Product Description: T420XW01 V6 TFT-LCD PANEL			
AUO Model Name: T420XW01 V6			
Customer Part No/Project Name:			
Customer Signature	**Date**	AUO	**Date**

Document Version: 1.0
Date:2006/01/08

Product Functional Specification

42” WXGA Color TFT-LCD Module
Model Name: T420XW01 V6

( ) Preliminary Specification
(*) Final Specification

Note : This specification is subject to change without notice.

Contents

Record of Revision

Version	Date	No	Old Description	New Description	Remark
1.0	2007 1/08		First release (final verison)		

1. General Description

This specification applies to the 42 inch Color TFT-LCD Module T420XW01 V6. This LCD module has a TFT active matrix type liquid crystal panel 1366x768 pixels, and diagonal size of 42 inch. This module supports 1366x768 WXGA mode (Non-interlace).

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 T420XW01 V6 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	42.02	inches	
Display Area	930.25(H) x 523.01(V)	mm	
Outline Dimension	983.0(H) x 576.0(V) x 52.7(D)	mm	With inverter
Driver Element	a-Si TFT active matrix		
Display Colors	16.7M	Colors	
Number of Pixels	1366 x 768	Pixel	
Pixel pitch	0.681	mm	
Pixel Arrangement	RGB vertical stripe		
Display Mode	Normally Black		
Lamp quantity, type	20pcs, Straight type	pcs	
Surface Treatment	AG, 3H		

2. Absolute Maximum Ratings

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

Item	Symbol	Min	Max	Unit	Note
Logic/LCD Drive Voltage	Vdd	-0.3	14.0	[Volt]	1
Input Voltage of Signal	Vin	-0.3	3.6	[Volt]	1
BLU Input Voltage	VDDB	-0.3	27.0	[Volt]	1
BLU Brightness Control Voltage	BLON	-0.3	5.5	[Volt]	1
Operating Temperature	TOP	0	+50	[°C]	2
Operating Humidity	HOP	10	90	[%RH]	2
Storage Temperature	TST	-20	+60	[°C]	2
Storage Humidity	HST	10	90	[%RH]	2
Shock (non-operation)		-	50	G	3
Vibration (non-operation)		-	1.5	G	4
Thermal shock		-20	60	C	5
Altitude test	50000feet (12Kpa)				

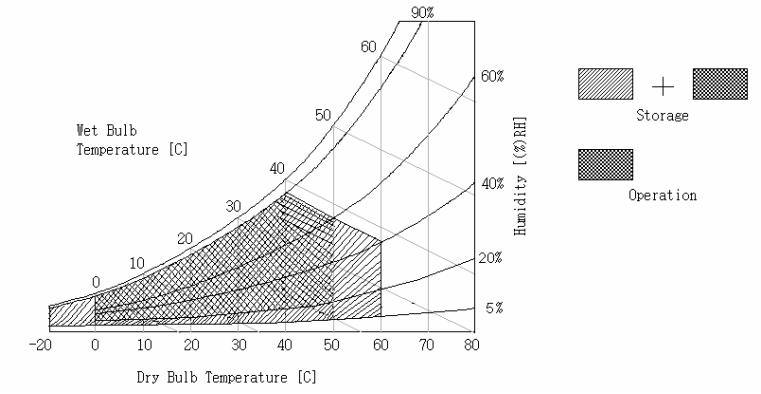
Note 1 : Duration = 50msec

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

Note 3 : Half sine wave, shock level : 50G(11ms), direction : ±x, ±y, ±z (one time each direction)

Note 4 : Wave form : random, vibration level : 1.5G RMS, Bandwidth : 10--300Hz
Duration : X,Y,Z 30min (one time each direction)

Note 5 : -20C/0.5hr ~ 60C/0.5hr, 10 cycles



3. Electrical Specification

The T420XW01 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 inverter.

3-1 Electrical Characteristics

Parameter		Symbol	Values			Unit	Notes
			Min	Typ	Max		
LCD:							
Power Supply Input Voltage		Vdd	10.8	12.0	13.2	Vdc	
Power Supply Input Current		Idd	-	0.95	1.3	A	1
Power Consumption		Pc	-	11.4	15.6	Watt	1
Inrush Current		I_{RUSH}	-	-	4	A	5
LVDS Interface	Differential Input High Threshold Voltage	V_{TH}			+100	mV	4
	Differential Input Low Threshold Voltage	V_{TL}	-100			mV	4
	Common Input Voltage	V_{CIM}	1.10	1.25	1.40	V	
CMOS Interface	Input High Threshold Voltage	V_{IH} (High)	2.4		3.3	Vdc	
	Input Low Threshold Voltage	V_{IL} (Low)	0		0.7	Vdc	
Backlight Power Consumption			-	175.2	182.4	Watt	2
Life Time			50000	60000		Hours	3

The performance of the Lamp in LCM, for example life time or brightness, is extremely influenced by the characteristics of the DC-AC Inverter. So all the parameters of an inverter should be carefully designed so as not to produce too much leakage current from high-voltage output of the inverter. When you design or order the inverter, please make sure unwanted lighting caused by the mismatch of the lamp and the inverter (no lighting, flicker, etc) never occurs. When you confirm it, the LCD Assembly should be operated in the same condition as installed in your

instrument.

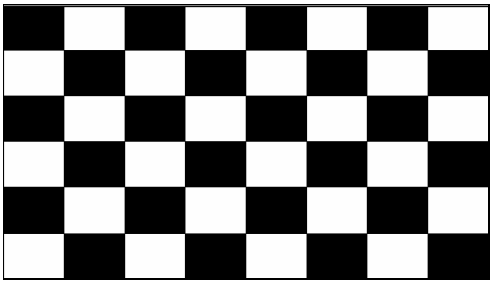
Do not attach a conducting tape to lamp connecting wire. If the lamp wire attach to conducting tape, TFT-LCD Module have a low luminance and the inverter has abnormal action because leakage current occurs between lamp wire and conducting tape.

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 lifetime of CCFL will be reduced.

