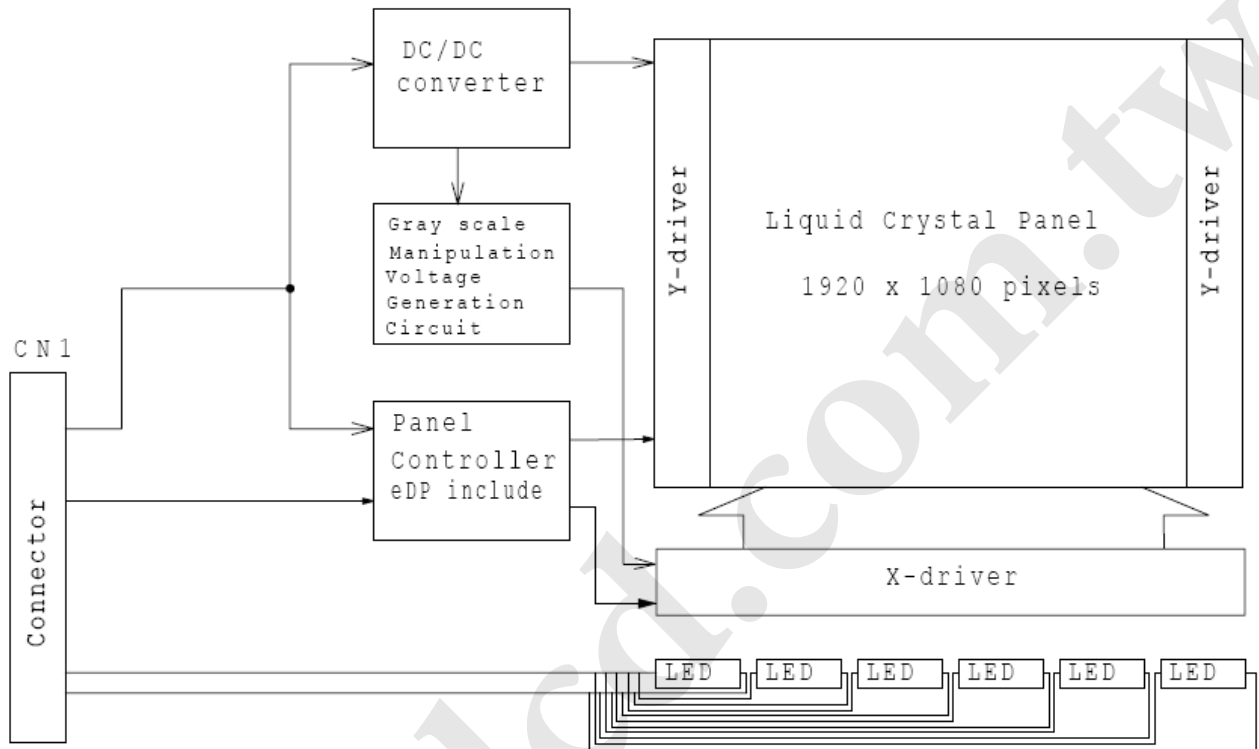
**Note 9.** Definition of viewing angle

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 13.1 inches wide Color TFT/LCD.



## 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 | +3.0 | [Volt] | Note 1,2   |
| Current capacity  | IDD              |      | 4.0  | [A]    |            |
| LED input reverse | V <sub>LED</sub> |      | 5    | [Volt] | Note 1     |
| LED input forward | I <sub>LED</sub> |      | 30   | [mA]   | Note 1     |

### 4.2 Absolute Ratings of Environment

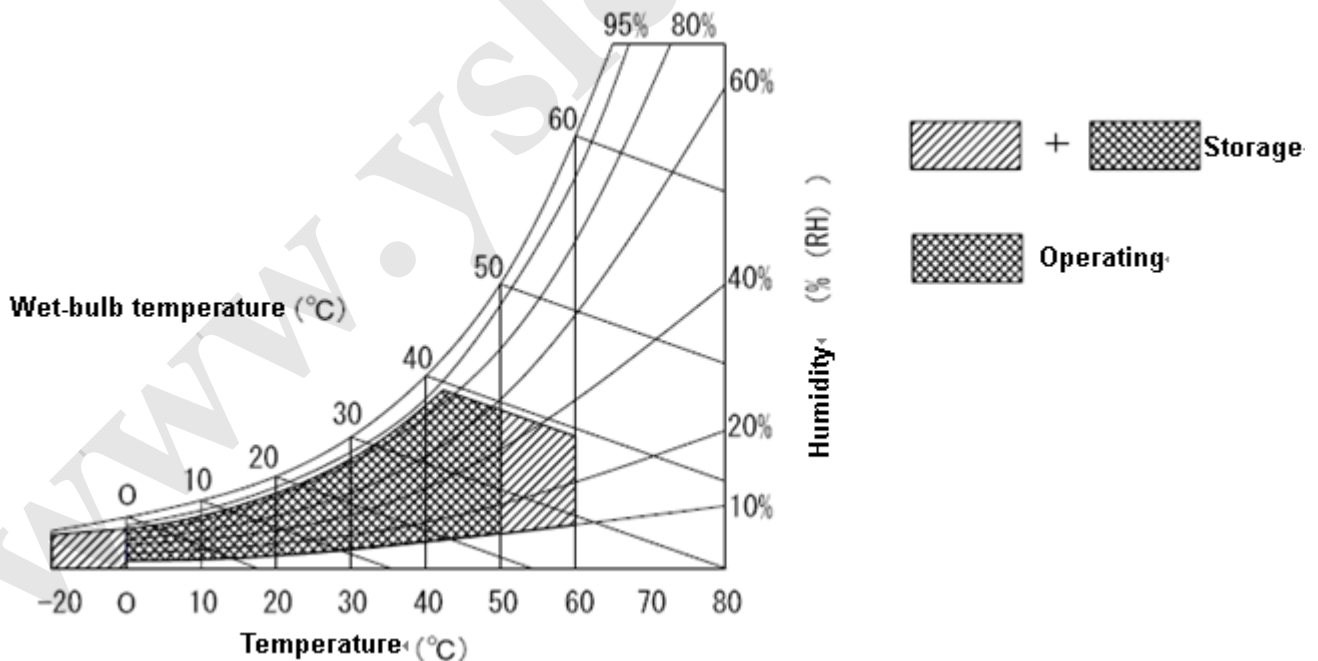
| Item                  | Symbol | Min | Max | Unit  | Conditions |
|-----------------------|--------|-----|-----|-------|------------|
| Operating Temperature | TOP    | 0   | +50 | [°C]  | Note 4     |
| Operation Humidity    | HOP    | 10  | 90  | [%RH] | Note 4     |
| Storage Temperature   | TST    | -20 | +60 | [°C]  | Note 4     |
| Storage Humidity      | HST    | 10  | 90  | [%RH] | Note 4     |

Note 1: At Ta (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 IIS (Incoming Inspection Standard).



