

Specification

Part Number:	MCT043LCA0W480272LML
Version:	1
Date:	13/03/2015

Revision

2014/08/25	1	First issue
2014/10/28	2	Modify Block Diagram

Display Size	4.3"
Resolution	480 x 272
VGA Size	HVGA
Orientation	Landscape
Appearance	RGB
Logic Voltage	3.1V
Interface	Parallel
Brightness	400 cd/m ²
Touchscreen	N/A
Module Size W x H x D	106.70 x 83.98 x 7.10 mm
Operating Temperature	-20°C ~ +70°C
Pin Out	36 - Way

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2. General Specification

- Resolution: 480 x RGBx272
- Module dimension: 106.7 x 83.98 x 7.1 mm
- Active Area : 95.04 x 53.856 mm
- Dot pitch: 0.066 x 0.198 mm
- LCD type: TFT, Normally White, Transmissive
- View direction: 1 o'clock
- Backlight Type: LED, Normally White
- Driver IC: SSD1963
- Interface: Digital 8080 family MPU 8bit/16bit
- With /Without TP: Without TP
- Surface: Anti-Glare

*Color tone slight changed by temperature and driving voltage

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Midas Active Matrix Display Part Number System

MC	T	057	A	6	*	W	320240	L	M	L	*	*
1	2	3	4	5	6	7	8	9	10	11	12	13

- | | | |
|----|---|---|
| 1 | = | MC: Midas Components |
| 2 | = | T: TFT A: Active Matrix OLED |
| 3 | = | Size |
| 4 | = | Series |
| 5 | = | Viewing Angle: 6: 6 O'clock 12: 12 O'clock |
| 6 | = | Blank: No Touch T: Resistive Touchscreen C: Capacitive Touchscreen |
| 7 | = | Operating Temp Range: S: 0+50Deg C B: -20+60Deg C
W: -20+70Deg C E: -30+85Deg C
X: -30+80Deg C |
| 8 | = | No of Pixels |
| 9 | = | Orientation: P: Portrait L: Landscape |
| 10 | = | Mode: R: Reflective M: Transmissive T: Transflective
S: Sunlight Readable (transmissive)
W: White on Black (Monochrome) |
| 11 | = | Backlight: Blank: None L: LED C: CCFL |
| 12 | = | Blank: No Module/board C: Controller board module |
| 13 | = | Blank: None OB: Optically Bonded |



4. Interface Pin Function

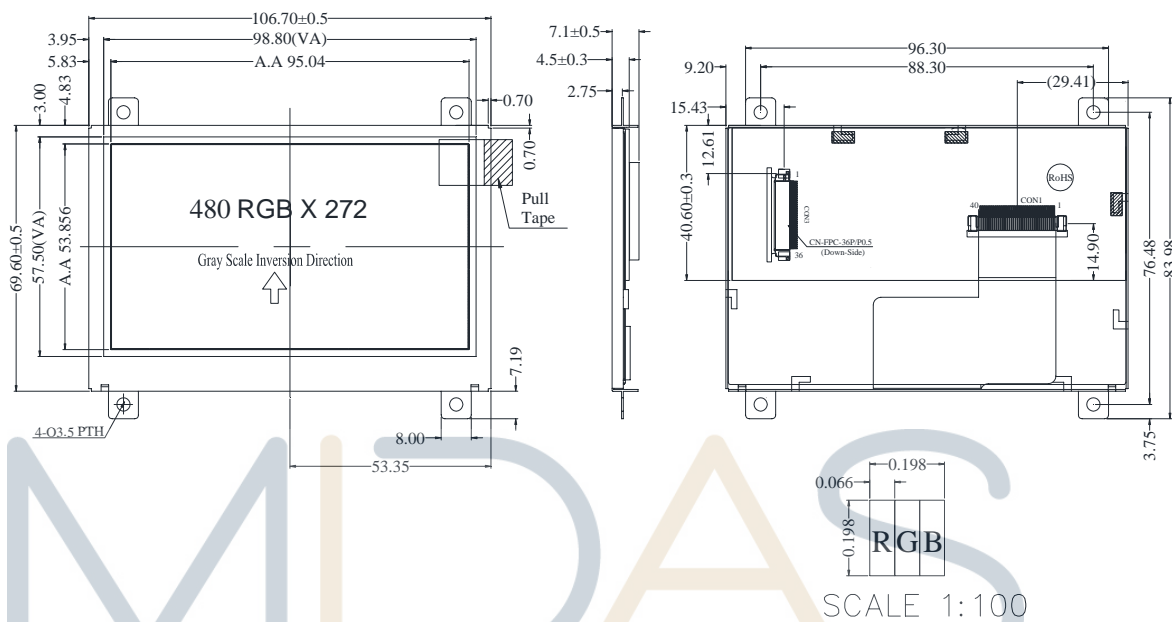
LCM PIN Definition (CON3)