Note :

1. Vdd=12.0V, fv=120Hz, f_{CLK}=155.0 MHz , 25℃, Vdd Duration time= 400 μs .The Power supply input check pattern definition and dissipation reference as below：

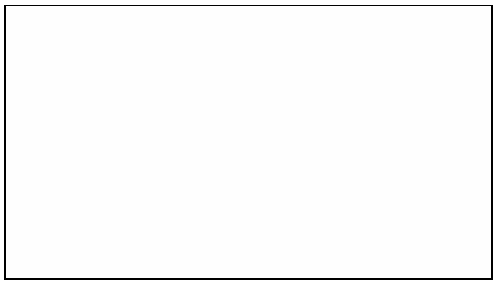
Chess Pattern：950mA (Typ.)



1366*768*3 Pixel

Chess Pattern

White Pattern：1300mA (Max.)



1366*768*3 Pixel

Gray Level 255(White Screen)

2. The Backlight power consumption shown above does include loss of external inverter at 25℃. The used lamp current is the lamp typical current

3. The life is determined as the time at which luminance of the lamp is 50% compared to that of initial value at the typical lamp current on condition of continuous operating at 25±2℃.

4. VCIM = 1.2V

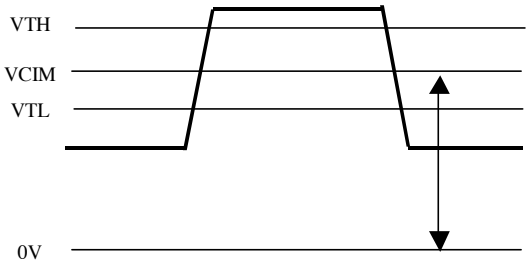
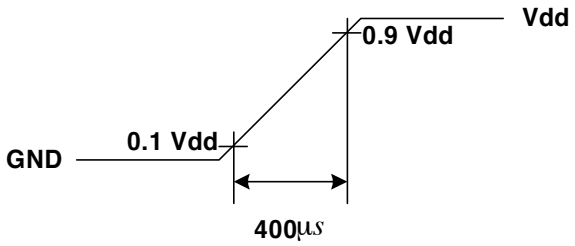


Figure : LVDS Differential Voltage

5. Measurement Condition: Rising time = 400 μ s



3-2 Interface Connections

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

Pin	Symbol	Description
1	Power	DC 12V
2	Power	DC 12V
3	Power	DC 12V
4	Power	DC 12V
5	Power	DC 12V
6	GND	GND
7	GND	GND
8	GND	GND
9	GND	GND
10	RO[0]N	Odd LVDS Signal -
11	RO[0]P	Odd LVDS Signal +
12	RO[1]N	Odd LVDS Signal -
13	RO[1]P	Odd LVDS Signal +
14	RO[2]N	Odd LVDS Signal -
15	RO[2]P	Odd LVDS Signal +
16	GND	GND
17	ROCLK-	Odd LVDS Clock -
18	ROCLK+	Odd LVDS Clock +
19	GND	GND
20	RO[3]N	Odd LVDS Signal -
21	RO[3]P	Odd LVDS Signal +
22	NC	NC
23	NC	NC
24	GND	GND
25	RE[0]N	Even LVDS Signal -

Pin	Symbol	Description
26	RE[0]P	Even LVDS Signal +
27	RE[1]N	Even LVDS Signal -
28	RE[1]P	Even LVDS Signal +
29	RE[2]N	Even LVDS Signal -
30	RE[2]P	Even LVDS Signal +
31	GND	GND
32	RECLK-	Even LVDS Clock -
33	RECLK+	Even LVDS Clock +
34	GND	GND
35	RE[3]N	Even LVDS Signal -
36	RE[3]P	Even LVDS Signal +
37	NC	NC
38	NC	NC
39	GND	GND
40	NC	NC
41	NC	NC
42	NC	NC
43	NC	NC
44	NC	NC
45	LVDS_SEL	LVDS JEIDA/NS Option
46	NC	NC
47	NC	NC
48	NC	NC
49	NC	NC
50	NC	NC
51	NC	NC

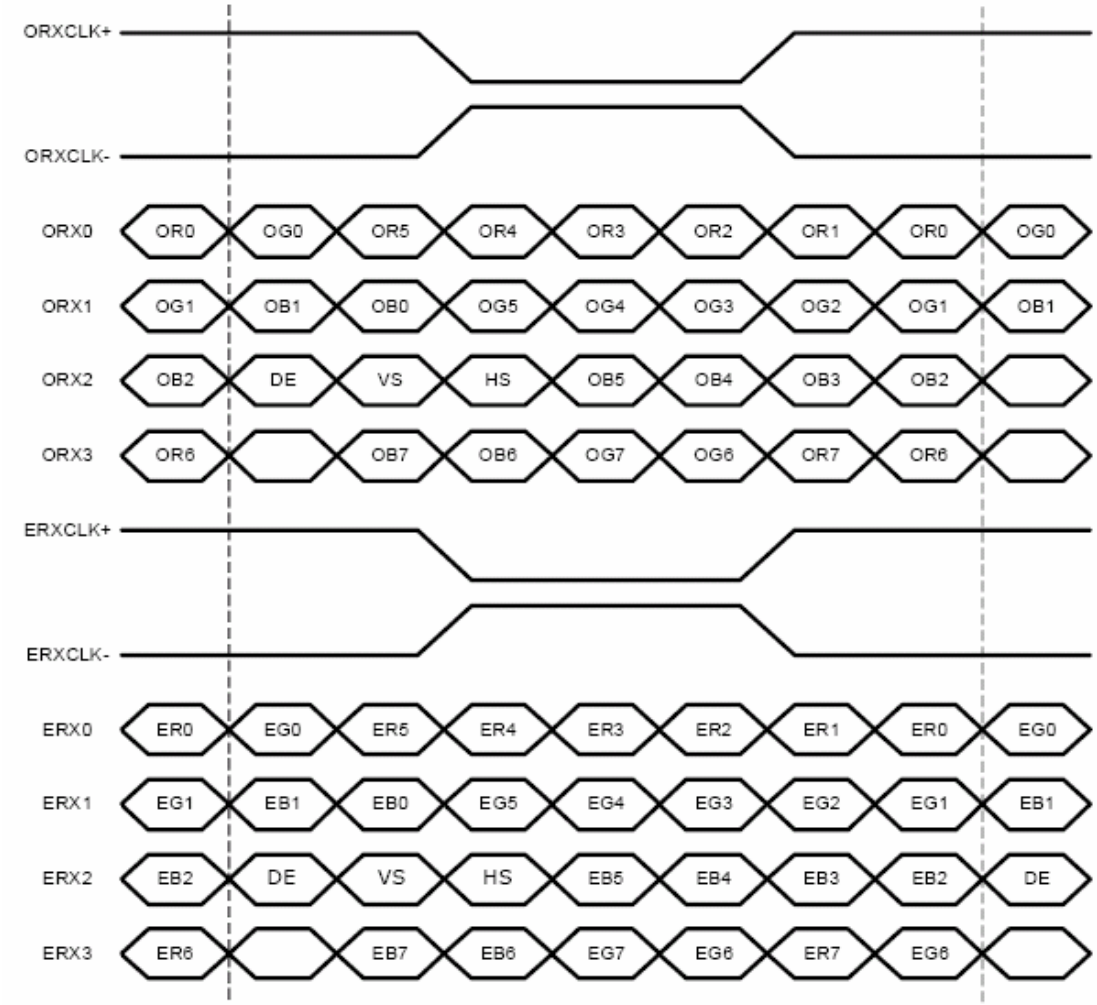
*NC pins：Let it “Open”.

