Product Description: G420XW01_V0 TFT-LCD PANEL with RoHS Guarantee

AUO Model Name: G420XW01 V0

Customer Part No/Project Name:

Customer Signature	Date	AUO	Date
		Approved By: Peter ML Lee	
		Reviewed By: Kelvin Chou	
		Prepared By: Tung Yu Chen	

Product Specifications

42.0'' WXGA Color TFT-LCD Module

Model Name: G420XW01 V.0

(*) Preliminary Specifications

( ) Final Specifications

Note: This Specification is subject to change without notice.

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Record of Revision

Version	Date	No	Description	Remark
0.0	Mar 19,'06		First Draft	

1. General Description

This specification applies to the 42.0 inch Color TFT-LCD Module G420XW01 V0. This LCD module has a TFT active matrix type liquid crystal panel 1366x768 pixels, and diagonal size of 42.0 inch. This module supports 1366x768 XGA-Wide modes (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 G420XW01 V0 has been designed to apply the 8-bit 1 channel LVDS interface operation. It is intended to support displays where high brightness, wide viewing angle, high color saturation, and high color depth are very important.

The data on this specification sheet is applicable when LCD module is placed in portrait position.

* General Information

| Items	Specification	Unit	Note
Display Mode	AMVA		
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 63(D)	mm	With inverter
Driver Element	a-Si TFT active matrix		
Display Colors	16.7M	Colors	
Number of Pixels	1366x768	Pixel	
Pixel pitch	0.681	mm	
Pixel Arrangement	RGB vertical stripe		
Display Mode	Normally Black		
RoHS	Compliance		
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.

Parameter	Symbol	Min.	Max.	Unit	Note
Logic/LCD Driving Voltage	V_{DD}	-0.3	14	V	1
Input Voltage of Signal	Vin	-0.3	3.6	V	1
BLU Input Voltage	V_{DDB}	-0.3	26	V	1
BLU Control Voltage	BL_{ON}	-0.3	5.5	V	1
Operating Temperature	T_{OP}	0	50	□	2
Storage Temperature	T_{ST}	-20	60	□	2
Operating Ambient Humidity	H_{OP}	10	90	%RH	2
Storage Humidity	H_{ST}	10	90	%RH	2

Note 1 : Duration = 50msec

Note 2 : Maximum Wet-Bulb should be 39□ and No condensation.
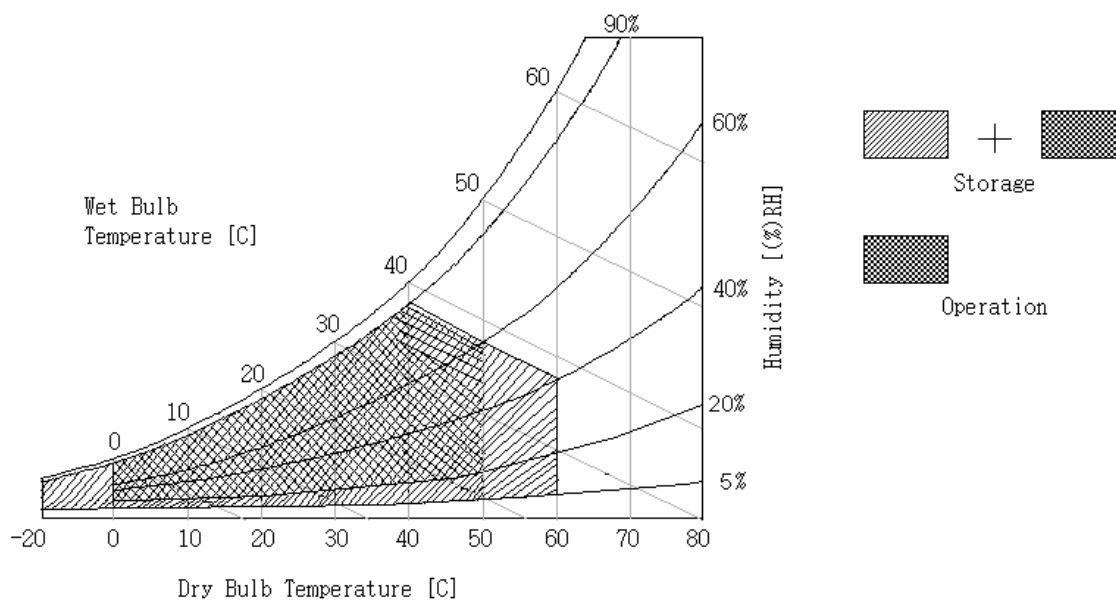
3. Electrical Specification

The G420XW01 V0 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	Value			Unit	Note
			Min.	Typ.	Max.		
LCD							
Power Supply Input Voltage		V_{dd}	11.4	12.0	12.6	V	
Power Supply Input Current		I_{dd}	-	0.75	TBD	A.	1
Power Consumption		P_C	-	9	(10)	W	1
Inrush Current		I_{RUSH}	-	-	(5)	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	V	
	Input Low Threshold Voltage	V_{IH} (Low)	0		0.7	V	
Backlight Power Consumption			-	248	-	W	2
Lamp Life Time			50000	60,000		hr	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.