Pin	Symbol	Function	Remark
1	GND	System round pin of the IC. Connect to system ground.	
2	VDD	Power Supply : +3.3V	
3	BL_E	Backlight control signal , H: On \ L: Off	
4	D/C	Data/Command select	
5	WR	Write strobe signal	
6	RD	Read strobe signal	
7	DB0	Data bus	
8	DB1	Data bus	
9	DB2	Data bus	
10	DB3	Data bus	
11	DB4	Data bus	
12	DB5	Data bus	
13	DB6	Data bus	
14	DB7	Data bus	
15	DB8	Data bus (When select 8bits mode, this pin is NC)	Note1
16	DB9	Data bus (When select 8bits mode, this pin is NC)	Note1
17	DB10	Data bus (When select 8bits mode, this pin is NC)	Note1
18	DB11	Data bus (When select 8bits mode, this pin is NC)	Note1
19	DB12	Data bus (When select 8bits mode, this pin is NC)	Note1
20	DB13	Data bus (When select 8bits mode, this pin is NC)	Note1
21	DB14	Data bus (When select 8bits mode, this pin is NC)	Note1
22	DB15	Data bus (When select 8bits mode, this pin is NC)	Note1
23	NC	No connection	
24	NC	No connection	
25	CS	Chip select	
26	RESET	Hardware reset	
27	DIP ON	Display control H: On \ L:Off	
28	NC	No connection	
29	NC	No connection	
30	NC	No connection	
31	NC	No connection	
32	NC	No connection	
33	VLED-	VLED- for B/L LED inverter (GND)	
34	VLED-	VLED- for B/L LED inverter (GND)	
35	VLED+	VLED+ for B/L LED inverter (+3.3V)	
36	VLED+	VLED+ for B/L LED inverter (+3.3V)	

Note1: When select 8bit mode, DB0~DB7 be used, DB8~DB15 no connect
When select 16bit mode, DB0~DB15 be used

