# **SPECIFICATION**

Sep-4-2009

**OF** 

# LIQUID CRYSTAL DISPLAY MODULE

Model version:		0		
Document Revision	on:	1		_
				TENTATIVE
	CUSTOME	R APPROVED S	IGNATURE	
	COSTONIE	THI THE VED S		
production and order for this mo	delivery from Micro odel no. will be trea		mer as a specification of e of this specification, and t this specification is auto	ny purchase
production and order for this mo	delivery from Microdel no. will be treated accepted by pure	otips. Without signature and considered that chaser or customer.	e of this specification, an	ny purchase omatically
production and order for this mo acknowledged a	delivery from Microdel no. will be treated accepted by pure	otips. Without signature and considered that chaser or customer.	e of this specification, at t this specification is auto	ny purchase omatically

Revision record								
Document	Model No.	Description	Revision					
Revision	Version No.	Description	by					
	UMSH-3267MD-UB		Ken Lin					
0	(UBSH-M150EN)		Wen-Chie Chi					
	Version No. 0		21-Aug-2009					
1	UMSH-3267MD-3UB	1.Modify the color of LED B/L from white to blue.	Ken Lin					
1	(UBSH-M150EN)	2.Modify the module number from	Wen-Chie Chi					
	Version No. 0	UMSH-3267MD-UB to UMSH-3267MD-3UB.	4-Sep-2009					
/////	Revision 1 ;	UMSH-3267MD-3UB Ver. 0 ; September-04-200	Page: 2					

# **CONTENTS:**

No.	Item	Page
	BASIC SPECIFICATION	
1	1.1 Mechanical Specification	4
	1.2 Display Specification	4
	1.3 Outline Dimension	5
	1.4 Block Diagram	6
	1.5 Interface Pin	7
	ELECTRICAL CHARACTERISTICS	
2	2.1 Absolute Maximum Ratings	8
	2.2 Command Sequence	9
	2.3 Standard Character Pattern	10
	2.4 DC Characteristics	11
	2.5 Back-light Characteristics	12
	2.6 AC Characteristics	13~14
	OPTICAL CHARACTERISTICS	
3	3.1 Condition	15
	3.2 Definition of Optical Characteristics	16
4	RELIABILITY	17
5	PRODUCT HANDING AND APPLICATION	18
6	DATECODE	19
7	PACKING & LOTNO	20~21
8	INSPECTION STANDARD	22~25



### 1. BASIC SPECIFICATION

1.1 Mechanical specifications

Items	Nominal Dimension	Unit
Character Line	20×2 Chars	Pixel
Module Size (W x H x T)	37.0 x 116.0 x 17.2	mm.
Viewing Area (W×H)	73.8 x 16.5	mm.
Active Area (W x H)	70.8 x 11.5	mm.
Character Font ( W × H )	5×8 dots	mm.
Character Size ( W × H )	$3.065 \times 5.56$	mm.
Character Pitch ( W × H )	$3.565 \times 5.94$	mm.
Dot Size (W×H)	0.585 x 0.66	mm.
Dot Pitch (W x H)	0.62 x 0.7	mm.
Driving Method	1/8	Duty
Driving Method	1/4	Bias
Driving IC Package	COB	-
Module Weight	TBD	g