Note:

1. All GND (ground) pins should be connected together and should also be connected to the LCD’s metal frame. All Vcc (power input) pins should be connected together.
2. High: NS mode

   Low/Open: JEIDA mode

LVDS Option = H (3.3V)



Note:

1. Odd data is the first priority.
2. First data is odd.

Backlight Connector Pin Configuration

1. Electrical specification

No	ITEM	SYMBOL		CONDITION	MIN	TYP	MAX	UNIT	Note
1	Input Voltage	V_{DDB}		---	22.8	24.0	26.4	V_{DC}	
2	Input Current (Turn On)	I_{DDB}		V_{DDB}=24V 100% Brightness	---	8.3	---	A_{DC}	1
3	Input Current (Stable)	I_{DDB}		V_{DDB}=24V 100% Brightness	7.0	7.3	7.6	A_{DC}	1
4	Input Power	P_{DDB}		V_{DDB}=24V 100% Brightness	---	175.2	182.4	W	1
5	Input inrush current	I_{RUSH}		V_{DDB}=24V 100% Brightness	---	---	11	A_{DC}	2
6	Output Frequency	F_{BL}		V_{DDB}=24V	---	58	---	kHz	
7	ON/OFF Control Voltage	V_{BLON}	ON	V_{DDB}=24V	2.0	---	5.0	V_{DC}	
			OFF	V_{DDB}=24V	0.0	---	0.8	V_{DC}	
8	ON/OFF Control Current	I_{BLON}		V_{DDB}=24V	0	---	2	mA_{DC}	
9	External PWM Control Voltage	EV_{PWM}	MAX	---	2.0	---	3.3	V_{DC}	
			MIN	---	0	---	0.8	V_{DC}	
10	External PWM Control Current	EI_{PWM}	MAX	PWM=100%	0	---	2	mA_{DC}	
			MIN	PWM=30%	0	---	2	mA_{DC}	
11	External PWM Duty Ratio	ED_{PWM}		---	30	---	100	%	
12	External PWM Frequency	EF_{PWM}		---	150	180	300	Hz	
13	Internal PWM Control Voltage	IV_{PWM}		V_{DDB}=24V	0	---	3.3	V_{DC}	

（Ta=25±5℃, Turn on for 45minutes）

Note 1 : V_{DIM}/Open = 1.6V; P_{DIM} = Open/High

Note 2 : Duration = 20 ms

2. Input specification

Master Board:

Connector 1: S14B-PH-SM3-TB(JST) or equivalent

Pin No	Symbol	Description
1	V_{DDB}	Operating Voltage Supply, +24V DC regulated
2	V_{DDB}	Operating Voltage Supply, +24V DC regulated
3	V_{DDB}	Operating Voltage Supply, +24V DC regulated
4	V_{DDB}	Operating Voltage Supply, +24V DC regulated
5	V_{DDB}	Operating Voltage Supply, +24V DC regulated
6	BL_{GND}	Ground and Current Return
7	BL_{GND}	Ground and Current Return
8	BL_{GND}	Ground and Current Return
9	BL_{GND}	Ground and Current Return
10	BL_{GND}	Ground and Current Return
11	Reserve	Open
12	V_{BLON}	BL On-Off: Open/High (5.0V) for BL On as default
13	P_{DIM} (1)	External PWM/Analog Dimming Control input; Open/High (3.3V, 100% Duty) for 100%
14	P_{DIM} Selection (2)	GND: External PWM dimming; Open/High (5.0V): Analog dimming.

Note (1) P_{DIM} is PWM duty control Input for +3.3V TTL Level Signal. This Input Signal is Continuous Pulse Signal with +3.3V, TTL Level Signal Spec. If this is Open or +3.3V, 100% Duty (i.e. +3.3V, DC level), Back Light should perform 100% Luminance. Duty Ratio of this Input signal should be proportional relationship in certain range of control without any kind of inherent side effect like Waterfall effect on Screen. Guaranteed Duty Range and Dimming Ratio should be specified with supplementary measurement result.

Note (2) 14 Pin is selection pin for PWM control method; if this pin is connected to GND, P_{DIM} input of 13th Pin should have Logic Level Duty Signal for PWM control. If this is set to High(5.0V) or Open, 13th Pin should have DC level signal therefore the Inverter should have Saw Tooth Wave Generator to generate internal PWM signal. Default setting is “Analog”, means when it is “Not Connected”, 13th pin of PWM control should be have DC Level signal for PWM.

Note (3) Pin 14 selection vs. Pin 13 control function table:

	Pin 13 Default: Open/High: 100%
Pin 14 = GND	External PWM (AC Signal Control Duty)
Pin 14 = Open/High(5.0V)	Internal PWM (DC Power Control Duty)

Slave Board:

Connector 2: S12B-PH-SM3-TB(JST) or equivalent

Pin No	Symbol	Description
1	V_{DDB}	Operating Voltage Supply, +24V DC regulated
2	V_{DDB}	Operating Voltage Supply, +24V DC regulated
3	V_{DDB}	Operating Voltage Supply, +24V DC regulated
4	V_{DDB}	Operating Voltage Supply, +24V DC regulated
5	V_{DDB}	Operating Voltage Supply, +24V DC regulated
6	BL_{GND}	Ground and Current Return
7	BL_{GND}	Ground and Current Return
8	BL_{GND}	Ground and Current Return
9	BL_{GND}	Ground and Current Return
10	BL_{GND}	Ground and Current Return
11	NC	
12	NC	

3-3 Signal Timing Specifications

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 it's proper operation.