## 5. Electrical Characteristics

### 5.1 TFT LCD Module

#### 5.1.1 Power Specification

Input power specifications are as follows;

The power specification are measured under 25°C and frame frequency under 60Hz

| Symble | Parameter               | Min  | Typ  | Max  | Units  | Note   |
|--------|-------------------------|------|------|------|--------|--------|
| VDD    | Logic/LCD Drive Voltage | 2.35 | 2.5  | 2.7  | [Volt] |        |
| PDD    | VDD Power               | -    | 1.13 | 1.38 | [Watt] | Note 1 |
| IDD    | IDD Current             | -    | 450  | 550  | [mA]   | Note 1 |

Note 1 : Display pattern

| Item | Color      |
|------|------------|
| 1.   | White      |
| 2    | Yellow     |
| 3    | Purple     |
| 4    | Red        |
| 5    | Light Blue |
| 6    | Green      |
| 7    | Blue       |
| 8    | Black      |

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

## 5.2 Backlight Unit

### 5.2.1 LED characteristics

Parameter guideline for LED driving is under stable conditions at 25°C (Room Temperature):

| Parameter                                   | Symbol | Min.   | Typ. | Max. | Unit   | Condition                     |
|---|--------|--------|------|------|--------|-------------------------------|
| LED Operation Current                       | IRLED  |        |      | 19   | [mA]   |                               |
| Light Bar Operation Voltage (for reference) | VLB    | -      | 31   | 34   | [Volt] | Note 1                        |
| BLU Power consumption (for reference)       | PLED   | -      | -    | 4.56 | [Watt] | (Ta=25°C), Note 2<br>Vin =12V |
| LED life Time (Typical)                     | N/A    | 10,000 | -    | -    | Hour   | (Ta=25°C), Note 3<br>IF=20 mA |

**Note 1 :** The value showed in the table is one light bar's operation voltage.

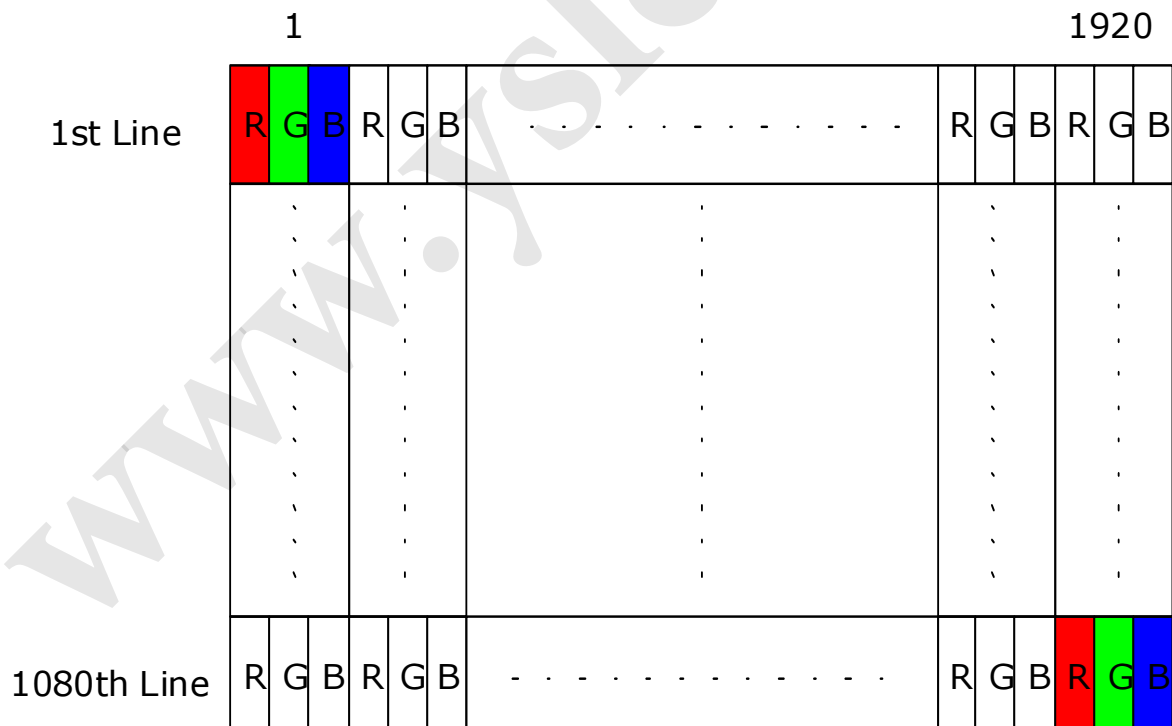
**Note 2:** Calculator value for reference PLED = Vf (Normal Distribution) \* If (Normal Distribution) / Efficiency

**Note 3 :** The LED life-time define as the estimated time to 50% degradation of initial luminous.

## 6. Signal Interface Characteristic

### 6.1 Pixel Format Image

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



## 6.2 Integration Interface Requirement

### 6.2.1 Connector Description

Physical interface is described as for the connector on module.

These connectors are capable of accommodating the following signals and will be following components.

| Connector Name / Designation | For Signal Connector |
|------------------------------|----------------------|
| Manufacturer                 | I-PEX                |
| Type / Part Number           | 20461-030E-12        |
| Mating Housing/Part Number   | 20459-130T-10        |

### 6.2.2 Pin Assignment

CN1 INPUT SIGNAL (20461-030E-12 / I-PEX )

[ Mating Connector :20459-130T-10 / I-PEX ]

| Terminal No. | Symbol | Function                  |
|--------------|--------|---------------------------|
| 1            | HPD    | HPD signal pin            |
| 2            | NC     | Non-Connection            |
| 3            | Lane1- | Comp Signal Link Lane1    |
| 4            | Lane1+ | True Signal Link Lane1    |
| 5            | Lane0- | Comp Signal Link Lane0    |
| 6            | Lane0+ | True Signal Link Lane0    |
| 7            | AUX-   | True Signal Auxiliary Ch. |
| 8            | AUX+   | Comp Signal Auxiliary Ch. |
| 9            | NC     | Non-Connection            |
| 10           | NC     | Non-Connection            |
| 11           | NC     | Non-Connection            |
| 12           | NC     | Non-Connection            |
| 13           | VCD1   | LED Cathode               |
| 14           | VCD2   | LED Cathode               |
| 15           | VCD3   | LED Cathode               |
| 16           | VCD4   | LED Cathode               |
| 17           | VCD5   | LED Cathode               |
| 18           | VCD6   | LED Cathode               |
| 19           | NC     | Non-Connection            |
| 20           | NC     | Non-Connection            |
| 21           | NC     | Non-Connection            |

|    |          |                    |
|----|----------|--------------------|
| 22 | $V_{SS}$ | GND                |
| 23 | $V_{SS}$ | GND                |
| 24 | $V_{SS}$ | GND                |
| 25 | $V_{DD}$ | Power Supply, 2.5V |
| 26 | $V_{DD}$ | Power Supply, 2.5V |
| 27 | $V_{DD}$ | Power Supply, 2.5V |
| 28 | NC       | Non-Connection     |
| 29 | VAD      | LED Anode          |
| 30 | VAD      | LED Anode          |

Note 1) Please refer to AC, DC timing specification of VESA DisplayPort Version 1.1a.