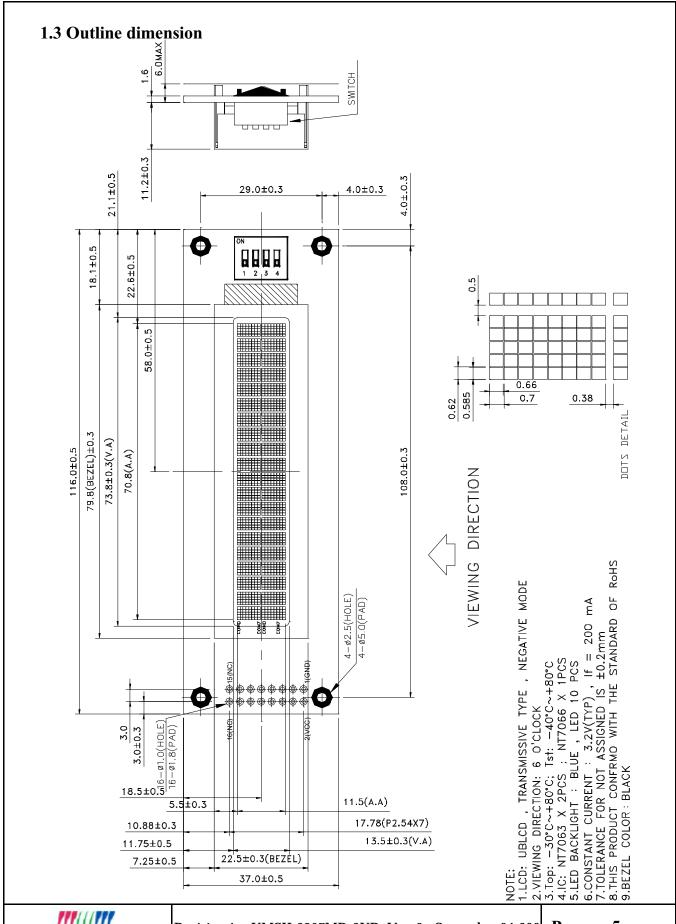
1.2 Display specification

Display	Descriptions	Note
LCD Type	2.95" UB	-
LCD Mode	Negative	-
Polarizer Mode	Transmissive	-
Polarizer UV - Cutting	Without	
Polarizer Surface	Normal	-
Backlight Type	LED	-
Backlight Color	Blue	
Viewing Direction	6 O'clock Direction	-

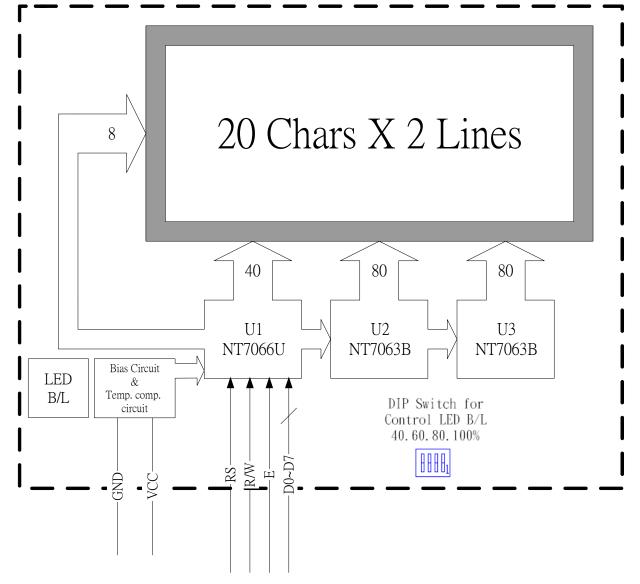
Color tone is slightly changed by temperature and driving voltage.



Revision 1; UMSH-3267MD-3UB Ver. 0; September-04-2009



# 1.4 Block diagram:



# 1.5 Interface pin:

Pin No.	Pin Name	I/O	Description
1	GND	P	Ground.(0V)
2	VCC	P	Power supply.(+5 V)
3	NC	-	Not connection.
4	RS	I	Register select signal:
4	KS	1	0: Instruction register. 1: Data register.
5	R/W	I	Read/Write control signal: 0:Write 1: Read
6	E	I	Read/Write enable signal.
7~14	D0~D7	I	Data bus(8-bits).
15-16	NC	-	Not connection.

# Dip switch for B/L Brightness Control PIN:

1	40 % Brightness of the Backlight.
2	60 % Brightness of the Backlight.
3	80 % Brightness of the Backlight.
4	100 % Brightness of the Backlight.