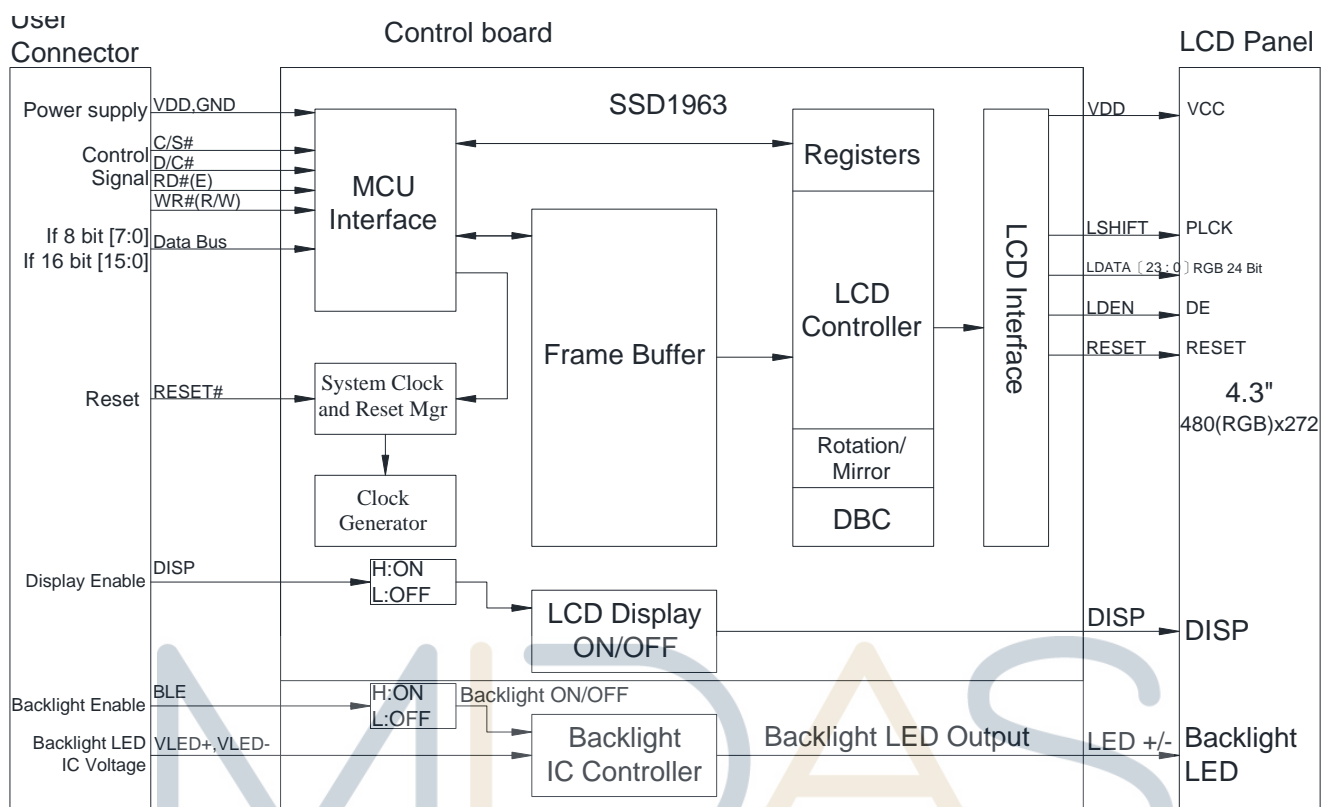
5. Contour Drawing

PIN NO.	SYMBOL
1	GND
2	VDD
3	BL_E
4	D ⁺ C
5	WR
6	RD
7	DB0
8	DB1
9	DB2
10	DB3
11	DB4
12	DB5
13	DB6
14	DB7
15	DB8
16	DB9
17	DB10
18	DB11
19	DB12
20	DB13
21	DB14
22	DB15
23	NC
24	NC
25	CS
26	RESET
27	DISP_ON
28	NC
29	NC
30	NC
31	NC
32	NC
33	VLED-
34	VLED-
35	VLED+
36	VLED+



The non-specified tolerance of dimension is $\pm 0.3\text{mm}$.

6. Block Diagram



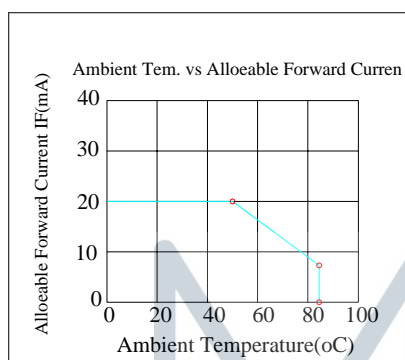
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7.Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	TOP	-20	—	+70	°C
Storage Temperature	TST	-30	—	+80	°C

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

1. Temp. $\leq 60^{\circ}\text{C}$, 90% RH MAX. Temp. $> 60^{\circ}\text{C}$, Absolute humidity shall be less than 90% RH at 60°C



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8. Electrical Characteristics