Note :

1. Vdd=12.0V, fv=60Hz, fCLK=81.5 Mhz , 25℃, Vdd Duration time= 400 μs , Test pattern : white pattern

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 = 1.25V
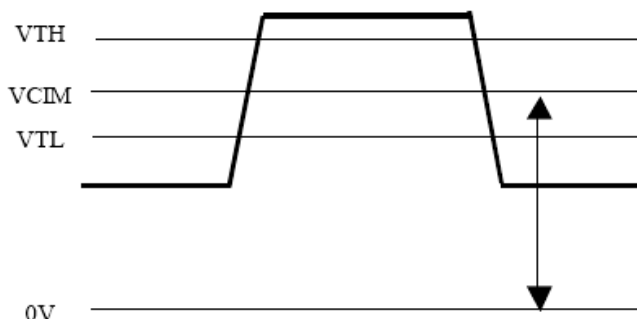
Figure : LVDS Differential Voltage

5. Measurement Condition: Rising time = 400μs

G420XW01 V0
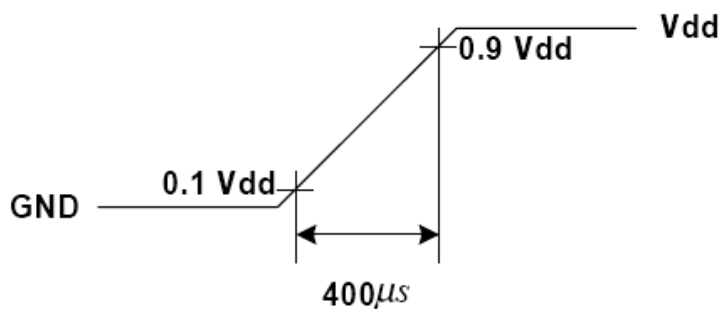
3-2 Interface Connections

LCD connector: FI-X30SSL-HF (JAE) or equivalent

Mating connector: FI-30C2L (JAE) or equivalent

Pin no	Symbol	Function	Note
1	VCC	+12V, DC, Regulated	
2	VCC	+12V, DC, Regulated	
3	VCC	+12V, DC, Regulated	
4	VCC	+12V, DC, Regulated	
5	GND	Ground and Signal Return	
6	GND	Ground and Signal Return	
7	GND	Ground and Signal Return	
8	GND	Ground and Signal Return	
9	LVDS Option	Low/Open for Normal (NS), High for JEIDA	Default : NS mode
10	Reserved	Open or High	For AUO internal test
11	GND	Ground and Signal Return for LVDS	
12	RXIN0-	LVDS Channel 0 negative	
13	RXIN0+	LVDS Channel 0 positive	
14	GND	Ground and Signal Return for LVDS	
15	RXIN1-	LVDS Channel 1 negative	
16	RXIN1+	LVDS Channel 1 positive	
17	GND	Ground and Signal Return for LVDS	
18	RXIN2-	LVDS Channel 2 negative	
19	RXIN2+	LVDS Channel 2 positive	
20	GND	Ground and Signal Return for LVDS	
21	RXCLKIN-	LVDS Clock negative	
22	RXCLKIN+	LVDS Clock positive	
23	GND	Ground and Signal Return for LVDS	
24	RXIN3-	LVDS Channel 3 negative	
25	RXIN3+	LVDS Channel 3 positive	
26	GND	Ground and Signal Return for LVDS	
27	Reserved	Open or High	For AUO internal test
28	Reserved	Open or High	For AUO internal test
29	GND	Ground and Signal Return	
30	GND	Ground and Signal Return	

FOR PROMATE INTERNAL USE ONLY

LVDS Option = High➔JEIDA
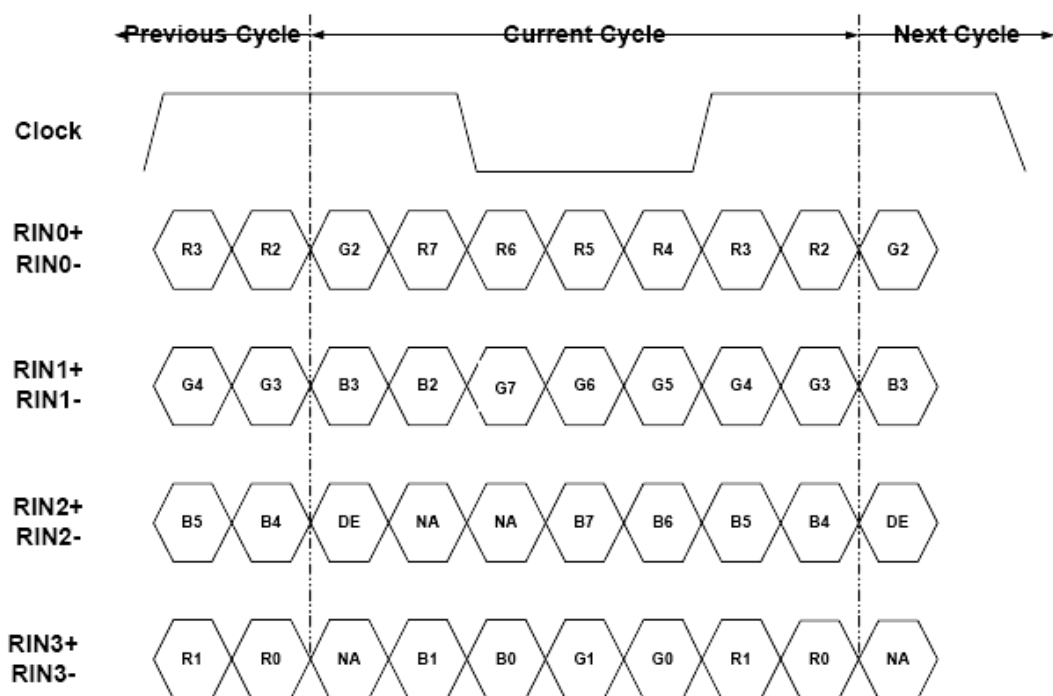
LVDS Option = Low/Open➔NS
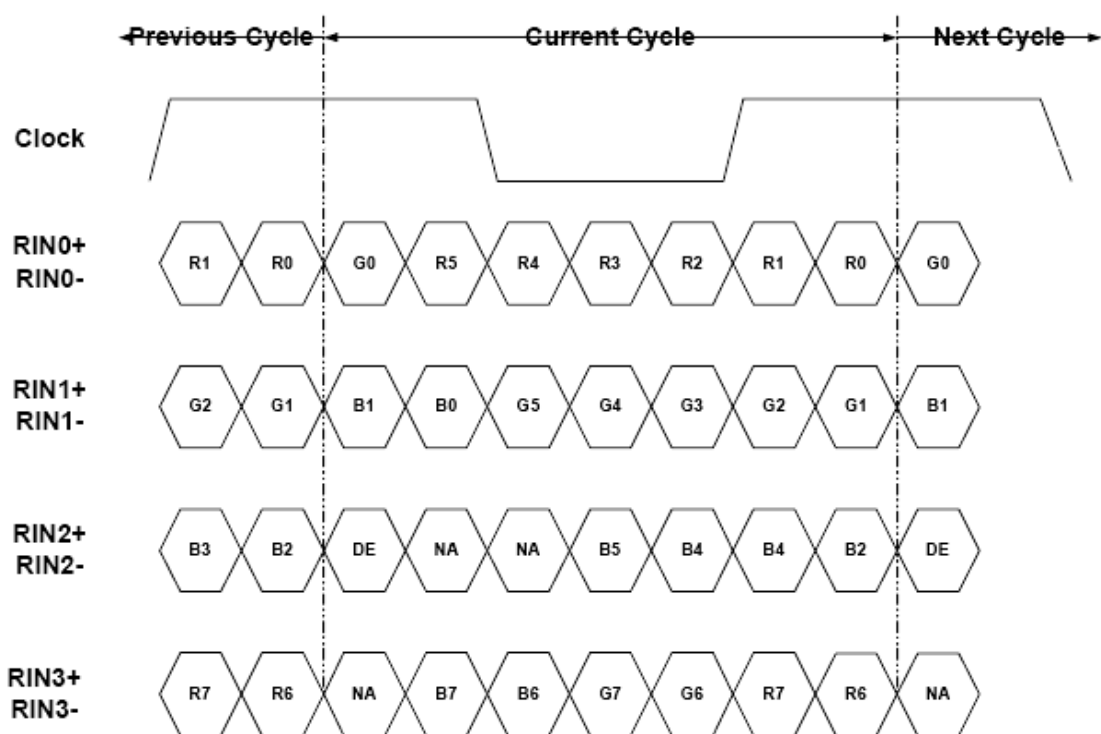
Backlight Connector Pin Configuration