# 2. ELECTRICAL CHARACTERISTICS

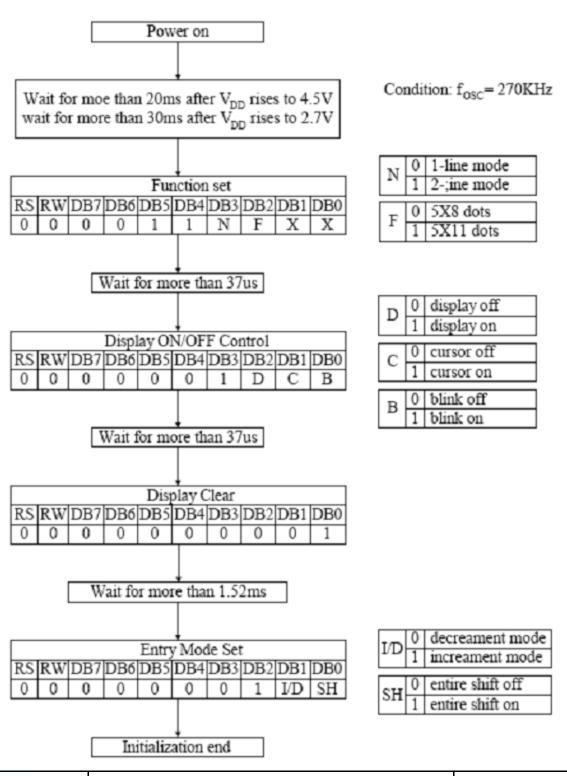
# 2.1 Absolute Maximum Ratings

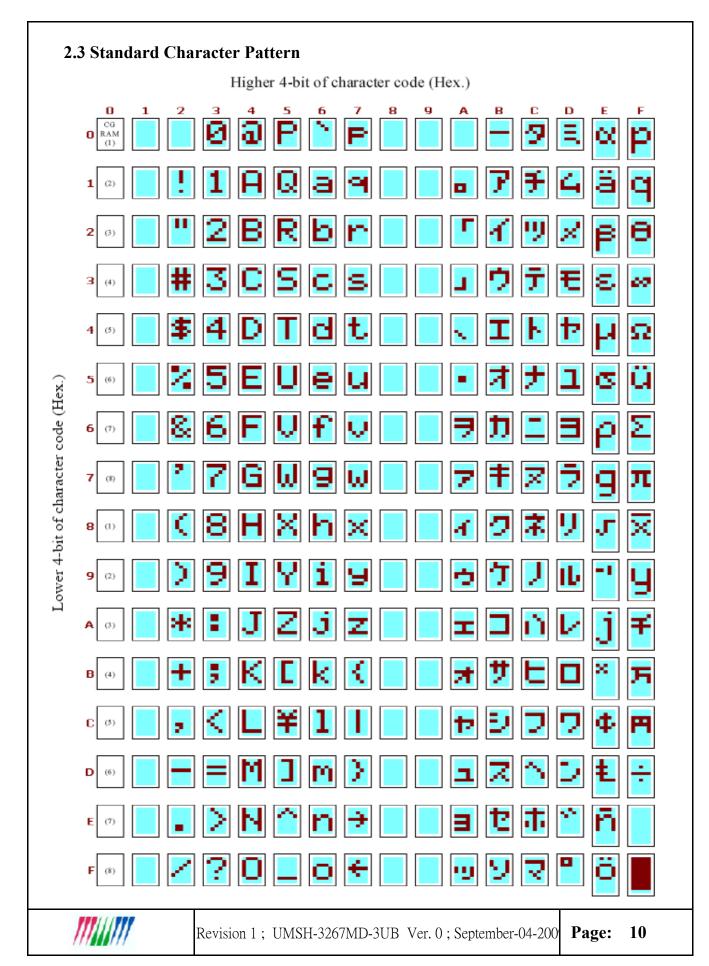
Items	Symbol	Min.	Max.	Unit
Supply voltage	VDD	-0.3	+7.0	V
Supply voltage for driving LCD	VLCD-V5	VDD-15	VDD+0.3	V
Input voltage	VIN	-0.3	VDD+0.3	V
Operate temperature range	Тор	-30	80	°C
Storage temperature range	Тѕт	-40	80	°C



# 2.2 Command Sequence INITIALIZING BY INSTRUCTION

8-bit interface mode





### 2.4 DC Characteristics

Items	Symbol	Min.	Тур.	Max.	Unit	Condition
Supply voltage (Logic)	VDD	TBD	5.0	TBD	V	
		6.55	6.85	7.15	V	Top = 80°C
Supply Voltage (LCD)	VLCD	6.55	6.85	7.15	V	*NOTE1
		6.75	7.05	7.35	V	Top = -30°C
Input logic HIGH	V <sub>I H</sub>	VDD-1.0	-	VDD	V	
Input logic LOW	V <sub>I L</sub>	-0.2	-	1.0	V	
Power supply current	$\mathbf{I}_{ extsf{DD}}$	-	TBD	TBD	mA	*NOTE2
Backlight Voltage	Vee	2.8	3.2	3.6	V	
Backlight current	Iee		200		mA	<b>≭</b> NOTE3

<sup>\*</sup>NOTE1: If change the VDD, the voltage boost and contrast need to be set again.

\*NOTE2: Min. and Max. Voltage is mean within the range will has optimum contrast at Ta:25°C Typ. Voltage is specified as module driving condition: Ta=25  $^{\circ}$ C,  $V_{OP}$  at Optimum Contrast, the measuring condition as below, this value is URT recommend when customer change the set condition, the VLCD will be change.

\*NOTE4:The Back light is constant current.