8.1. Operating conditions:

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
Supply Voltage For LCM	VDD	—	3.0	3.1	3.3	V	-
Supply Current For LCM	IDD	—	—	200	300	mA	Note1

Note 1 : This value is test for VCC=3.3V , Ta=25°C only

8.2. Backlight driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Operation Current For LED Driver	VLED+=3.3V	270	-	405	mA	Note 1,2
Power Consumption	VLED+=3.3V	891	-	1337	mW	Note 1,2
Supply Voltage For LED Driver	VLED+	3.3	-	5	V	Note 1,2
LED Life Time		-	50,000	-	Hr	Note 2,3,4

Note 1 : Base on VLED= 3.3V for the back light driver IC specification

Note 2 : Ta = 25 °C

Note 3 : Brightness to be decreased to 50% of the initial value

Note 4 : The single LED lamp case

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9. DC CHARACTERISTICS

Parameter	Symbol	Rating			Unit	Condition
		Min	Typ	Max		
Low level input voltage	V _{IL}	0	-	0.3VDD	V	
High level input voltage	V _{IH}	0.7VDD	-	VDD	V	

10. Interface Timing

10.1. 8080 Mode 8bit/16bit

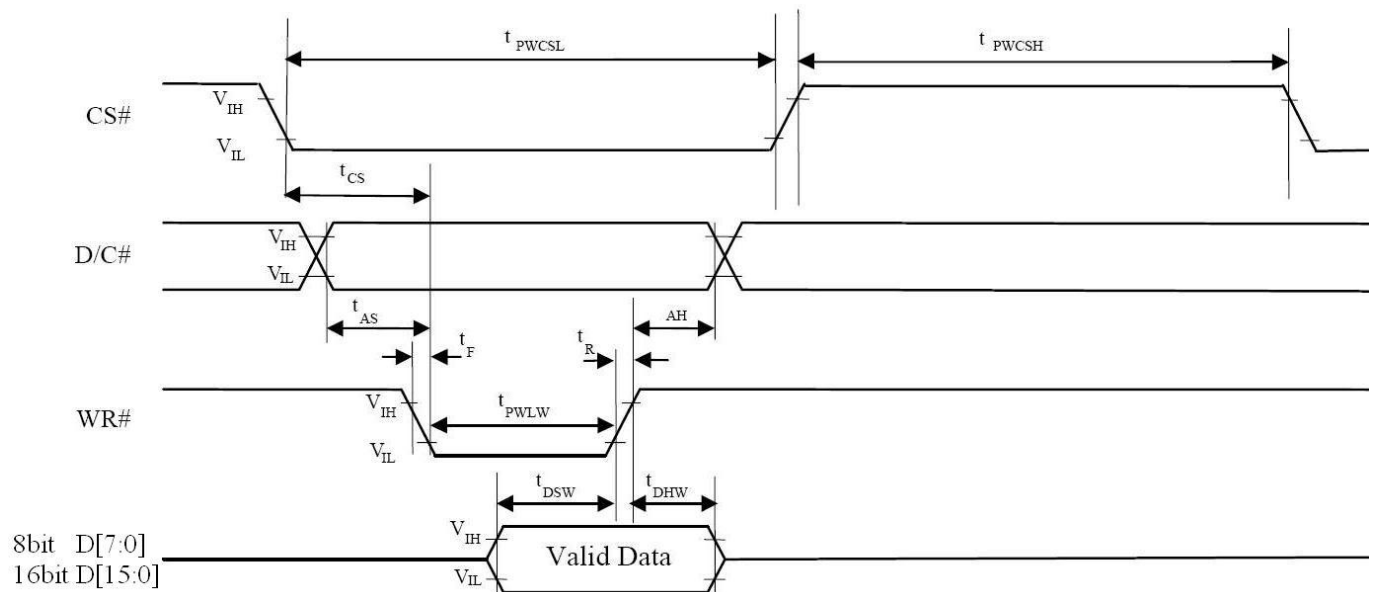
The 8080 mode MCU interface consist of CS#, D/C#, RD#, WR#, Data Bus signals. This interface use WR# to define a write cycle and RD# for read cycle. If the WR# goes low when the CS# signal is low, the data or command will be latched into the system at the rising edge of WR#. Similarly, the read cycle will start when RD# goes low and end at the rising edge of RD#.