Timing Table (DE only Mode)

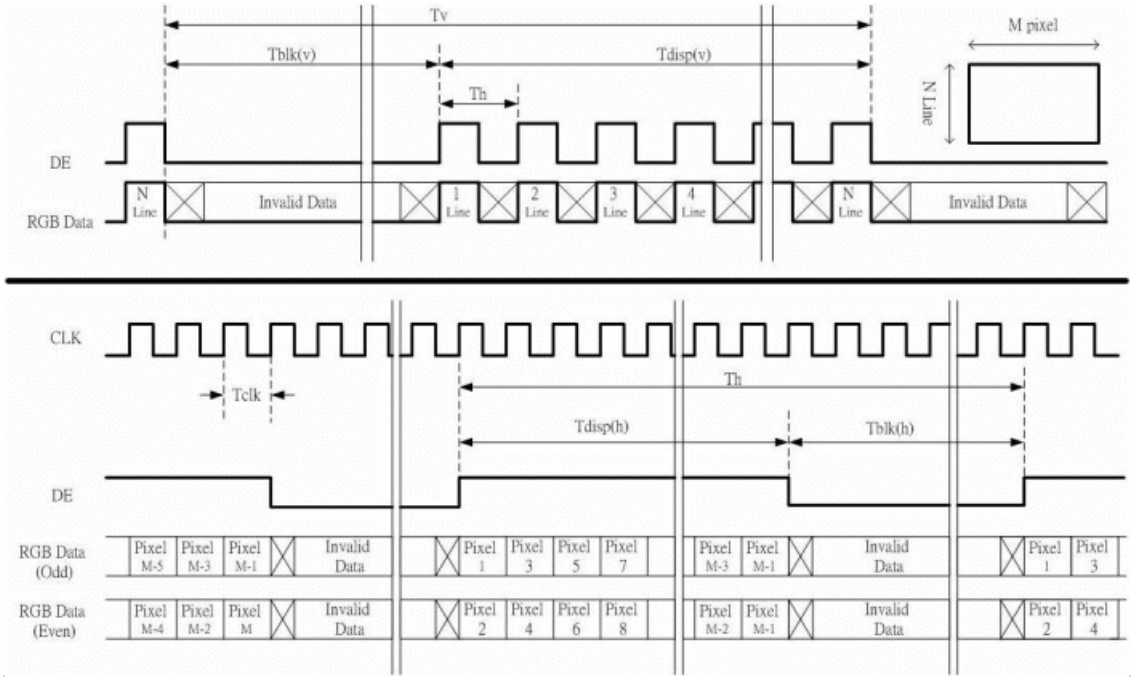
Vertical Frequency Range A (120Hz)

Signal	Item	Symbol	Min	Typ	Max	Unit
H (CLK)	Period	Th	748	780	800	CLK
	Active	Tdisp(h)		683		CLK
	Blanking	Tblk(h)	65	97	117	CLK
V (Line)	Period	Tv	776	780	800	Line
	Active	Tdisp(v)		768		Line
	Blanking	Tblk(v)	8	12	32	Line
CLK	Frequency	fCLK	69.7	73.0	78.1	MHz
Line	Frequency	-	91.6	93.6	97.6	KHz
Frame	Frequency	-	118	120	122	Hz

Vertical Frequency Range B (100Hz)

Signal	Item	Symbol	Min	Typ	Max	Unit
Horizontal	Period	Th	748	780	800	CLK
	Active	Tdisp(h)		683		CLK
	Blanking	Tblk(h)	65	97	117	CLK
Vertical	Period	Tv	930	960	980	Line
	Active	Tdisp(v)		768		Line
	Blanking	Tblk(v)	162	192	212	Line
CLK	Frequency	fCLK	69.7	74.9	82.0	MHz
Line	Frequency	-	92.1	96.0	100.0	KHz
Frame	Frequency	-	98	100	102	Hz

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

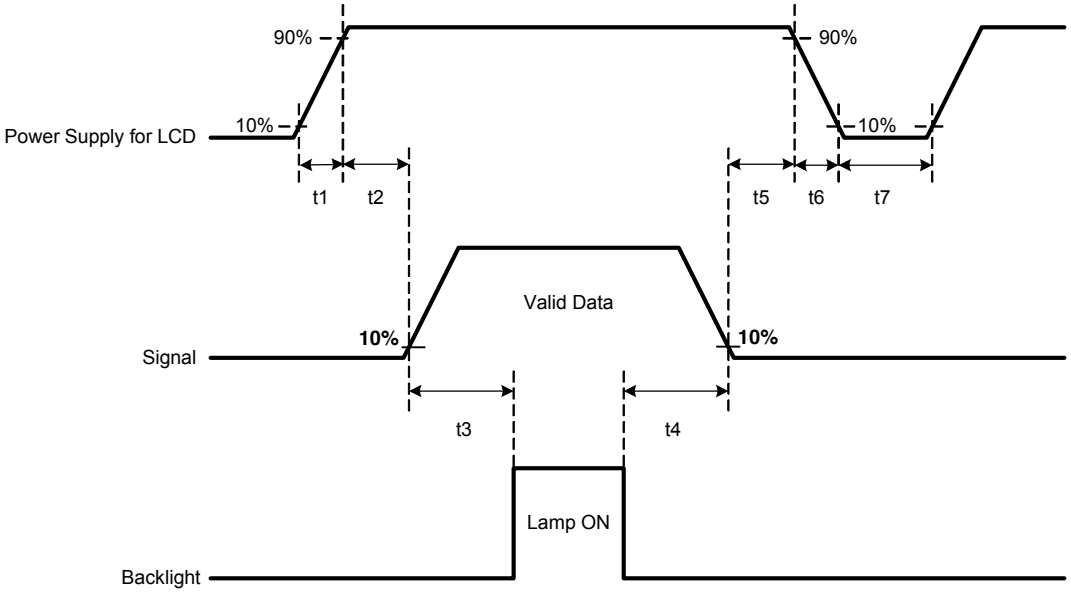
	RED(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