1. Electrical specification

No	Item	Symbol		Test Condition	Min	Typ	Max	Unit	Note
1	Input Voltage	V_{DDB}		--	22.8	24	25.2	V	
2	Input Current	I_{DDB}		V_{DDB}=24V 100%brightness	8.9	9.4	9.9	A	1
3	Input Power	P_{DDB}		V_{DDB}=24V 100%brightness	-	248	-	W	1
4	Input Inrush current	I_{RUSH}		V_{DDB}=24V 100%brightness			TBD	A	2
5	Output Frequency	F_{BL}		V_{DDB}=24V		58		KHz	
6	On/Off Control Voltage	V_{BLON}	On	V_{DDB}=24V	2.0	3.3	5	V	
			Off	V_{DDB}=24V	0.0	-	0.8	V	
7	On/Off Control Current	I_{BLON}		V_{DDB}=24V	0		2	mA	
8	External PWM Control Voltage	EV_{PWM}	Max	--	2.0		3.3	V	
			Min	--	0		0.8	V	
9	External PWM Control Current	EI_{PWM}	Max	PWM = 100%	0		2	mA	
			Min	PWM = 30%	0		2	mA	
10	External PWM Duty Ratio	ED_{PWM}		--	30		100	%	
11	External PWM Frequency	EF_{PWM}		--	150	180	300	Hz	
12	Internal PWM Control Voltage	IV_{PWM}		V_{DDB}=24V	0		3.3	V	

（Ta=25±5□, Turn on for 45 mins）

Note 1: A_{DIM}= Open/3.3V; P_{DIM}=Open/3.3V

Note 2: Duration = 20ms

2. Input specification

Master Board:

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

CN1 : S14B-PH-SM3-TB(JST)		
No	Signal Name	Feature
1	V_{BL}	Operating Voltage Supply, +24V DC regulated
2	V_{BL}	Operating Voltage Supply, +24V DC regulated
3	V_{BL}	Operating Voltage Supply, +24V DC regulated
4	V_{BL}	Operating Voltage Supply, +24V DC regulated
5	V_{BL}	Operating Voltage Supply, +24V DC regulated
6	GND	Ground and Current Return
7	GND	Ground and Current Return
8	GND	Ground and Current Return
9	GND	Ground and Current Return
10	GND	Ground and Current Return
11	A_{DIM}	GND: 80%; Open/High (3.3V); 100%, Luminance
12	V_{BLON}	GND: BL Off; Open/High (3.3V): BL On
13	P_{DIM}	External PWM (AC Signal Control Duty); Internal PWM (DC Power Control Duty, 0~3.3V); Open/High (+3.3V, 100% Duty) for 100%
14	SEL pin	GND: External PWM dimming; Open/High(3.3V): Internal PWM dimming

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

CN2 : S12B-PH-SM3-TB(JST)		
No	Signal Name	Feature
1	V_{BL}	Operating Voltage Supply, +24V DC regulated
2	V_{BL}	Operating Voltage Supply, +24V DC regulated
3	V_{BL}	Operating Voltage Supply, +24V DC regulated
4	V_{BL}	Operating Voltage Supply, +24V DC regulated
5	V_{BL}	Operating Voltage Supply, +24V DC regulated
6	GND	Ground and Current Return
7	GND	Ground and Current Return
8	GND	Ground and Current Return
9	GND	Ground and Current Return
10	GND	Ground and Current Return
11	NC	No Connection
12	NC	No Connection