#### \*NOTE3:

Measuring Condition:

Standard Value MAX.

= 25°C Ta VDD-VSS = 5.0V

VEE-VSS = About 3.2V (200mA)

Fosc = 270 KHzBias = 1/4 Bias= 1/8 Duty Duty

Display Patten = Checkered pattern



# 2.5 Back-light Characteristics

PARAMETER	SYMBOL	MIN	TYP	MAX	Unit	Test Condition	NOTE
Supply Current	If		200		mA	Ta=25°℃	1
Supply Voltage	Vs	2.8	3.2	3.6	V	Ta=25°℃	-

Note 1: The Back light is constant current.



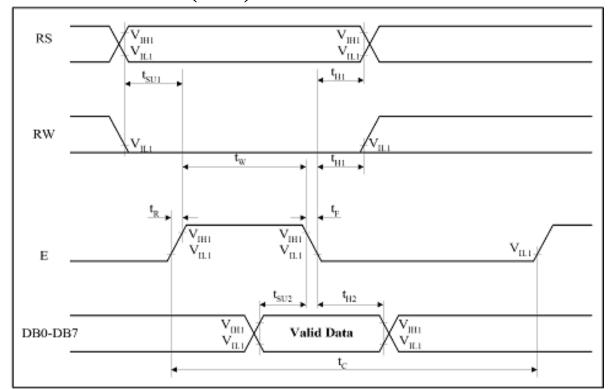
# 2.6 AC Characteristics

 $(V_{DD} = 4.5V\sim5.5V, Ta = -30\sim+85^{\circ}C)$ 

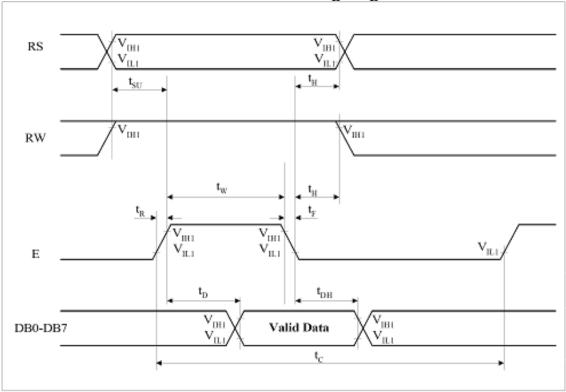
Mode	Characteristic	Symbol	Min.	Тур.	Max.	Unit
	E cycle time	t <sub>C</sub>	500	-	-	
	E rise/fall time	t <sub>R</sub> , t <sub>F</sub>	-	-	20	
Write mode	E pulse width (high, low)	t <sub>W</sub>	230	-	-	
(refer to Fig.6)	R/W and RS setup time	t <sub>su1</sub>	40	-	-	ns
(Telefito Fig.6)	R/W and RS hold time	t <sub>H1</sub>	10	-	-	]
	Data setup time	t <sub>SU2</sub>	60	-	-	
	Data hold time	t <sub>H2</sub>	10	-	-	
	E cycle time	t <sub>C</sub>	500	-	-	
	E rise/fall time	t <sub>R</sub> , t <sub>F</sub>	-	-	20	
Read mode	E pulse width (high, low)	t <sub>W</sub>	230	-	-	
(refer to Fig.7)	R/W and RS setup time	t <sub>s∪</sub>	40	-	-	ns
(Telef to Fig.7)	R/W and RS hold time	t <sub>H</sub>	10	-	-	
	Data output delay time	t <sub>D</sub>	-	-	120	
	Data hold time	t <sub>DH</sub>	5	-	-	



# 2.6 AC Characteristics (Cont.)



# Write mode timing diagram



# Read mode timing diagram

/////////

## 3. OPTICAL CHARACTERISTICS

### 3.1 Characteristics

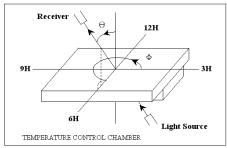
Electrical and Optical Characteristics

No.	Item	Item			ol / temp.	Min.	Тур.	Max.	Unit	Note										
1	Response Time			Tr	<b>25</b> ℃	-	80	160	ms	2										
					<b>25</b> ℃	-	35	70	1115	2										
		Han	Hom	Цоя	Цоя	Цая	Цог	Uor	Uor	Hor	Hor	Hor.		$\Theta_{2^+}$	0°	60	75	-		
	Viewing	1101.	Cr>=2	Θ <sub>2-</sub>	180°	60	75	-	dagraa	3										
Z	2 Angle	Angle Ver.		$\Theta_{1+}$	270°	60	75	-	degree											
				Θ1-	90°	40	50	-	1											
3	3 Contrast Ratio		Cr	<b>25</b> ℃	400	800	-	-	4											
4	4 Brightness			Y		240	400	-	cd/m <sup>2</sup>											