	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

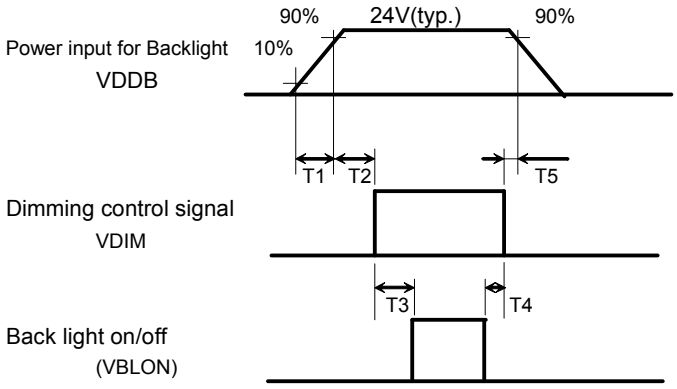
1. Power sequence of panel

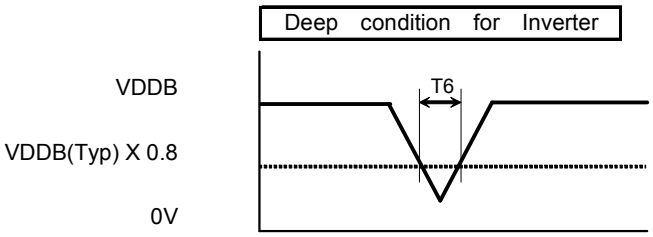


Parameter	Values			Units
	Min.	Typ.	Max.	
t1	470	-	5000	**us**
t2	20	-	50	**ms**
t3	350	-	-	**ms**
t4	10	-	-	**ms**
t5	1	-	50	**ms**
t6	-	-	300	**ms**
t7	1	-	-	**s**

Note : 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.

2. Power sequence of inverter





Parameter	Values			Units
	Min.	Typ.	Max.	
T1	20	-	-	ms
T2	50	-	-	ms
T3	0	-	-	ms
T4	0	-	-	ms
T5	0	-	-	ms
T6	-	-	10	ms

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℃. The values specified are at an approximate distance 50cm from the LCD surface at a viewing angle of Φ and θ equal to 0°.

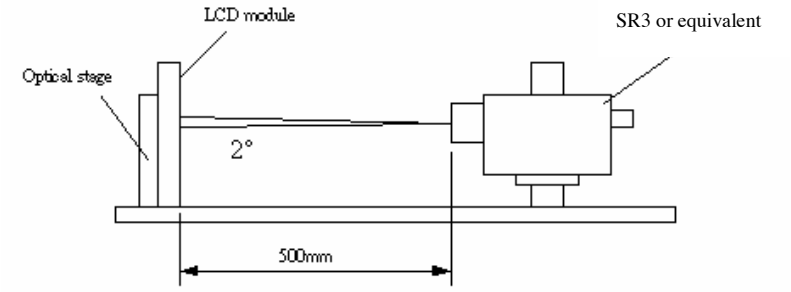


Fig.4-1 Optical measurement equipment and method

Parameter		Symbol	Values			Units	Notes
			Min.	Typ.	Max.		
Contrast Ratio		CR	1200	1500		-	1
Surface Luminance, white		LWH	400	500		cd/㎡	2
Luminance Variation		δ_{WHITE} 5 p			1.25		3
Response Time (Average)		T_γ		6		ms	4,5 (Gray to Gray)
	Rise Time	Tr		15		ms	
	Decay Time	Tf		5		ms	
Color Coordinates							
	RED	R_X	Typ.-0.03	0.640	Typ.+0.03		
		R_Y		0.330		-	
	GREEN	G_X		0.290			
		G_Y		0.600			
	BLUE	B_X		0.150			
		B_Y		0.060		-	
	WHITE	W_X		(0.280)			
		W_Y		(0.290)			
Viewing Angle							Contrast Ratio>10
	x axis, right(φ =0°)	θ_r		89		Degree	6
	x axis, left(φ =180°)	θ_l		89		-	
	y axis, up(φ =90°)	θ_u		89			
	y axis, down (φ =0°)	θ_d		89			

Note:

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

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

2. Surface luminance is luminance value at point 1 across the LCD surface 50cm from the surface with all pixels displaying white. From more information see Fig. 4-2. When V_{DDB} = 24V, I_{DDB} = 7.3A. $L_{WH}=L_{on1}$, Where L_{on1} is the luminance with all pixels displaying white at center 1 location.

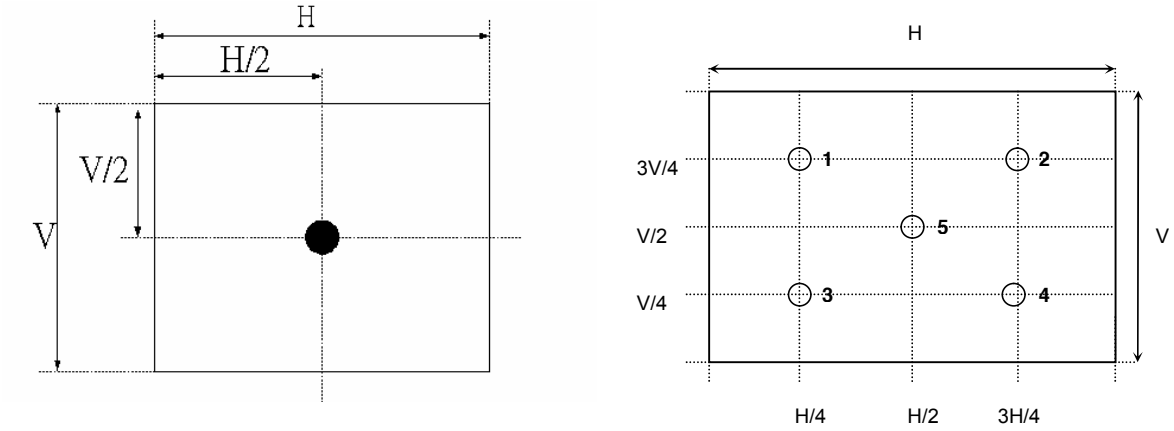


Fig.4-2 Optical measurement point

3. The variation in surface luminance, δ_{WHITE} is defined under 100% brightness as:

$$\delta_{WHITE(5P)} = \text{Maximum}(L_{on1}, L_{on2},\ldots,L_{on5}) / \text{Minimum}(L_{on1}, L_{on2},\ldots L_{on5})$$

4. Response time is the time required for the display to transition from white(L255) to black(L0) (Decay Time, Tr_D=Tf) and from black(L0) to white(L255) (Rise Time, Tr_R=Tr). For additional information see Fig. 4-3.