Slave Board:

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

CN1 : S14B-PH-SM3-TB(JST)		
No	Signal Name	Feature
1	V_{BL}	Operating Voltage Supply, +24V DC regulated
2	V_{BL}	Operating Voltage Supply, +24V DC regulated
3	V_{BL}	Operating Voltage Supply, +24V DC regulated
4	V_{BL}	Operating Voltage Supply, +24V DC regulated
5	V_{BL}	Operating Voltage Supply, +24V DC regulated
6	GND	Ground and Current Return
7	GND	Ground and Current Return
8	GND	Ground and Current Return
9	GND	Ground and Current Return
10	GND	Ground and Current Return
11	NC	No Connection
12	NC	No Connection
13	NC	No Connection
14	NC	No Connection

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

CN2 : S12B-PH-SM3-TB(JST)		
No	Signal Name	Feature
1	V_{BL}	Operating Voltage Supply, +24V DC regulated
2	V_{BL}	Operating Voltage Supply, +24V DC regulated
3	V_{BL}	Operating Voltage Supply, +24V DC regulated
4	V_{BL}	Operating Voltage Supply, +24V DC regulated
5	V_{BL}	Operating Voltage Supply, +24V DC regulated
6	GND	Ground and Current Return
7	GND	Ground and Current Return
8	GND	Ground and Current Return
9	GND	Ground and Current Return
10	GND	Ground and Current Return
11	NC	No Connection
12	NC	No Connection

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 (60Hz)

Signal	Item	Symbol	Min	Type	Max	Unit
Vertical Section	Period	Tv	789		822	Th
	Active	Tdisp (v)	—	768	—	Th
	Blanking	Tblk (v)	21		54	Th
Horizontal Section	Period	Th	1414		1722	Tclk
	Active	Tdisp (h)	—	1366	—	Tclk
	Blanking	Tblk (h)	48		356	Tclk
Clock	Period	CLK	11.36	—	15.38	ns
	Frequency	Freq	65		88	MHz
Vertical Frequency	Frequency	Vs	58	60	62	Hz
Horizntal Frequency	Frequency	Hs	45.76		50.96	KHz

Vertical Frequency Range B (50Hz)

Signal	Item	Symbol	Min	Type	Max	Unit
Vertical Section	Period	Tv	789		822	Th
	Active	Tdisp (v)	—	768	—	Th
	Blanking	Tblk (v)	21		54	Th
Horizontal Section	Period	Th	1414		1722	Tclk
	Active	Tdisp (h)	—	1366	—	Tclk
	Blanking	Tblk (h)	48		356	Tclk
Clock	Period	CLK	13.51	—	18.52	ns
	Frequency	Freq	54		74	MHz
Vertical Frequency	Frequency	Vs	48	50	52	Hz
Horizntal Frequency	Frequency	Hs	37.87		42.74	KHz

3-4 Signal Timing Waveforms
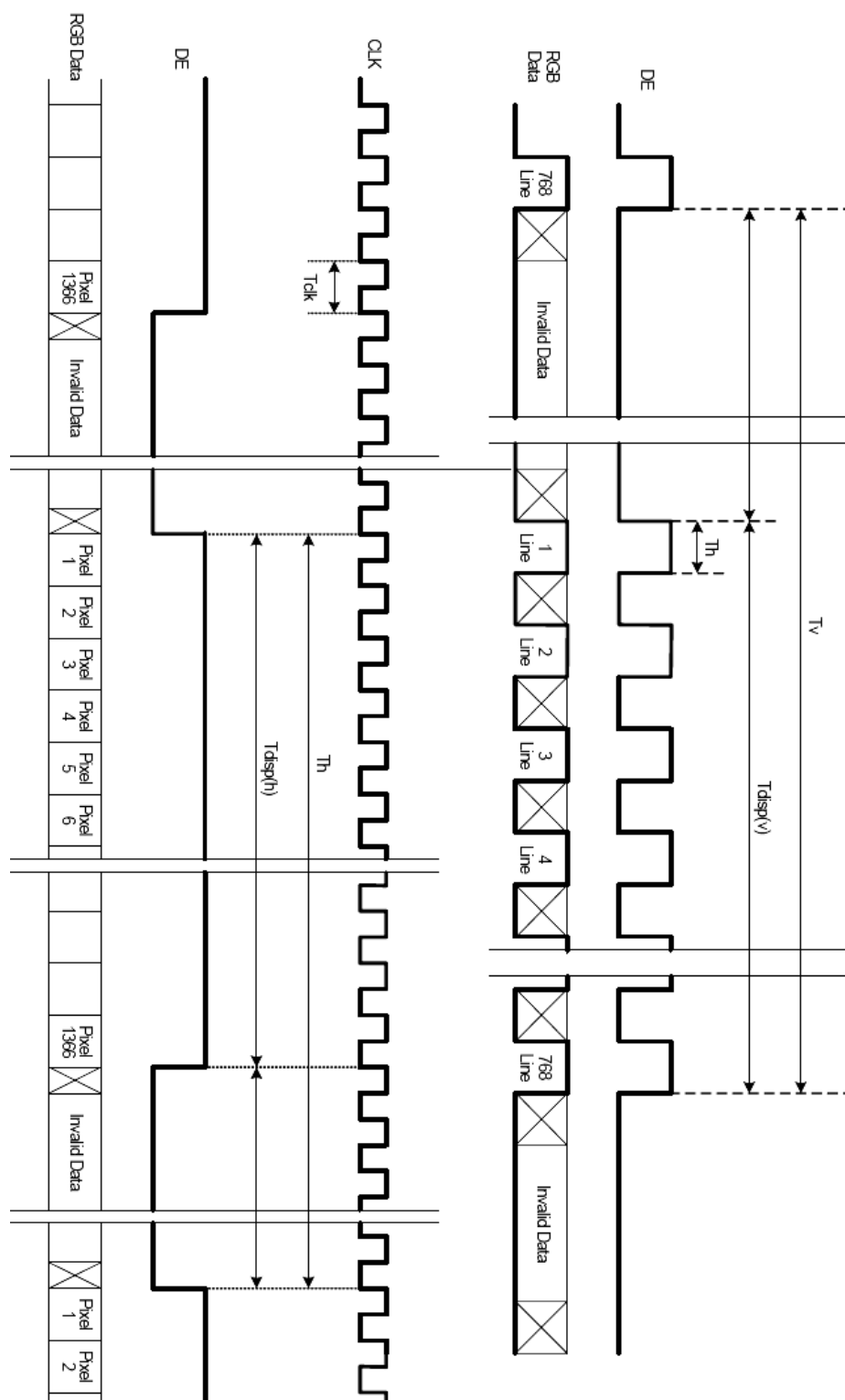
3-5 Color Input Data Reference