## 3.2 Definition of optical characteristics

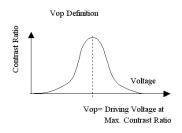
#### **Measurement condition:**

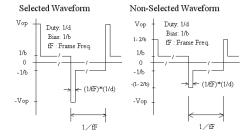
Transmissive and Transflective type



PHOTAL LCD-5000

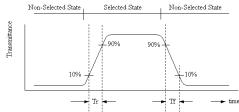
## [Note 1] Definition of LCD Driving Vop and Waveform:





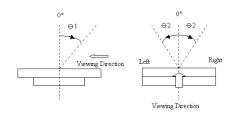
[Note 2] Definition of Response Time

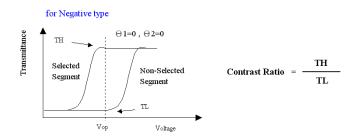
for Negative type



[Note 3] Definition of Viewing Angle:

[Note 4] Definition of Contrast Ratio:







## 4. RELIABILITY:

Item No	Items	Condition	
1	High temperature operating	80 ℃ , 200 hours	
2	Low temperature operating	-30 ℃ , 200 hours	
3	High temperature storage	80 ℃ , 200 hours	
4	Low temperature storage	-40 ℃ , 200 hours	
5	High temperature & humidity storage	60 ℃, 90%RH, 100 hours	
6	Thermal Shock storage	-40 °C, 30min.<=> 80 °C, 30min.	
7	Vibration test	10 => 55 => 10 => 55 => 10 Hz, within 1 minute Amplitude: 1.5mm. 15 minutes for each Direction ( X,Y,Z )	
8	Drop test	Packed, 100CM free fall, 6 sides, 1 corner, 3edges	
9	Life time	50,000 hours 25 °C, 70%RH below, specification condition driving	

- \* One single product test for only one item.
- \* Judgment after test: keep in room temperature for more than 2 hours.
  - Current consumption < 2 times of initial value
  - Contrast > 1/2 initial value
  - Function : work normally



#### 5. PRODUCT HANDLING AND APPLICATION

#### □ PRECAUTION FOR HANDLING LCM

- The LCD module contains a C-MOS LSI. People who operate the LCM should wear ESD protection eguipement to prevent ESD hurt on products.
- Do not input any signal before power is turned on.
- Do not take LCM from its packaging bag until it is assembled.
- Peel off the LCM protective film slowly since static electricity may be generated.
- Pay attention to the humidity of the work shop, 50~60%RH is satisfactory.
- Use a non-leak iron for soldering LCM.
- Do not touch the display surface or connection terminals area with bare hands. Smudges on the display surface reduce the insulation between terminals.
- Cautions for soldering to LCM:

Condition for soldering I/O terminals:

Soldering time : 3~4sec./ terminals.

Type of solder: Eutectic solder(rosin flux filled).

#### ☐ PRECAUTION IN USE OF LCD

- Do not contact or scratch the front surface and the contact pads of a LCD panel with hard materials such as metal or glass or with one's nail.
- To clean the surface, wipe it gently with soft cloth dampened by alcohol.
- Do not attempt to wiped off the contact pads.
- Keep LCD panels away from direct sunlight, also avoid them in high-temperature & high humidity environment for a long period.
- Do not drive LCD panels by DC voltage.
- Do not expose LCD panels to organic solvent.
- Liquid in LCD is hazardous substance. In case a contact with liquid crystal material is occured, be sure to immediately wash such material away by soap and water.
- The polarizer is easily damaged and should be handle with special care. Don't press or rub it with hard objects.

#### □ PRECAUTION FOR STORING LCM

● To avoid degradation of the device, do not store the module under the conditions of direct sunlight, high temperature or high humidity. Keep the module in bags designed to prevent static electricity charging under low temperature / normal humidity conditions(avoid high temperature / high humidity and low temperature below 0°C)

#### □ USING ON MEDICAL CARE, SAFETY OR HAZARDOUS APPLICATION OR SYSTEM

- For the application in medical care, safety and hazardous products or systems, an authorization from u is required. We will not responsible for any damage or loss which caused by the products without any authorization given by us.
- This product is not allowed to be designed and used for military application and/or purpose.
- The delivery of this product to the countries and/or regions where the embargoes are imposed by U.N. is prohibited.
- The application and delivery of this product must comply with Startegic High-Tech Commodities (SHTC) export control and the sales to the embargoed and/or sanctioned countries or regions are strictly prohibited.