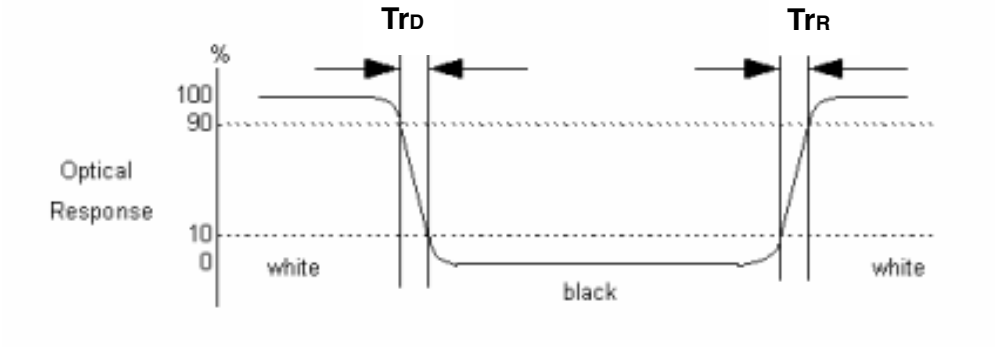


Fig.4-3 Response time

5. The response time is defined as the following figure and shall be measured by switching the input signal among 0%, 25%, 50%, 75%, 100% luminance. For additional information see Fig. 4-4.

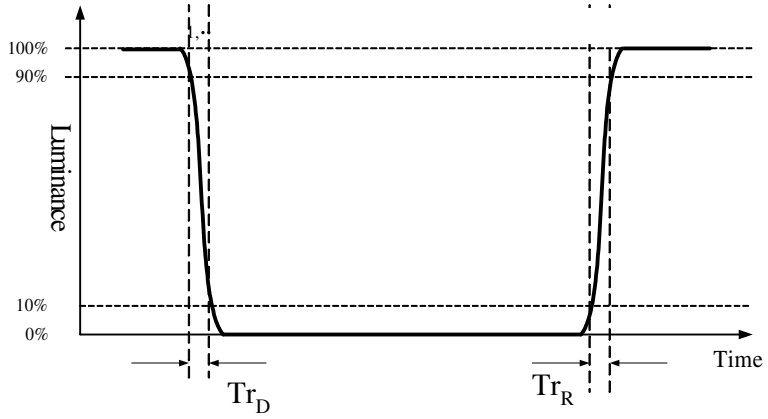


Fig.4-4 Response time

6. 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 Fig. 4-5.