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
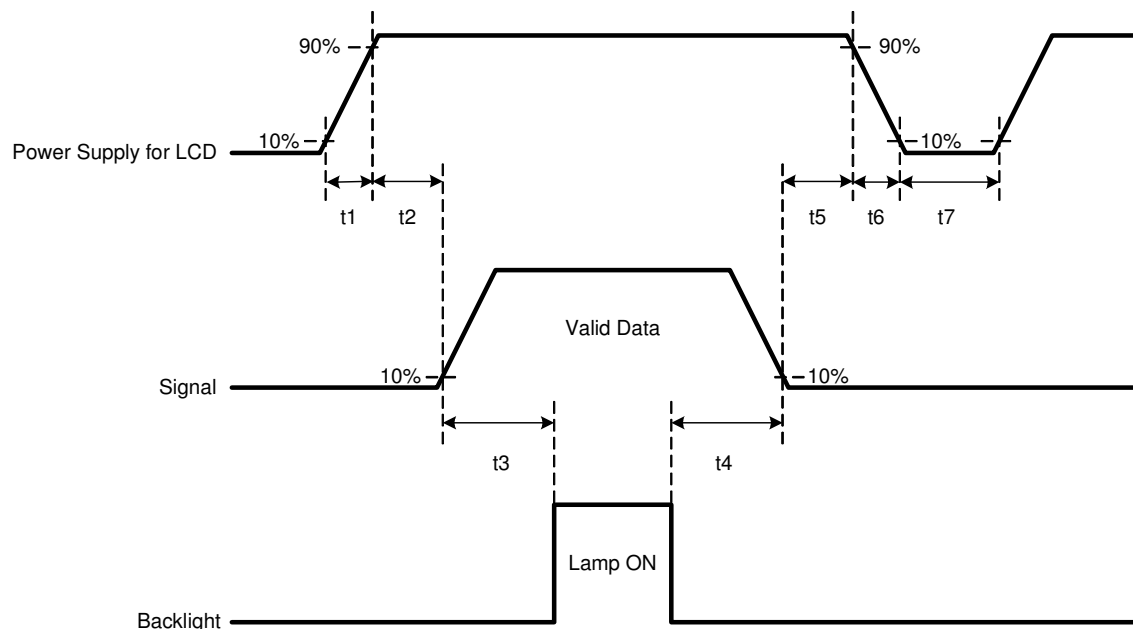
Parameter	Values			Units
	Min.	Typ.	Max.	
t1	400	-	20000	us
t2	20	-	50	ms
t3	700 or (200 *)	-	-	ms
t4	200	-	-	ms
t5	50	-	-	ms
t6	0.47	-	30	ms
t7	1.0	-	-	s

* : If t3=200ms, input black signal till 700ms from system is necessary.In case of t3<200ms, the abnormal display will be happened. But it will not damage timing controller.

Apply the lamp voltage within the LCD operating range. When the backlight turns on before the LCD operation or the LCD turns off before the backlight turns off, the display may momentarily become abnormal.

Caution : The above on/off sequence should be applied to avoid abnormal function in the display. In case of handling, make sure to turn off the power when you plug the cable into the input connector or pull the cable out of the connector

2 Power Sequence of Inverter
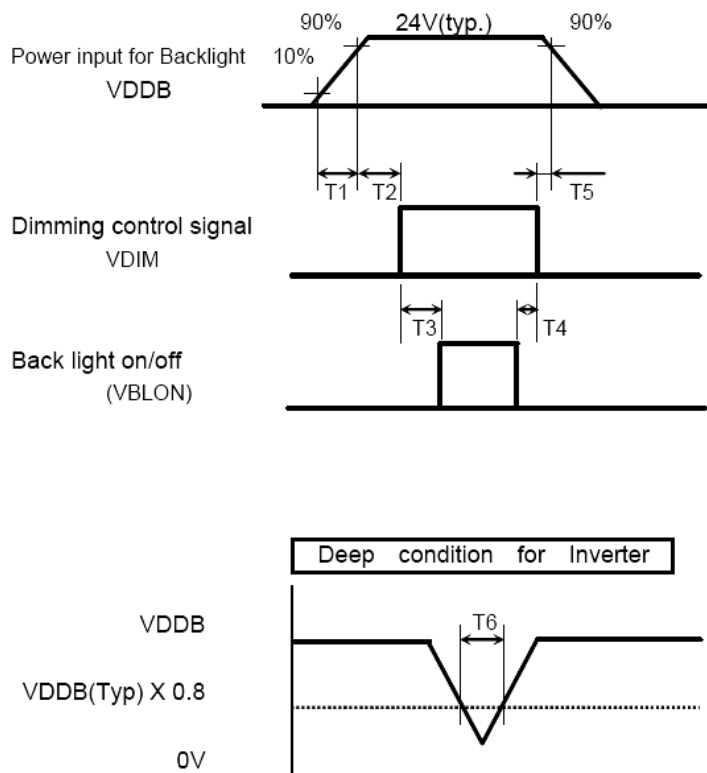
Parameter	Values			Units
	Min.	Typ.	Max.	
T1	20	-	-	ms
T2	0	-	-	ms
T3	500	-	-	ms
T4	0	-	-	ms
T5	1	-	-	ms
T6	-	-	10	ms

4. Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 60 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°.
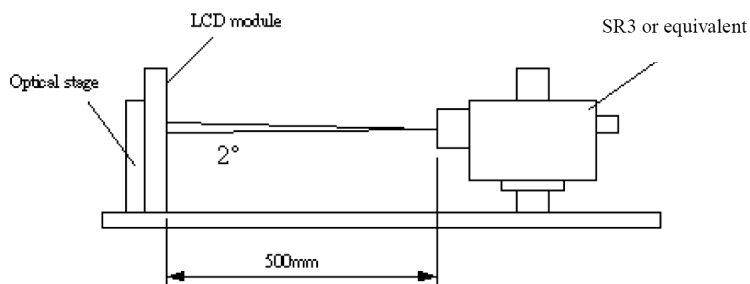
Fig.4-1 Optical measurement equipment and method

Parameter		Symbol		Values			Units	Notes
				Min.	Typ.	Max.		
Contrast Ratio		CR		1000	1500	-		1
Surface Luminance, white		LWH		550	700	-	cd/㎡	2
Luminance Variation		δ$_{WHITE}$	5 p	-	-	1.3		3
Response Time (Average)		T$_γ$			8		ms	4,5 (Gray to Gray)
	Rise Time	Tr		-	15		ms	4
	Decay Time	Tf		-	5		ms	4
Color Chromaticity	RED	R$_X$			0.640			
		R$_Y$			0.330			
	GREEN	G$_X$			0.290			
		G$_Y$	Typ –0.03		0.600	Typ +0.03		
	BLUE	B$_X$			0.150			
		B$_Y$			0.060			
	WHITE	W$_X$			0.280			
		W$_Y$			0.290			
Viewing Angle								CR>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:

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

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} = 6.3A. $L_{WH}=L_{on1}$, Where Lon1 is the luminance with all pixels displaying white at center 1 location.
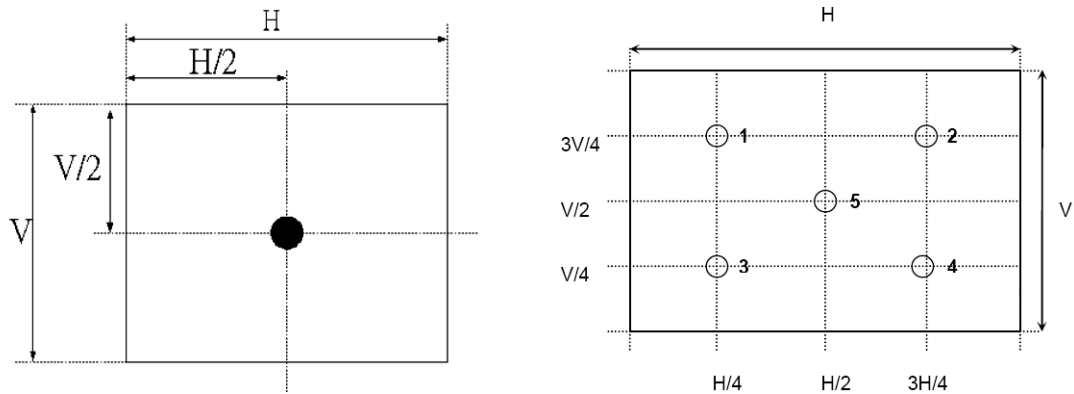
Fig.4-2 Optical measurement point

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

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

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.
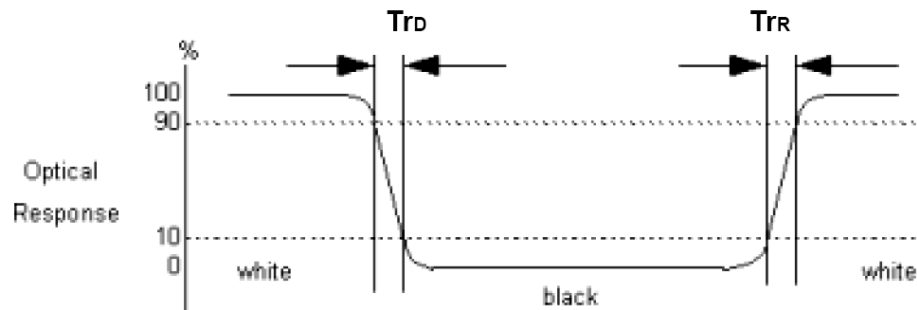
Fig.4-3 Response time

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.
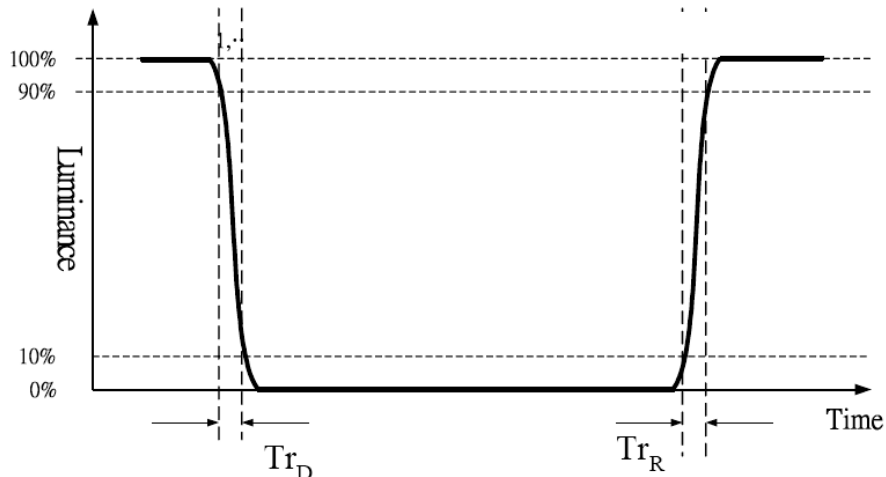
Fig.4-4 Response time