Note 2) Please connect GND pin to ground. Don't use it as no-connect nor connection with high impedance.

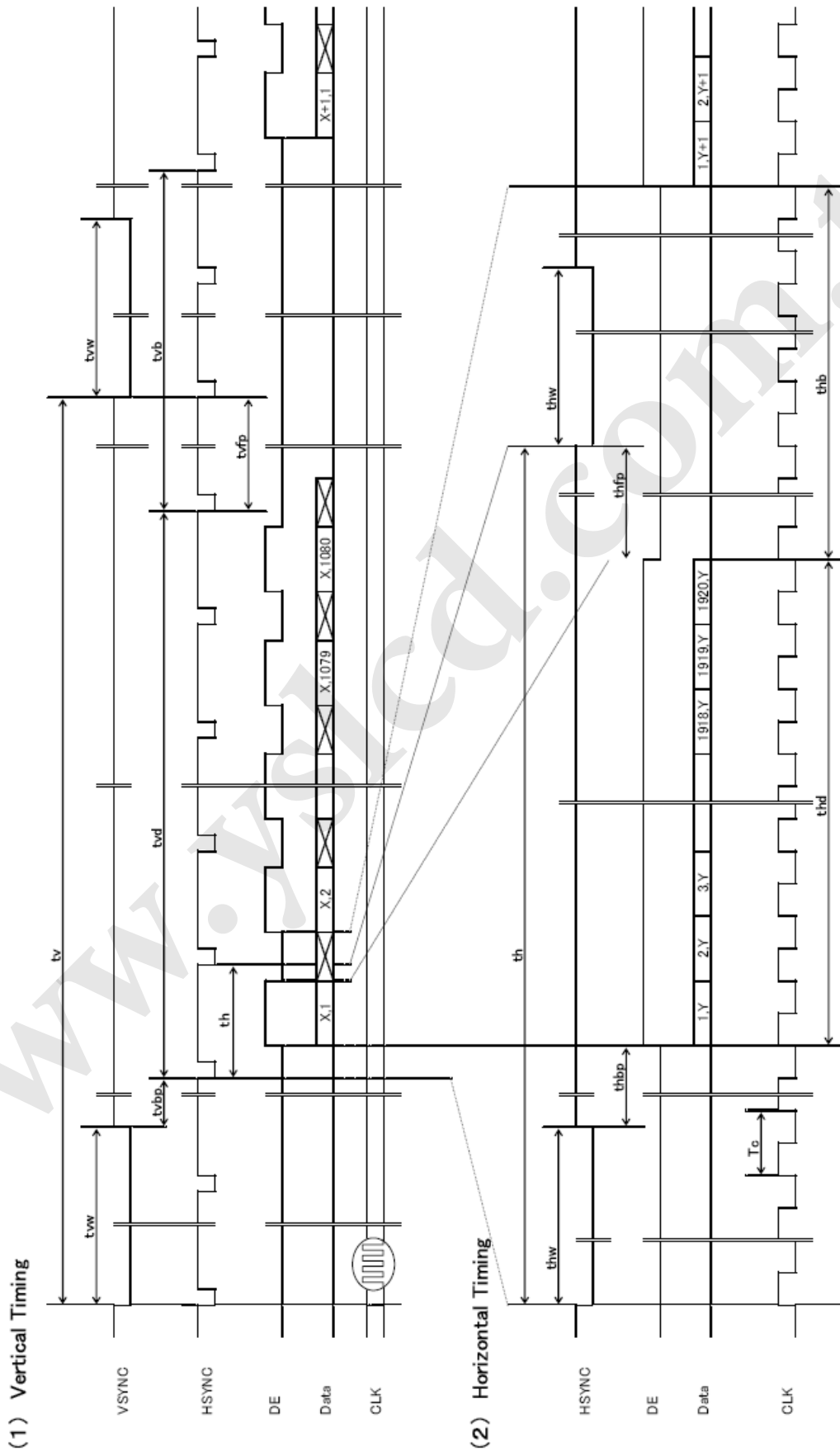
Note 3) Please connect NC to nothing. Don't connect it to ground nor to other signal input.

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## 6.3 Interface Timing

### 6.3.1 Timing diagram



## 6.3.2 Timing Specifications

### ●60Hz

| 項目         | 記号  | Min.  | Typ.   | Max.  | 単位  |
|------------|-----|-------|--------|-------|-----|
| フレーム周期     | tv  | 1092  | 1095   | 1100  | th  |
|            |     | 16.56 | 16.68  | 16.93 | ms  |
| 垂直表示期間     | tvd | 1080  | 1080   | 1080  | th  |
| 垂直ブランキング期間 | tvb | 12    | 15     | 20    | th  |
| 1走査線時間     | th  | 2450  | 2481   | 2502  | tc  |
|            |     | 15.16 | 15.24  | 15.39 | μs  |
| 水平表示期間     | thd | 1920  | 1920   | 1920  | tc  |
| 水平ブランキング期間 | thb | 530   | 561    | 582   | tc  |
| クロック周期     | tc  | 159.2 | 162.84 | 165   | MHz |
|            |     | 6.061 | 6.141  | 6.281 | ns  |

### ●50Hz

| 項目         | 記号  | Min.  | Typ.   | Max.  | 単位  |
|------------|-----|-------|--------|-------|-----|
| フレーム周期     | tv  | 1092  | 1095   | 1100  | th  |
|            |     | 19.66 | 20.00  | 20.87 | ms  |
| 垂直表示期間     | tvd | 1080  | 1080   | 1080  | th  |
| 垂直ブランキング期間 | tvb | 12    | 15     | 20    | th  |
| 1走査線時間     | th  | 2160  | 2169   | 2182  | tc  |
|            |     | 18.00 | 18.27  | 18.97 | μs  |
| 水平表示期間     | thd | 1920  | 1920   | 1920  | tc  |
| 水平ブランキング期間 | thb | 240   | 249    | 262   | tc  |
| クロック周期     | tc  | 115   | 118.75 | 120   | MHz |
|            |     | 8.333 | 8.421  | 8.696 | ns  |

### ●40Hz

| 項目         | 記号  | Min.  | Typ.   | Max.   | 単位  |
|------------|-----|-------|--------|--------|-----|
| フレーム周期     | tv  | 1092  | 1095   | 1100   | th  |
|            |     | 23.40 | 25.00  | 26.75  | ms  |
| 垂直表示期間     | tvd | 1080  | 1080   | 1080   | th  |
| 垂直ブランキング期間 | tvb | 12    | 15     | 20     | th  |
| 1走査線時間     | th  | 2250  | 2281   | 2310   | tc  |
|            |     | 21.43 | 22.83  | 24.32  | μs  |
| 水平表示期間     | thd | 1920  | 1920   | 1920   | tc  |
| 水平ブランキング期間 | thb | 330   | 361    | 390    | tc  |
| クロック周期     | tc  | 95    | 99.91  | 105    | MHz |
|            |     | 9.524 | 10.009 | 10.526 | ns  |

| 項目         | 記号   | Min. | Typ. | Max. | 単位 |
|------------|------|------|------|------|----|
| 垂直同期信号パルス幅 | tvw  | 1    |      |      | th |
| 垂直フロントポーチ  | tvfp | 1    |      |      | th |
| 垂直バックポーチ   | tvbp | 2    |      |      | th |
| 水平同期信号パルス幅 | thw  | 8    |      |      | tc |
| 水平フロントポーチ  | thfp | 8    |      |      | tc |
| 水平バックポーチ   | thbp | 8    |      |      | tc |
| DEパルス幅     | thd  | 1920 | 1920 | 1920 | tc |