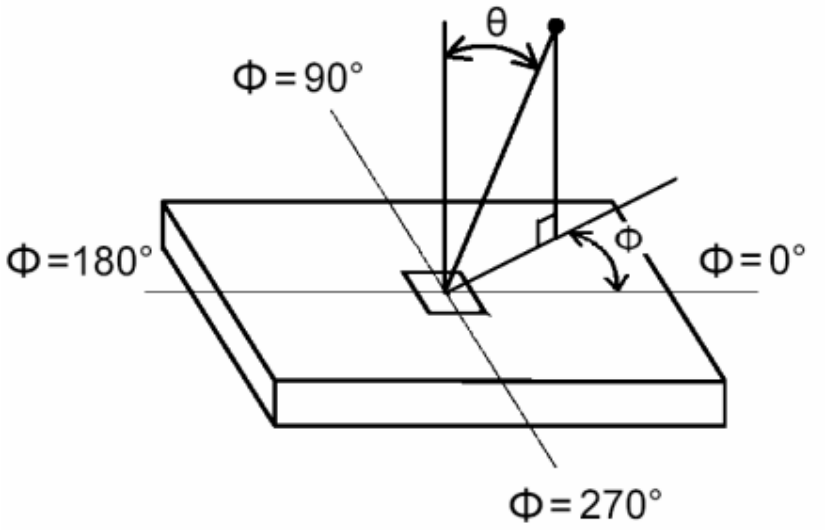


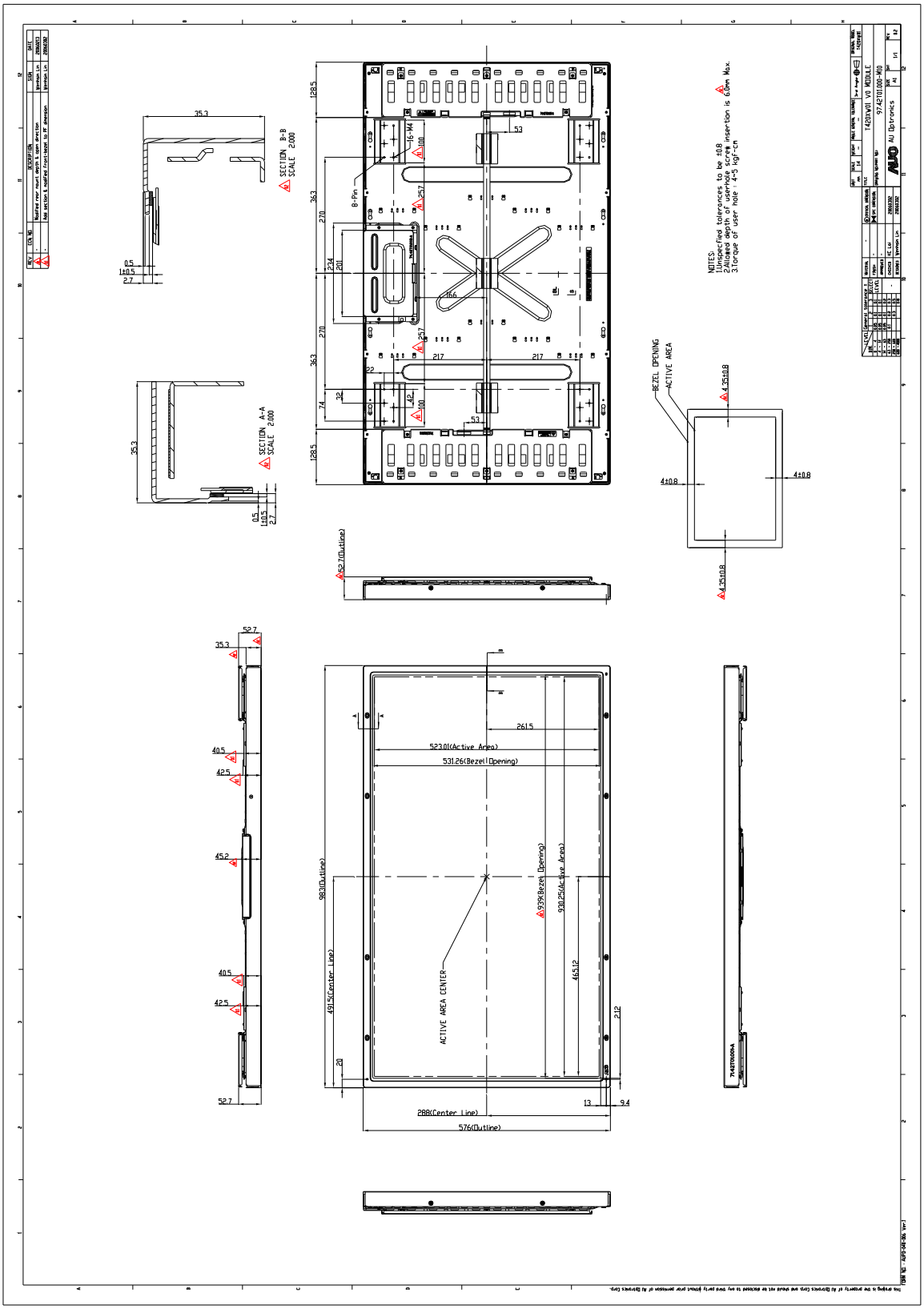
Fig.4-5 Viewing Angle Definition

5. Mechanical Characteristics

The contents provide general mechanical characteristics for the model T420XW01. In addition the figures in the next page are detailed mechanical drawing of the LCD.

Outline Dimension	Horizontal (typ.)	983.0mm
	Vertical (typ.)	576.0mm
	Depth (typ.)	52.7mm (with inverter)
Bezel Area	Horizontal (typ.)	939.0mm
	Vertical (typ.)	531.3mm
Active Display Area	Horizontal	930.25mm
	Vertical	523.01mm
Weight	15000g (Max)	
Surface Treatment	AG, 3H	

2D drawing



6. Reliability

No	Test Item	Condition
1	**High temperature storage test**	Ta=60℃, 300hr judge
2	**Low temperature storage test**	Ta=-20℃, 300h judge
3	**High temperature/High humidity operation test**	Ta=50℃, 80%RH, 300hr judge (interval 3min)
4	**High temperature operation test**	Ta=50℃, 300hr judge
5	**Low temperature operation test**	Ta=-5℃, 300hr judge
6	**Thermal shock**	-20C/0.5hr ~ 60C/0.5hr, 10cycle
7	**Vibration test (non-operating)**	Wave form: Random Vibration level: 1.5G RMS, Bandwidth: 10-500Hz Duration: X, Y, Z (1hr each direction)
8	**Shock test (non-operating)**	Shock level: 50G Waveform: half since wave, 11ms Direction: ±X, ±Y, ±Z (One time each direction)
9	**Vibration test (with carton)**	Wave form: Random Vibration level: 2.16G RMS, Bandwidth: 5~500Hz Duration: X, Y, Z (120min each direction)
10	**Drop test (with carton)**	Height: 46cm 1 corner, 3 edges, 6 surfaces (ASTMD4169-I)

7. International Standard

7-1. Safety

(1) UL6500, UL60065, Underwriters Laboratories, Inc. (AUO file number : E204356)
Audio and video electronic apparatus, safety requirement.

(2) CSA E60065, Canadian Standards Association
Audio, video and similar electronic apparatus, safety requirement.

(3) IEC 60065 ver. 7th,European Committee for Electro technical Standardization (CENELEC)
Audio, video and similar electronic apparatus, safety requirement