Revision 1; UMSH-3267MD-3UB Ver. 0; September-04-2009 Page: 18

### 6. DATE CODE OF PRODUCTS

• Date code will be shown on each product :

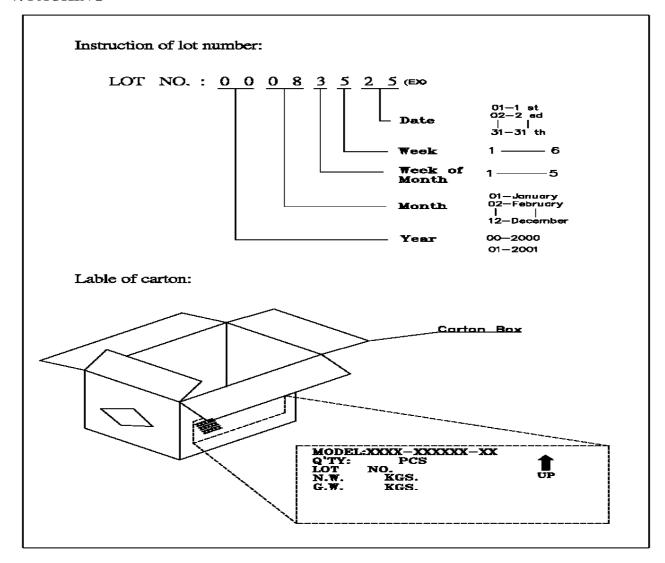
# • YY MM DD - XXXX | Year Month Day - Production lots

• Example: 090508 - 0 0 0 3 ==> Year 2009, May., 08rd, Batch no.03

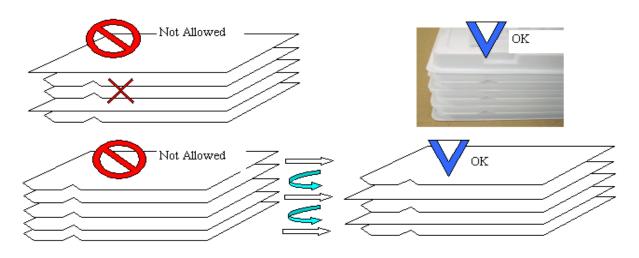


Revision 1; UMSH-3267MD-3UB Ver. 0; September-04-2009

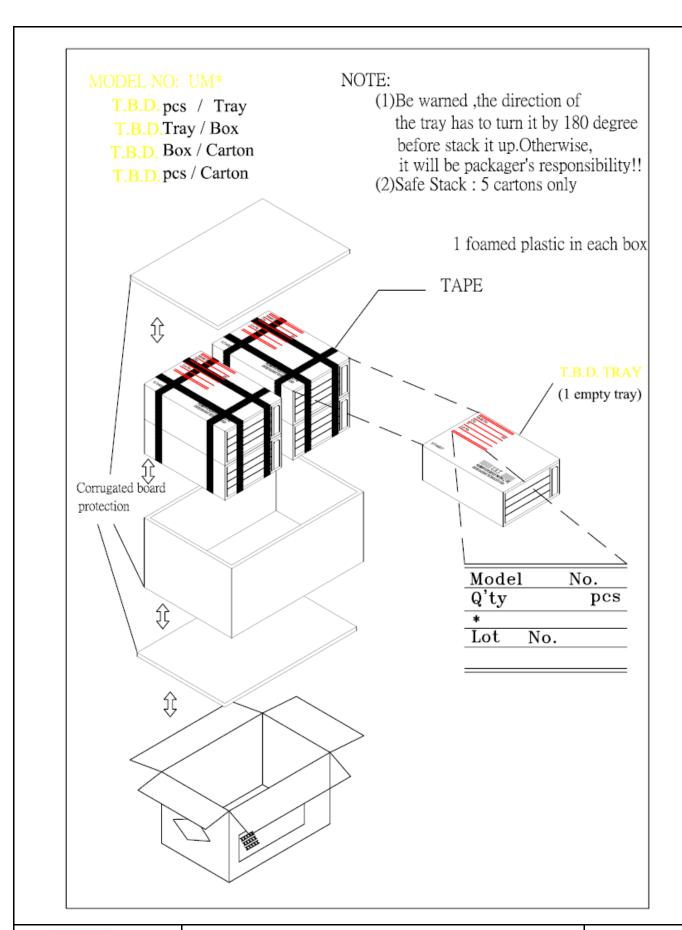
### 7. PACKING



Packing tray must be stacked with alternated direction to each others. To tacks packing trays in same direction will cause product damaged.