10.2. 8080 Mode Write Cycle

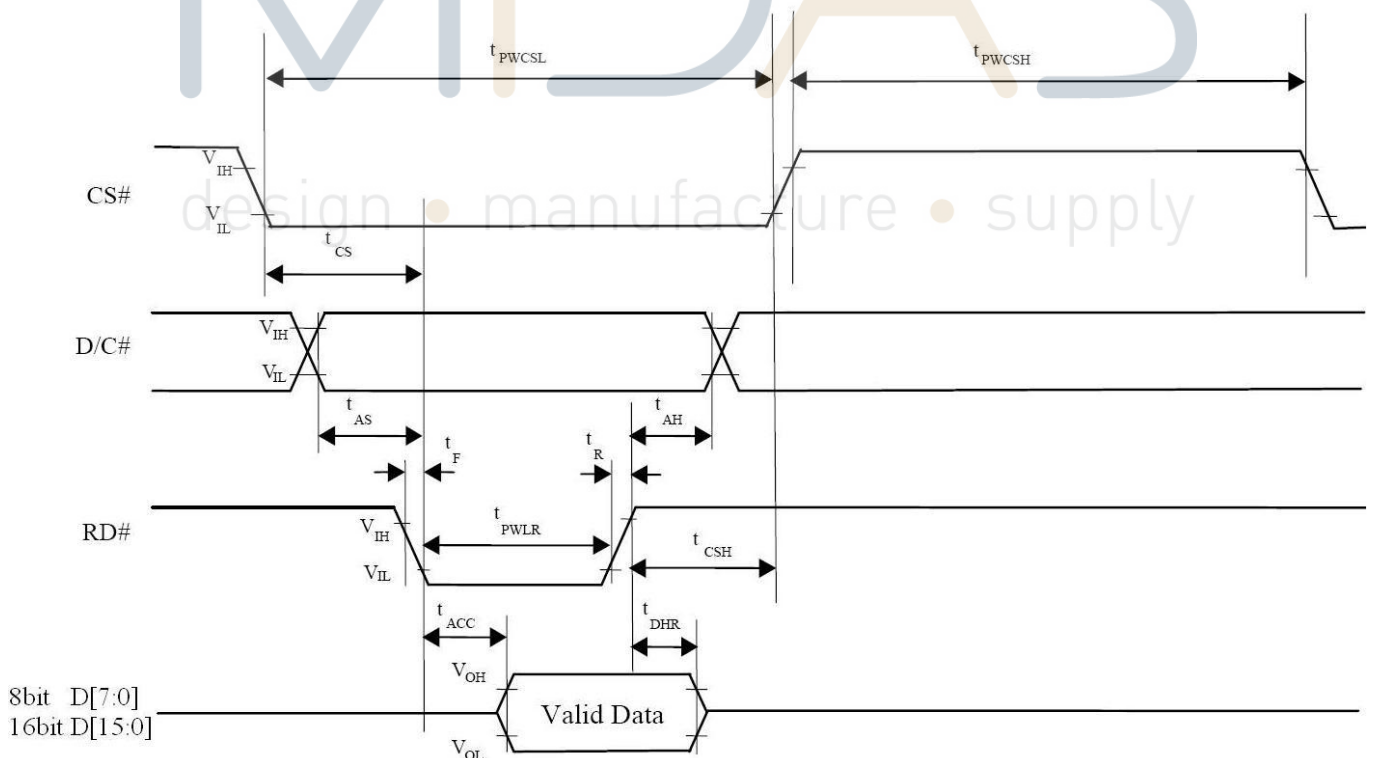
Symbol	Parameter	Min	Typ	Max	Unit
fMCLK	System Clock Frequency	1	-	110	MHz
tMCLK	System Clock Period	1/ fMCLK	-	-	ns
tPWCSH	Control Pulse High Width Write Read	13 30	1.5* tMCLK 3.5* tMCLK	-	ns
tPWCSL	Control Pulse Low Width Write (next write cycle) Write (next read cycle) Read	13 80 80	1.5* tMCLK 9* tMCLK 9* tMCLK	-	ns
tAS	Address Setup Time	1	-	-	ns
tAH	Address Hold Time	2	-	-	ns
tDSW	Write Data Setup Time	4			ns
tDHW	Write Data Hold Time	1	-	-	ns
tPWLW	Write Low Time	12			ns
tDHR	Read Data Hold Time	1	-	-	ns
tACC	Access Time	32			ns
tPWLR	Read Low Time	36	-	-	ns
tR	Rise Time	-		0.5	ns
tF	Fall Time	-	-	0.5	ns
tCS	Chip select setup time	2		-	ns
tCSH	Chip select hold time to read signal	3	-	-	ns