※1 右の数式を満足する事。  $tvb = tvw + tvfp + tvbp$

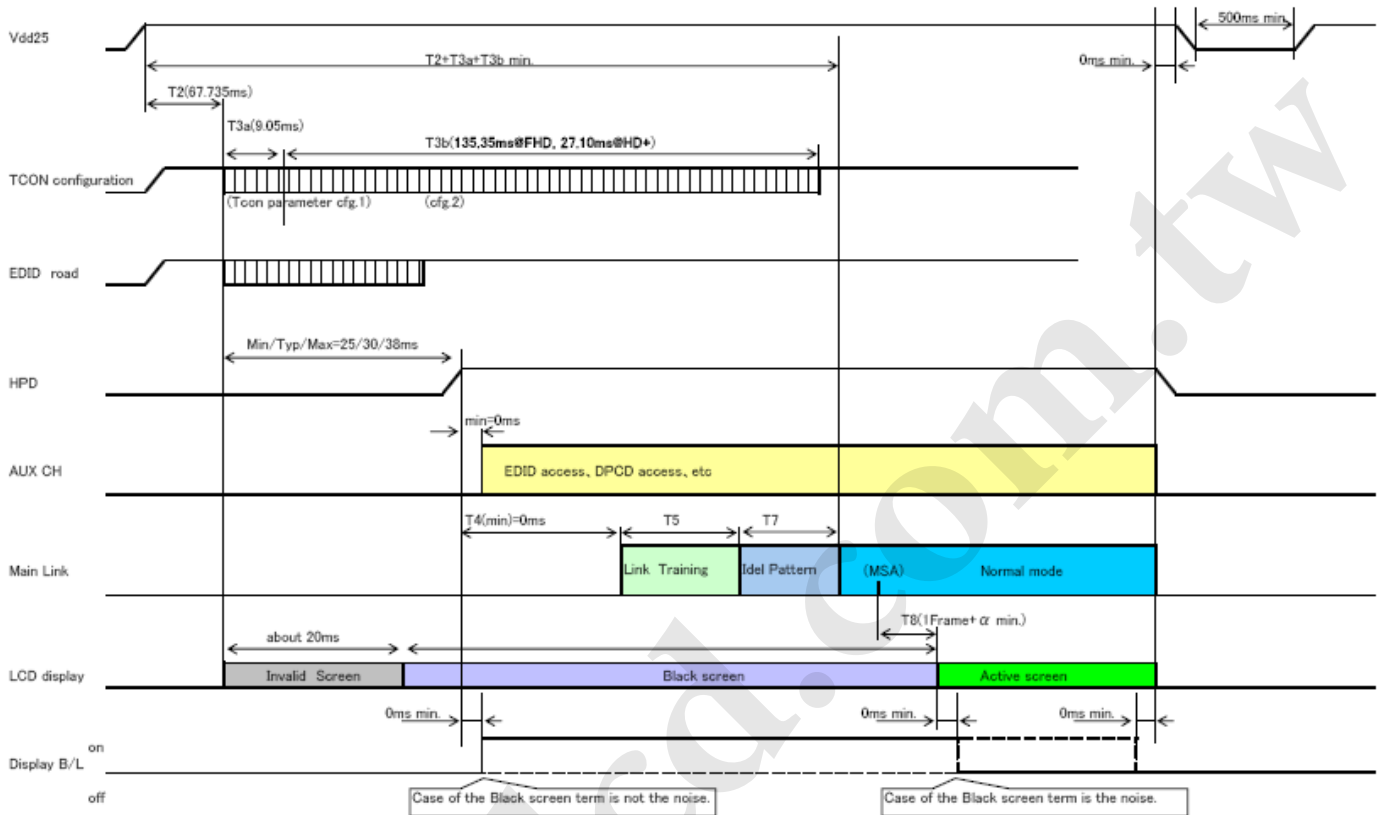
※2 右の数式を満足する事。  $thb = thw + thfp + thbp$

注1) フレーム周期が遅くなりますと、フリッカ、点欠点など表示品位の低下を招く場合があります。

注2) Display port の AC, DC, タイミングについては VESA Display port Ver. 1.1a 参照ください。

## 6.4 Power ON/OFF Sequence

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



## 7. Panel Reliability Test

### 7.1 Reliability Test

This module is then tested in the following table.

However, this study will be conducted only one test item in the same module, multiple-item test module to perform the same

| 試験項目   | 試験条件                              |         | 備考               | 結果       |
|--------|-----------------------------------|---------|------------------|----------|
| 高温動作   | 5 0℃                              | 計 4 8時間 | 動作 <sup>3)</sup> | 3p/3p OK |
| 高温保存   | 6 5℃                              | 計 4 8時間 | 非動作              | 3p/3p OK |
| 高温高湿動作 | 4 5℃, 9 0%                        | 計 4 8時間 | 動作 <sup>3)</sup> | 3p/3p OK |
| 高温高湿保存 | 5 0℃, 9 0%                        | 計 4 8時間 | 非動作              | 3p/3p OK |
| 低温動作   | 0℃                                | 計 4 8時間 | 動作 <sup>3)</sup> | 3p/3p OK |
| 低温保存   | - 3 0℃                            | 計 4 8時間 | 非動作              | 3p/3p OK |
| 温度急変   | - 3 0℃ (2時間) ⇔ 6 5℃ (2時間) 1 2サイクル |         | 非動作              | 3p/3p OK |