Revision 1; UMSH-3267MD-3UB Ver. 0; September-04-2009



#### 8. INSPECTION STANDARD

#### **8.1. QUALITY:**

THE QUALITY OF GOODS SUPPLIED TO PURCHASER SHALL COME UP TO THE FOLLOWING STANDARD.

#### 8.1.1. THE METHOD OF PRESERVING GOODS

AFTER DELIVERY OF GOODS FROM US TO PURCHASER. PURCHASER SHALL CONTROL THE LCM AT -10  $^\circ$ C  $^\circ$  , AND IT MIGHT BE DESIRABLE TO KEEP AT THE NORMAL ROOM TEMPERATURE AND HUMIDITY UNTIL INCOMING INSPECTION OR THROWING INTO PROCESS LINE.

#### 8.1.2. INCOMING INSPECTION

(A) THE METHOD OF INSPECTION

IF PURCHASER MAKE AN INCOMING INSPECTION, A SAMPLING PLAN SHALL BE APPLIED ON THE CONDITION THAT QUALITY OF ONE DELIVERY SHALL BE REGARDED AS ONE LOT.

(B) THE STANDARD OF QUALITY

ISO-2859-1 (or MIL-STD-105E), LEVEL II SINGLE PLAN.

CLASS	AQL(%)
CRITICAL	0.4 %
MAJOR	0.65 %
MINOR	1.5 %
TOTAL	1.5 %

EVERY ITEM SHALL BE INSPECTED ACCORDING TO THE CLASS.

#### (C) MEASURE

IF AS THE RESULT OF ABOVE RECEIVING INSPECTION , A LOT OUT IS DISCOVERED. PURCHASER SHALL BE INFORM SELLER OF IT WITHIN SEVEN DAYS. BUT FIRST SHIPMENT WITHIN FOURTEEN DAYS.

#### 8.1.3. WARRANTY POLICY

WE WILL PROVIDE ONE-YEAR WARRANTY FOR THE PRODUCTS ONLY IF UNDER SPECIFICATION OPERATING CONDITIONS. WE WILL REPLACE NEW PRODUCTS FOR THESE DEFECT PRODUCTS WHICH UNDER WARRANTY PERIOD AND BELONG TO THE RESPONSIBILITY OF US.

#### 8.2. CHECKING CONDITION

- **8.2.1.** CHECKING DIRECTION SHALL BE IN THE 45 DEGREE AREA TO FACE THE SAMPLE.
- **8.2.2.** CHECKER SHALL SEE OVER 30 cm. WITH BARE EYES FAR FROM SAMPLE AND USING 2 PCS. OF 20W FLUORESCENT LAMP.



Revision 1; UMSH-3267MD-3UB Ver. 0; September-04-2009 Page:

# 8.3. INSPECTION PLAN:

Gr. A GG	ATTEN 6	HID ODD GDAT	GI A GG
CLASS	ITEM	JUDGEMENT	CLASS
	1. OUTSIDE AND INSIDE PACKAGE	"MODEL NO." , "LOT NO." AND "QUANTITY"	Minor
PACKING &		SHOULD INDICATE ON THE PACKAGE.	
INDICATE	2. MODEL MIXED AND QUANTITY	OTHER MODEL MIXEDREJECTED	Critical
		QUANTITY SHORT OR OVERREJECTED	
	3. PRODUCT INDICATION	"MODEL NO." SHOULD INDICATE ON	Major
		THE PRODUCT	
	4. DIMENSION,	ACCORDING TO SPECIFICATION OR	
ASSEMBLY	LCD GLASS SCRATCH	DRAWING.	Major
	AND SCRIBE DEFECT.		
	5. VIEWING AREA	POLARIZER EDGE OR LCD'S SEALING LINE	Minor
		IS VISABLE IN THE VIEWING AREA	
		REJECTED	
	6. BLEMISH、BLACK SPOT、	ACCORDING TO STANDARD OF VISUAL	Minor
	WHITE SPOT IN THE LCD	INSPECTION (INSIDE VIEWING AREA)	
	AND LCD GLASS CRACKS	, ,	
	7. BLEMISH、BLACK SPOT	ACCORDING TO STANDARD OF VISUAL	Minor
APPEARANCE	WHITE SPOT AND SCRATCH	INSPECTION ( INSIDE VIEWING AREA )	
	ON THE POLARIZER	, , , , , , , , , , , , , , , , , , , ,	
	8. BUBBLE IN POLARIZER	ACCORDING TO STANDARD OF VISUAL	Minor
		INSPECTION (INSIDE VIEWING AREA)	
	9. LCD'S RAINBOW COLOR	STRONG DEVIATION COLOR ( OR NEWTON	
		RING) OF LCDREJECTED.	Minor
		OR ACCORDING TO LIMITED SAMPLE	
		( IF NEEDED, AND INSIDE VIEWING AREA )	
	10. ELECTRICAL AND OPTICAL	ACCORDING TO SPECIFICATION OR	Critical
	CHARACTERISTICS	DRAWING . ( INSIDE VIEWING AREA )	
	( CONTRAST \ VOP \		
	CHROMATICITY ETC )		
ELECTRICAL	11.MISSING LINE	MISSING DOT · LINE · CHARACTER	Critical
		REJECTED	
	12.SHORT CIRCUIT \	NON DISPLAY、WRONG PATTERN	
	WRONG PATTERN DISPLAY	DISPLAY · CURRENT CONSUMPTION	
		OUT OF SPECIFICATION REJECTED	
	13. PIN HOLE · PATTERN DEFORMITY	ACCORDING TO STANDARD OF VISUAL	Minor
		INSPECTION	

Revision 1; UMSH-3267MD-3UB Ver. 0; September-04-2009

# **8.4. STANDARD OF VISUAL INSPECTION**

NO.	CLASS	ITEM	JUDGEMENT	
			(A) ROUND TYPE: unit : mm.	
			DIAMETER (mm.) ACCEPTABLE Q'TY	
		· BLEMISH · BLACK SPOT ·	$\Phi \leq 0.1$ DISREGARD	
8.4.1	MINOR	WHITE SPOT IN THE LCD.	$0.1 < \Phi \leq 0.2$	
			$0.2 < \Phi \leq 0.25$	
			0.25 < Ф 0	
		· BLEMISH · BLACK SPOT ·	NOTE: $\Phi = (LENGTH + WIDTH)/2$	
		WHITE SPOT AND SCRATCH	(B) LINER TYPE: unit : mm	
		ON THE POLARIZER	LENGTH WIDTH ACCEPTABLE Q'TY	
			W ≤0.03 DISREGARD	
			$L \le 5.0  0.03 < \qquad W  \le 0.05 \qquad 3$	
			$L \le 5.0  0.05 < \qquad W  \le 0.07 \qquad 1$	
			0.07 < W FOLLOW ROUND TYPE	
			unit : mm.	
			DIAMETER ACCEPTABLE Q'TY	
8.4.2	MINOR	BUBBLE IN POLARIZER	$\Phi \leq 0.15$ DISREGARD	
			$0.15 < \Phi \leq 0.5$	
			$0.5 < \Phi$	
			a unit : mm	
8.4.3	MINOR	PIN HOLE 、	DIAMETER ACC. Q'TY	
		PATTERN DEFORMITY	$\Phi \leq 0.1$ DISREGARD	
			$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
			$0.25 < \Phi$	
			$\Phi = (a+b)/2$	

NO.	CLASS	ITEM	JUDGEMENT	
8.4.4	MINOR	CHIPPING	S	Y > S REJ.
8.4.5	MINOR	CHIPPING	SXX	$X \text{ or } Y \ge S$ REJ.
8.4.6	MAJOR	GLASS CRACK	Y	Y > (1/2) T REJ.
8.4.7	MAJOR	SCRIBE DEFECT	$A_{\uparrow}^{\downarrow} \xrightarrow[\vdash a \to \uparrow]{}^{\downarrow} B$	<ol> <li>a&gt; L/3 , A&gt;1.5mm. REJ.</li> <li>B: ACCORDING TO DIMENSION</li> </ol>
8.4.8	MINOR	CHIPPING (ON THE TERMINAL AREA)	T	$\Phi = (x+y)/2 > 2.5 \text{ mm}$ REJ.
8.4.9	MINOR	CHIPPING (ON THE TERMINAL SURFACE)	T Z X	Y > (1/3) T REJ.
8.4.10	MINOR	CHIPPING	T T Z	Y>T REJ.

25