10.3. Parallel 8080-series Interface Timing Diagram(Write Cycle)



10.4. Parallel 8080-series Interface Timing Diagram(Read Cycle)



Interface	Cycle	D[15]	D[14]	D[13]	D[12]	D[11]	D[10]	D[9]	D[8]	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
16 bits (565 format)	1 st	R5	R4	R3	R2	R1	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1
16 bits	1 st	R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0
	2 nd	B7	B6	B5	B4	B3	B2	B1	B0	R7	R6	R5	R4	R3	R2	R1	R0
	3 rd	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
8 bits	1 st									R7	R6	R5	R4	R3	R2	R1	R0
	2 nd									G7	G6	G5	G4	G3	G2	G1	G0
	3 rd									B7	B6	B5	B4	B3	B2	B1	B0

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11. OPTICAL CHARATERISTIC

Item		Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time		Tr+ Tf	$\theta=0^{\circ}$ 、 $\Phi=0^{\circ}$	-	30	45	.ms	Note 3
Contrast ratio		CR	At optimized viewing angle	250	350	-	-	Note 4
Color Chromaticity	White	Wx	$\theta=0^{\circ}$ 、 $\Phi=0$	0.28	0.30	0.33		Note 2,5
		Wy		0.31	0.33	0.36		
Viewing angle	Hor.	ΘR	$CR \geq 10$	-	75	-	Deg.	Note 1
		ΘL		-	75	-		
	Ver.	ΦT		-	75	-		
		ΦB		-	75	-		
Brightness		-	-	350	400	-	cd/m ²	Center of display

Note 1: Definition of viewing angle range

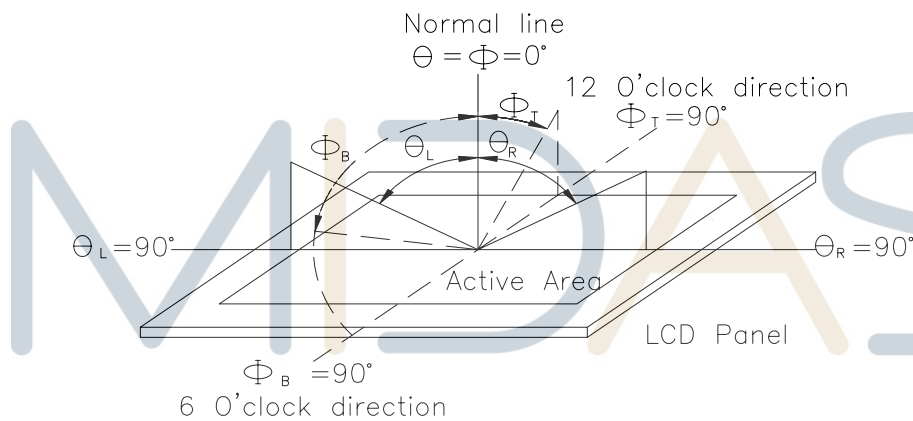


Fig. 11.1. Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7 or BM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