注1) 試験はモジュールに結露の無い条件にて実施する。

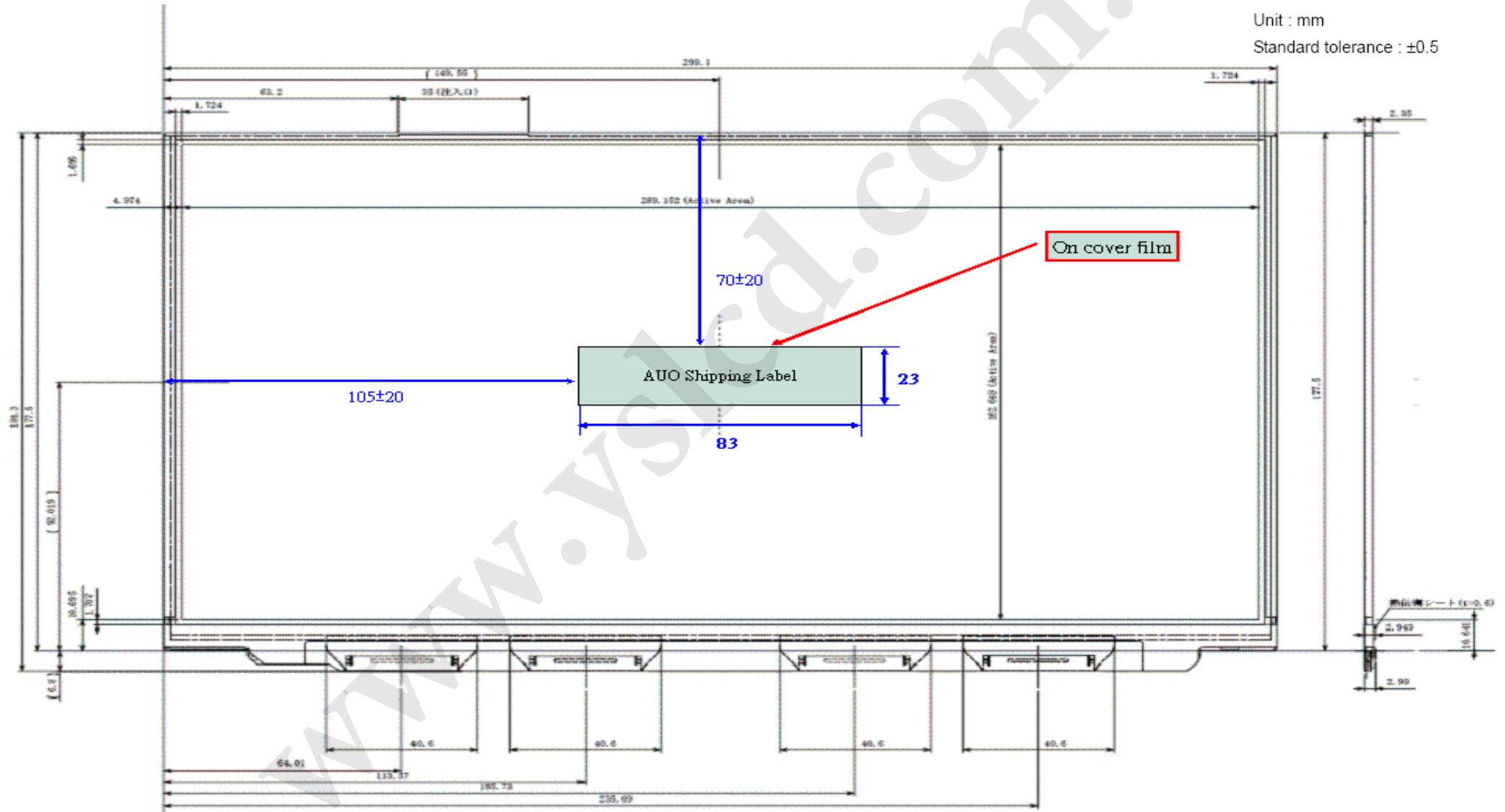
注2) 試験後、常温常湿 (1 5℃~3 5℃, 4 5~6 5%(RH)) で2時間以上放置後、検査を実施する。

注3) 周囲温度 : T a 2 5 ± 5℃, 周囲湿度 : H a 6 5 ± 2 0%RH, 電源電圧 : V DD 2. 5 V; LED 入力順電流 : 1 9 mA