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. (Optical measurement by SR3)
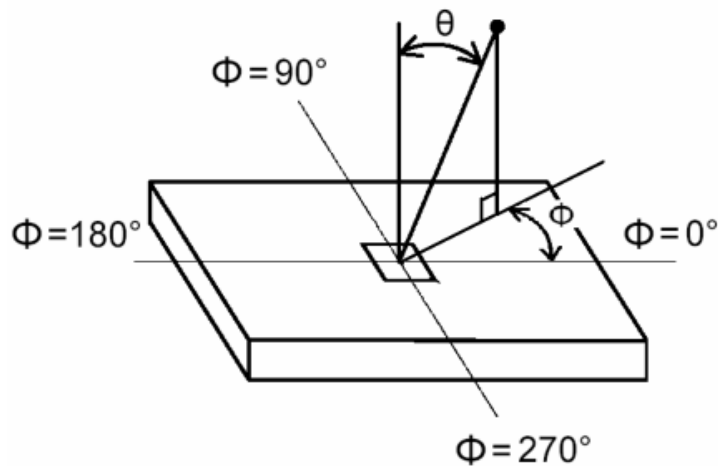
Fig.4-5 Viewing Angle Definition

5. Mechanical Characteristics

The contents provide general mechanical characteristics for the model G420XW01 V0. In addition the figures in the next page are detailed mechanical drawing of the LCD.

Outline Dimension	Horizontal (typ.)	983.0 mm
	Vertical (typ.)	576.0 mm
	Depth (max.)	63 mm(with inverter)
Bezel Opening Area	Horizontal (typ.)	939.0 mm
	Vertical (typ.)	531.3 mm
Display Active Area	Horizontal (typ.)	930.25 mm
	Vertical (typ.)	523.01 mm
Weight	12000 g (Max.)	
Surface Treatment	AG, 3H	

2-D Drawing (front view)

G420XW01 V0
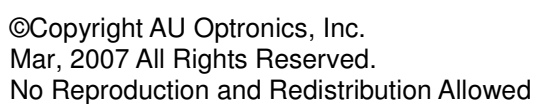
22/30

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) UL60065, Underwriters Laboratories, Inc. (AUO file number : E204356)

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

(2) CISPR 20 "Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment. " International Special committee on Radio Interference.

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

8. Packing

1pcs Module/ESD Bag

Module

3pcs Modules

Cushion top

Cushion set

Cushion down

" H " Tape

3pcs / 1 carton
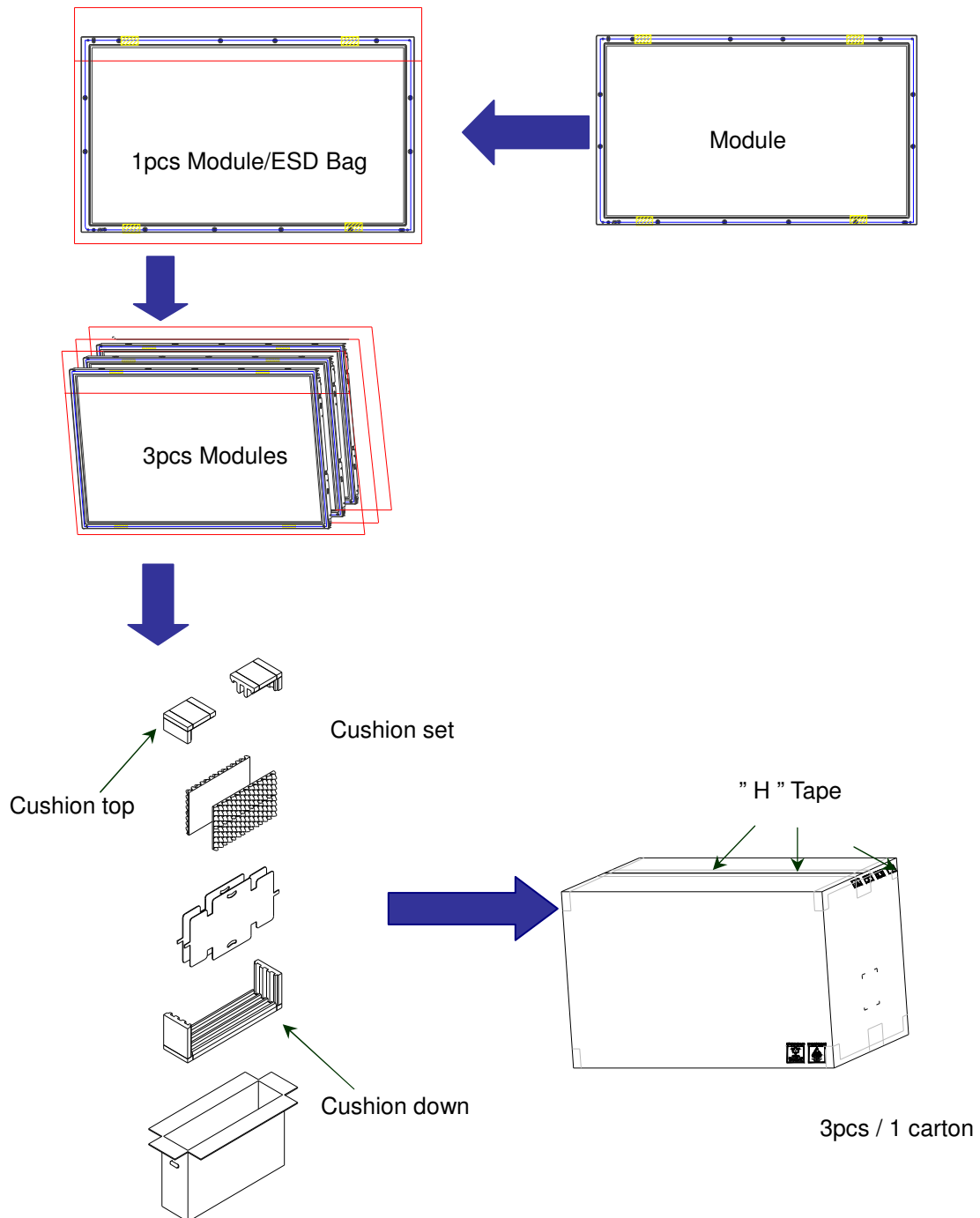
Package Information:

Carton outside dimension: 1086(L)mm× 285(W)mm× 693(H)mm

Carton/Package weight : 5kg

Gross weight (per Box): 41kg

Shipping Label (on the rear side of TFT-LCD display)

```
*xxxxxxxxxxx-xxxx*    Model No: G420XW01    XX/XX    cRUus    RoHS    Pb
                              VX         MADE IN TAIWAN  E204356
                                            xxxx

        xxxxxxxxxxxxxxxxxx
```

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

```
AU Optronics                    QTY:3
MODEL NO: G420XW01 VX
PART NO: 97.42G01.XXX
CUSTOMER NO:
CARTON NO:    [barcode]

Made in XXXXXX    *xxxxx-xxxxxxxxxx*
```

Pallet Information

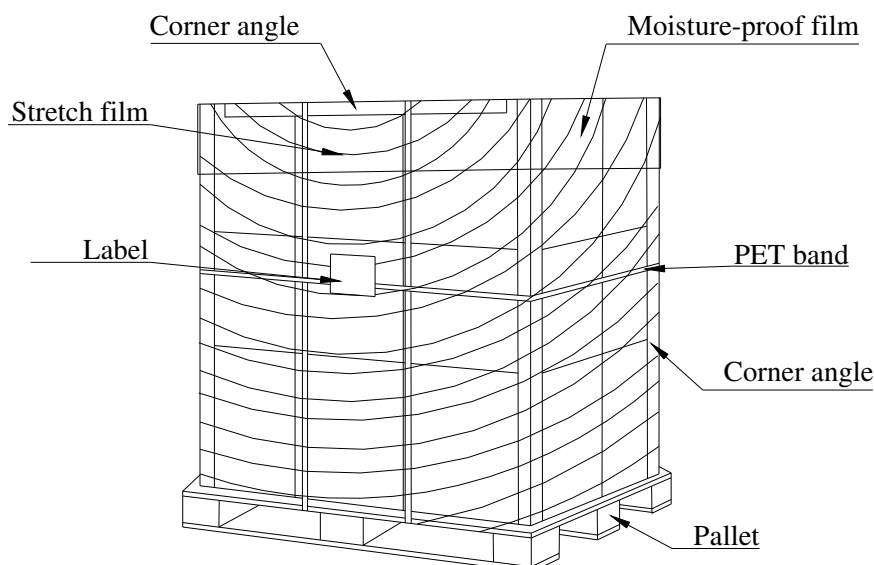By air cargo : : (4x1) x2 layers, one pallet put 8 boxes, total 24 pcs module.

By sea : (4x1) x3 layers, one pallet put 12 boxes, total 36 pcs module.

Pallet dimension : 1150mm× 1100mm× 126mm

Pallet weight : 15.5kg

By air total weight : 41 kg/box X 8 boxes=328 kg (with pallet weight 343.5 kg)

By sea total weight : 41 kg/box X 12 boxes=492 kg (with pallet weight 507.5 kg)

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.

(7) Since front polarizer is easily damaged, please be cautious and not to scratch it.

(8) Be sure to turn off power supply when inserting or disconnecting from input connector.

(9) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.

(10) When the panel surface is soiled, wipe it with absorbent cotton or soft cloth.

(11) Since the panel is made of glass, it may be broken or cracked if dropped or bumped on hard surface.

(12) Since CMOS LSI is used in this module, take care of static electricity and insure human earth when handling.

(13) Do not open nor modify the module assembly.

(14) Do not press the reflector sheet at the back of the module to any direction.

(15) At the insertion or removal of the Signal Interface Connector, be sure not to rotate nor tilt the Interface Connector of the TFT Module.

(16) After installation of the TFT Module into an enclosure (Notebook PC Bezel, for example), do not twist nor bend the TFT Module even momentary. 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.

(17) Cold cathode fluorescent lamp in LCD contains a small amount of mercury. Please follow local ordinances or regulations for disposal.

(18) 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.

(19) The LCD module is designed so that the CCFL in it is supplied by Limited Current Circuit (IEC60950 or UL1950). Do not connect the CCFL in Hazardous Voltage Circuit.

(20) Severe temperature condition may result in different luminance, response time and lamp ignition voltage.

(21) Continuous operating TFT-LCD display under low temperature environment may accelerate lamp exhaustion and reduce luminance dramatically.

(22) The data on this specification sheet is applicable when LCD module is placed in portrait position.

(23) Continuous displaying fixed pattern may induce image sticking. It's recommended to use screen saver or shuffle content periodically if fixed pattern is displayed on the screen.

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.