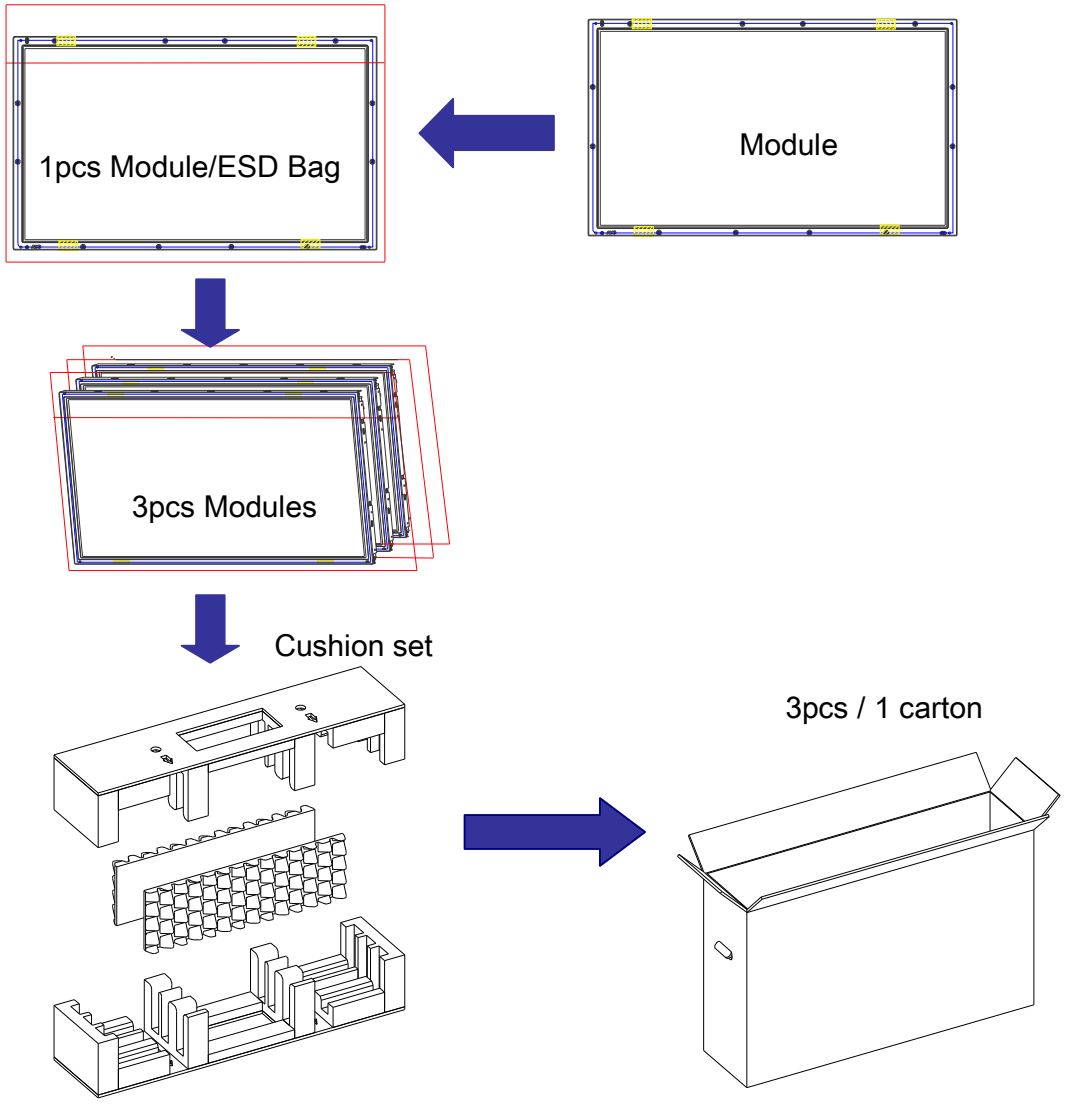
7-2. EMC

(1) Use CISPR20.

(2) Use FCC class B part15.

8. Packing

Packing Instruction



Package information:

Carton outside dimension : 1087x285x716mm

Carton/Package weight : 3kg

Gross weight (per Box) : 48kg

Shipping label

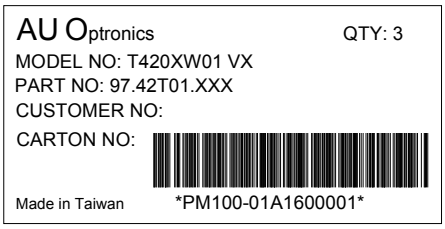
Green Mark Description:

For Pb Free products, AUO will 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.)

Carton label



Pallet information

By air cargo : : (4x1) x2 layers, one pallet put 8 boxes, total 24 pcs module.

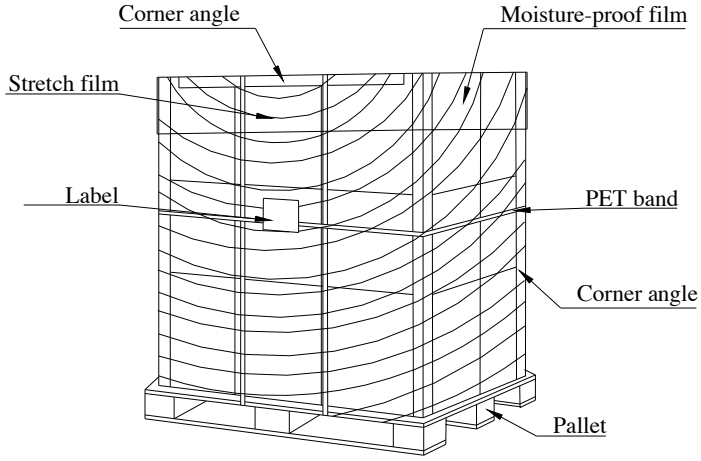
By sea : (4x1) x3 layers, one pallet put 12 boxes, total 24 pcs module.

Pallet dimension : 1150x1100x120mm

Pallet weight : 10kg

By air total weight : 48 kg/box X 8 boxes=384 kg (with pallet weight 394kg)

By sea total weight : 48 kg/box X 12 boxes=576 kg (with pallet weight 586kg)



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 on back side of panel.

(2) 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.

(3) You should adopt radiation structure to satisfy the temperature specification.

(4) 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.

(5) Do not touch, push or rub the exposed polarizers 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.)

(6) 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 polarizers. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.

(7) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.

(8) Do not open the case because inside circuits do not have sufficient strength.

9-2 OPERATING PRECAUTIONS

(1) The spike noise causes the mis-operation of circuits. It should be lower than following voltage: V=±200mV(Over and under shoot voltage)

(2) Response time depends on the temperature. (In lower temperature, it becomes longer..)

(3) Brightness 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.

(4) 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.

(5) When fixed patterns are displayed for a long time, remnant image is likely to occur.

(6) 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 wrist band 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.

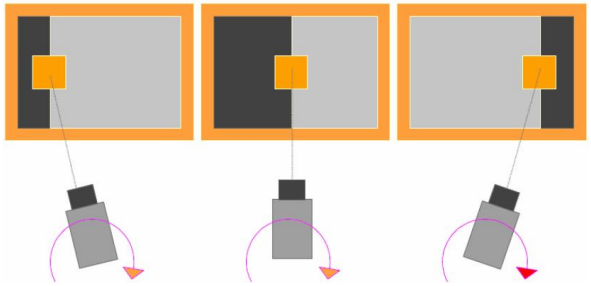
(2) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of flue still on the Bezel after the protection film is peeled off.

(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.

Appendix : MPRT (Moving Picture Response Time)

MPRT definition: moving picture response time is the average value of 16*16 gray to gray table. The table data is measured under 25℃ room temperature after 1hour panel warm-up.

Equipment: MPRT-1000 with CCD camera and Galvano Meter Mirror



AUO MPRT measured data: 9ms(Ref)