## 8. Mechanical Characteristics

### 8.1 LCM Outline Dimension

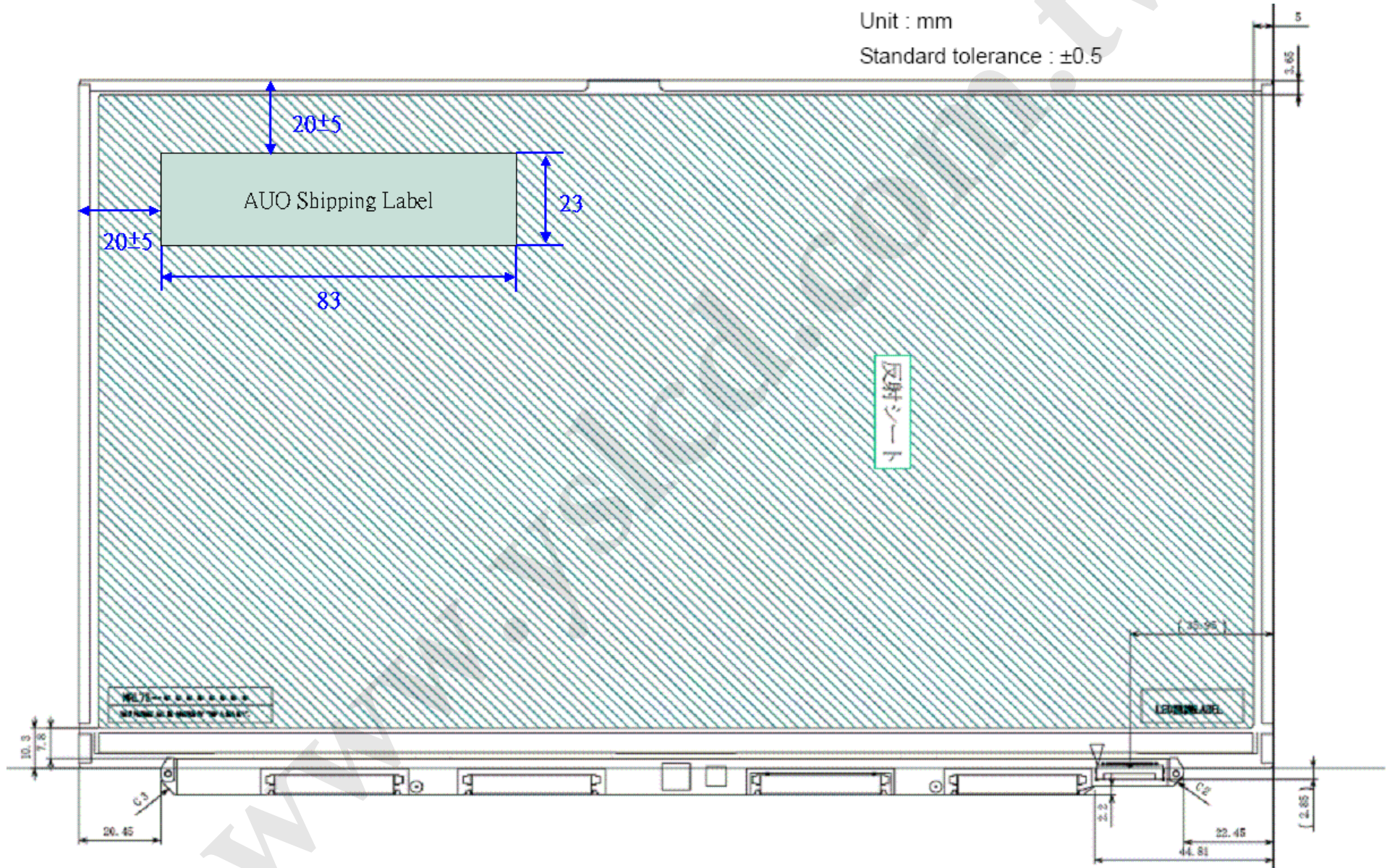
#### 8.1.1 Standard Front View



## 8.1.2 Standard Rear View

Unit : mm

Standard tolerance :  $\pm 0.5$



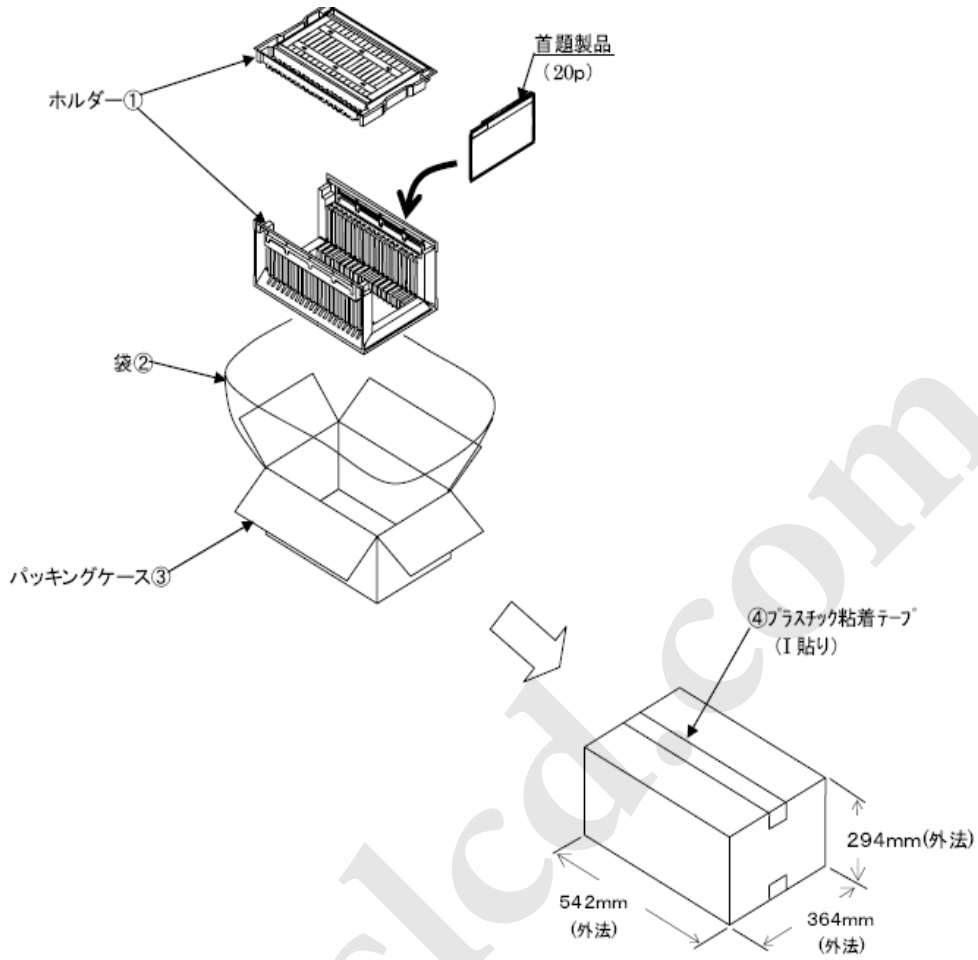
## 9. Shipping and Package

### 9.1 Shipping Label Format



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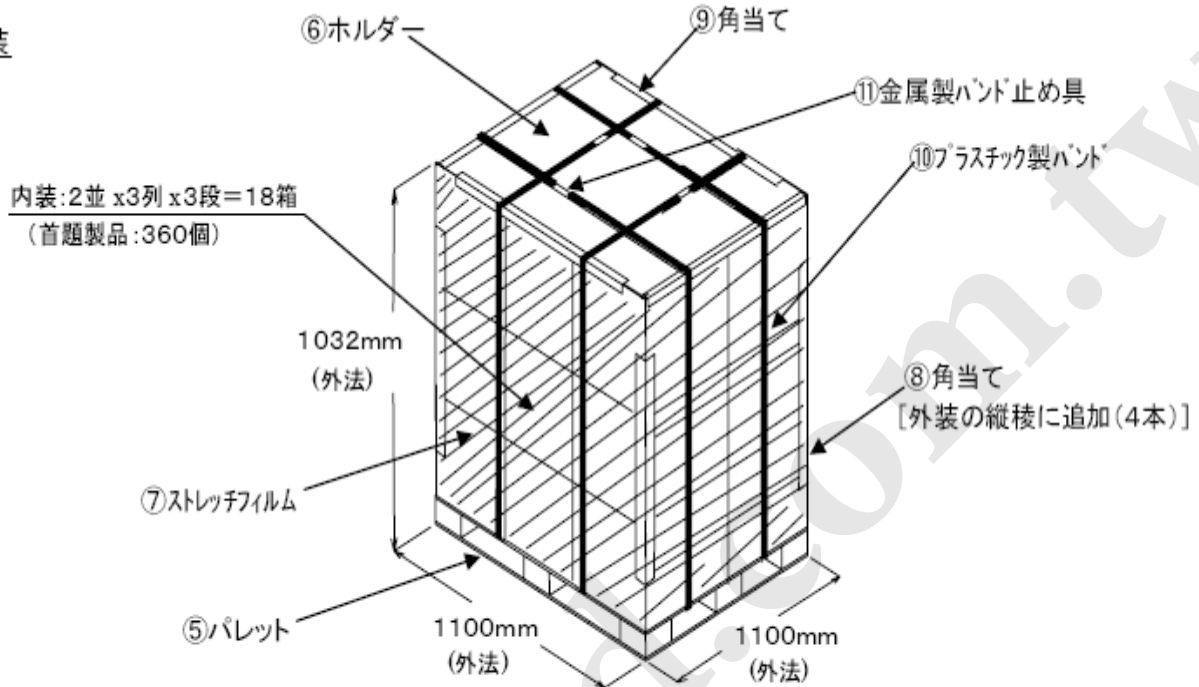
### 9.2 Carton Package





## 9.3 Shipping Package of Palletizing Sequence

外装

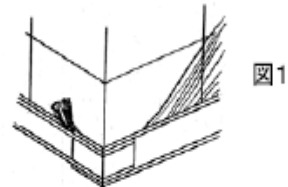


(注1)端数の場合は、下記の処置を行うこと。

- \* 内装の積み段数を減らす。
- \* 同じ段内で端数が生じた場合は、空の内装箱を詰め合わせる。

(注2)ストレッチフィルムの巻き方

- (1)巻き始めは粘着面を内側にしてフィルム端を図1の如く固定する。
- (2)巻き順は下側→上側→下側へ行く。
- (3)パレットの引っかかりは、フィルムを50mm以上でローピングする。
- (4)巻き数は下側2.5巻、中間、上側2巻とする。
- (5)巻きテンションはフィルム伸び率で約10%にする。
- (6)天面の引っかかり折り幅は200mm以上とする。
- (7)巻き終わりは、図2の如くフィルム端を固定する。
- (8)フィルムのつながぎはないこと。



## 10. Appendix

### 10.1 EDID Description

| Data No. | Data (Hex) | Data (Dec) | 説明   | 実入力            | 2進数表示             | 10進数表示 |
|----------|------------|------------|--|----------------|-------------------|--------|
| 0        | 00         | 0          | 固定入力(Header)                                 |                |                   |        |
| 1        | FF         | 255        |  |                |                   |        |
| 2        | FF         | 255        |  |                |                   |        |
| 3        | FF         | 255        |  |                |                   |        |
| 4        | FF         | 255        |  |                |                   |        |
| 5        | FF         | 255        |  |                |                   |        |
| 6        | FF         | 255        |  |                |                   |        |
| 7        | 00         | 0          |  |                |                   |        |
| 8        | 36         | 54         | メーカーID                                       | MS_            | 00110110          |        |
| 9        | 7F         | 127        | (ASCIIコードで入力)                                |                | 01111111          |        |
| 10       | 25         | 37         | プログラク外ID                                     | 0025           |                   |        |
| 11       | 00         | 0          | (10、11番地は逆転して使用される)                          |                |                   |        |
| 12       | 01         | 1          | シリアルNo.                                      | 未記入            |                   |        |
| 13       | 01         | 1          | 未記入の場合は『01』入力                                |                |                   |        |
| 14       | 01         | 1          |  |                |                   |        |
| 15       | 01         | 1          |  |                |                   |        |
| 16       | 03         | 3          | 製造週(1-53週: 閏年は54週)                           | 3週             |                   | 3      |
| 17       | 14         | 20         | 製造年(製造年-1990)                                | 2010年          |                   | 20     |
| 18       | 01         | 1          | EDID Version (Structure ①・②)                 | 1.4            |                   | 1      |
| 19       | 04         | 4          | ①:18番地 ②:19番地                                |                |                   | 4      |
| 20       | A5         | 165        | Video Input 情報                               |                | 10100101          |        |
| 21       | 1D         | 29         | 画面サイズ*(cm)                                   | 13.1inch       |                   | 29     |
| 22       | 10         | 16         | (21番地:横 22番地:縦)                              | 29cm/16cm      |                   | 16     |
| 23       | 78         | 120        | 階調: $\gamma$ 値( $\gamma$ 値 $\times$ 100-100) | $\gamma = 2.2$ |                   | 120    |
| 24       | 02         | 2          | サポート情報                                       |                | 00000010          |        |
| 25       | 0F         | 15         | 色度: R,G,B,W                                  |                | 00001111          |        |
| 26       | 15         | 21         | 10進数を2進数(10桁)に変換。                            |                | 00010101          |        |
| 27       | 9A         | 154        | その際、誤差は $\pm 0.0005$ 以下とする。                  |                | Rx=0.602 10011010 |        |
| 28       | 56         | 86         | (例:0.610 $\rightarrow$ 1001110001)           |                | Ry=0.336 01010110 |        |
| 29       | 4B         | 75         | (0.6103516)                                  |                | Gx=0.296 01001011 |        |
| 30       | 8B         | 139        |  |                | Gy=0.546 10001011 |        |
| 31       | 26         | 38         |  |                | Bx=0.148 00100110 |        |
| 32       | 20         | 32         |  |                | By=0.126 00100000 |        |
| 33       | 50         | 80         |  |                | Wx=0.313 01010000 |        |
| 34       | 54         | 84         |  |                | Wy=0.329 01010100 |        |
| 35       | 00         | 0          | Establish Timing                             | 該当無し           | 00000000          |        |
| 36       | 00         | 0          | 受像可能な解像度には全てbitを立てる。                         |                | 00000000          |        |
| 37       | 00         | 0          | LCDは60Hzのみbitを立てるのが良い。                       |                | 00000000          |        |

| Data No. | Data (Hex) | Data (Dec) | 説明  | 実入力        | 2進数表示    | 10進数表示 |
|----------|------------|------------|---|------------|----------|--------|
| 38       | D1         | 209        | <b>Standard Timing</b>                      | 色度         | 1920     | 209    |
| 39       | C0         | 192        | ・受像可能な代表的な全ての解像度を記入。                        | 16:9 60Hz  | 11000000 |        |
| 40       | 01         | 1          | ・2Byteのコードで1つの解像度を表示。                       |            |          |        |
| 41       | 01         | 1          | ・計8種類の解像度を記述出来る。                            |            |          |        |
| 42       | 01         | 1          | ・E-Timing(35-37番地)と重複しない事。                  |            |          |        |
| 43       | 01         | 1          | ・E-TimingとS-Timingのどちらかに                    |            |          |        |
| 44       | 01         | 1          | 最大解像度を記述する。                                 |            |          |        |
| 45       | 01         | 1          | ・未使用部分には 01 01 を入れる。                        |            |          |        |
| 46       | 01         | 1          |   |            |          |        |
| 47       | 01         | 1          | #1:(水平解像度/8)-31 → 16進数                      |            |          |        |
| 48       | 01         | 1          | #2:7-6Bit…アスペクト比                            |            |          |        |
| 49       | 01         | 1          | 16:10 → 0,0                                 |            |          |        |
| 50       | 01         | 1          | 4:3 → 0,1                                   |            |          |        |
| 51       | 01         | 1          | 5:4 → 1,0                                   |            |          |        |
| 52       | 01         | 1          | 16:9 → 1,1                                  |            |          |        |
| 53       | 01         | 1          | 5-0Bit…リフレッシュレート - 60                       |            |          |        |
| 54       | 9C         | 156        | <b>推奨タイミング(24番地のフラグを立てておく)</b>              | 推奨タイミング    |          |        |
| 55       | 3F         | 63         | 54,55番地:ピクセルクロック/10000                      | 162.84MHz  |          | 16284  |
| 56       | 80         | 128        | 56番地: 水平表示期間(pixels)/下位8bit(全12bit)         | 1920Pixels | 10000000 | 1920   |
| 57       | 31         | 49         | 57番地: 水平フランクング(pixels)/下位8bit(全12bit)       | 561 Pixels | 00110001 | 561    |
| 58       | 72         | 114        | 58番地: H-A上位4bit + H-B上位4bit                 |            | 01110010 |        |
| 59       | 38         | 56         | 59番地: 垂直表示期間(lines)/下位8bit(全12bit)          | 1080Lines  | 00111000 | 1080   |
| 60       | 0F         | 15         | 60番地: 垂直フランクング(lines)/下位8bit(全12bit)        | 15Lines    | 00001111 | 15     |
| 61       | 40         | 64         | 61番地: V-A上位4bit + V-B上位4bit                 |            | 01000000 |        |
| 62       | 20         | 32         | 62番地: H-Sync. Offset(70ピクセル)/下位8bit(全10bit) | 32Pixels   | 00100000 | 32     |
| 63       | 20         | 32         | 63番地: H-Sync.(ハルス幅)/下位8bit(全10bit)          | 32Pixels   | 00100000 | 32     |
| 64       | 33         | 51         | 64番地: V-70ピクセル下位4bit + V-Sync.下位4bit(全6bit) | 3/3Lines   | 00110011 |        |
| 65       | 00         | 0          | 65番地: コント参照                                 |            | 00000000 |        |
| 66       | 23         | 35         | 66番地: 画面サイズ横(mm)/下位8bit(全12bit)             | 291 mm     | 00100011 | 291    |
| 67       | A4         | 164        | 66番地: 画面サイズ縦(mm)/下位8bit(全12bit)             | 164mm      | 10100100 | 164    |
| 68       | 10         | 16         | 68番地: 画面サイズ上位4bit + 画面サイズ縦上位4bit            |            | 00010000 |        |
| 69       | 00         | 0          | 69番地: H-Border(全8bit)                       | 0Pixels    | 00000000 | 0      |
| 70       | 00         | 0          | 70番地: V-Border(全8bit)                       | 0Lines     | 00000000 | 0      |
| 71       | 18         | 24         | 71番地: フラグ(E-EDID Standard Page 18 of 32参照)  |            | 00011000 |        |
| 72       | 07         | 7          | <b>40Hzタイミング</b>                            | 40Hzタイミング  |          |        |
| 73       | 27         | 39         | 72,73番地:ピクセルクロック/10000                      | 99.91 MHz  |          | 9991   |
| 74       | 80         | 128        | 74番地: 水平表示期間(pixels)/下位8bit(全12bit)         | 1920Pixels | 10000000 | 1920   |
| 75       | 69         | 105        | 75番地: 水平フランクング(pixels)/下位8bit(全12bit)       | 361 Pixels | 01101001 | 361    |
| 76       | 71         | 113        | 76番地: H-A上位4bit + H-B上位4bit                 |            | 01110001 |        |
| 77       | 38         | 56         | 77番地: 垂直表示期間(lines)/下位8bit(全12bit)          | 1080Lines  | 00111000 | 1080   |
| 78       | 0F         | 15         | 78番地: 垂直フランクング(lines)/下位8bit(全12bit)        | 15Lines    | 00001111 | 15     |
| 79       | 40         | 64         | 79番地: V-A上位4bit + V-B上位4bit                 |            | 01000000 |        |
| 80       | 20         | 32         | 80番地: H-Sync. Offset(70ピクセル)/下位8bit(全10bit) | 32Pixels   | 00100000 | 32     |
| 81       | 20         | 32         | 81番地: H-Sync.(ハルス幅)/下位8bit(全10bit)          | 32Pixels   | 00100000 | 32     |
| 82       | 33         | 51         | 82番地: V-70ピクセル下位4bit + V-Sync.下位4bit(全6bit) | 3/3Lines   | 00110011 |        |
| 83       | 00         | 0          | 83番地: コント参照                                 |            | 00000000 |        |
| 84       | 23         | 35         | 84番地: 画面サイズ横(mm)/下位8bit(全12bit)             | 291 mm     | 00100011 | 291    |
| 85       | A4         | 164        | 85番地: 画面サイズ縦(mm)/下位8bit(全12bit)             | 164mm      | 10100100 | 164    |
| 86       | 10         | 16         | 86番地: 画面サイズ上位4bit + 画面サイズ縦上位4bit            |            | 00010000 |        |
| 87       | 00         | 0          | 87番地: H-Border(全8bit)                       | 0Pixels    | 00000000 | 0      |
| 88       | 00         | 0          | 88番地: V-Border(全8bit)                       | 0Lines     | 00000000 | 0      |
| 89       | 18         | 24         | 89番地: フラグ(E-EDID Standard Page 18 of 32参照)  |            | 00011000 |        |

| Data No. | Data (Hex) | Data (Dec) | 説明  | 実入力 | 2進数表示 | 10進数表示 |
|----------|------------|------------|---|-----|-------|--------|
| 90       | 00         | 0          | <b>モデル名 (識別 FC)</b><br><br>Header:00 00 00 FC 00<br>モデル名:ASCIIコードにて記述<br>Terminator:0A<br>Blank:20<br><br>得意要求:Sony LCD<br><br><div style="border: 1px solid black; padding: 2px; display: inline-block;">ASCIIコード</div>  |     |       |        |
| 91       | 00         | 0          |   |     |       |        |
| 92       | 00         | 0          |   |     |       |        |
| 93       | FC         | 252        |   |     |       |        |
| 94       | 00         | 0          |   |     |       |        |
| 95       | 53         | 83         |   |     |       |        |
| 96       | 6F         | 111        |   |     |       |        |
| 97       | 6E         | 110        |   |     |       |        |
| 98       | 79         | 121        |   |     |       |        |
| 99       | 20         | 32         |   |     |       |        |
| 100      | 4C         | 76         |   |     |       |        |
| 101      | 43         | 67         |   |     |       |        |
| 102      | 44         | 68         |   |     |       |        |
| 103      | 0A         | 10         |   |     |       |        |
| 104      | 20         | 32         |   |     |       |        |
| 105      | 20         | 32         |   |     |       |        |
| 106      | 20         | 32         |   |     |       |        |
| 107      | 20         | 32         |   |     |       |        |
| 108      | 00         | 0          | <b>Monitor Range (識別 FD)</b><br><br>Header:00 00 00 FD 00<br><br>113番地:最小フレーム周波数(Hz) 整数入力<br>114番地:最大フレーム周波数(Hz) 整数入力<br>115番地:最小水平周波数(kHz) 整数入力<br>116番地:最大水平周波数(kHz) 整数入力<br>117番地:最大クロック周波数(MHz)/10<br><br>118-125番地:<br>Terminator...00 0A<br>残り...20 20 20 20 20 20<br><br>Terminator:0A<br>Blank:20 |     |       |        |
| 109      | 00         | 0          |   |     |       |        |
| 110      | 00         | 0          |   |     |       |        |
| 111      | FD         | 253        |   |     |       |        |
| 112      | 00         | 0          |   |     |       |        |
| 113      | 27         | 39         |   |     |       |        |
| 114      | 3D         | 61         |   |     |       |        |
| 115      | 2B         | 43         |   |     |       |        |
| 116      | 42         | 66         |   |     |       |        |
| 117      | 11         | 17         |   |     |       |        |
| 118      | 00         | 0          |   |     |       |        |
| 119      | 0A         | 10         |   |     |       |        |
| 120      | 20         | 32         |   |     |       |        |
| 121      | 20         | 32         |   |     |       |        |
| 122      | 20         | 32         |   |     |       |        |
| 123      | 20         | 32         |   |     |       |        |
| 124      | 20         | 32         |   |     |       |        |
| 125      | 20         | 32         |   |     |       |        |
| 126      | 00         | 0          | <b>Extension Flag</b> (Extensionが無い場合は"00"と記入)  |     |       |        |
| 127      | 2A         | 42         | <b>Check-Sum</b> (0-127番地を合計し下2桁が00になる値)  |     |       |        |