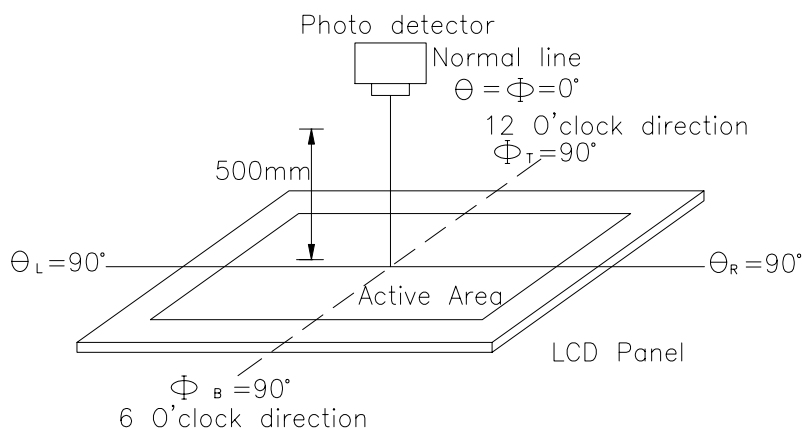
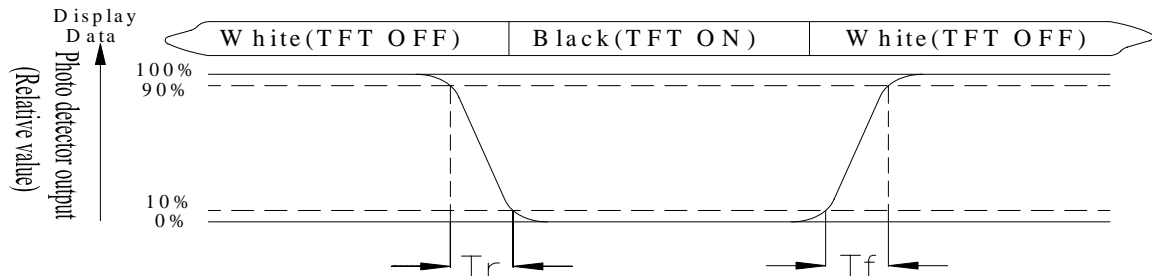


Fig. 11.2. Optical measurement system setup

Note 3: Definition of Response time:

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time, T_r , is the time between photo detector output intensity changed from 90% to 10%. And fall time, T_f , is the time between photo detector output intensity changed from 10% to 90%.



Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: White $V_i = V_{i50} \pm 1.5V$

Black $V_i = V_{i50} \pm 2.0V$

“ \pm ” means that the analog input signal swings in phase with VCOM signal.

“ \pm ” means that the analog input signal swings out of phase with VCOM signal.

The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

Note 6: Definition of color chromaticity (CIE 1931)

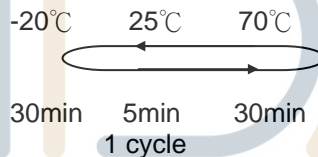
Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

$$\text{Note 8: Uniformity (U)} = \frac{\text{Brightness (min)}}{\text{Brightness (max)}} \times 100\%$$

12. Reliability Test

Content of Reliability Test (Wide temperature, -20°C~70°C)

Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70°C 200hrs	—
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C, 90%RH max For 96hrs under no-load condition excluding the polarizer, Then taking it out and drying it at normal temperature.	60°C, 90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation 	-20°C/70°C 10 cycles	—
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 15mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=800V, RS=1.5kΩ CS=100pF 1 time	—

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

Note3: The packing have to including into the vibration testing.

13. Package specification

<div>LCM Model : A7H\$(' @ 5</div> <div>Drawing NO.</div>		<div>LCM 包裝規格書</div> <div>LCM Packaging Specifications</div>	<div>Approve</div> <div>Check</div> <div>Contact</div>
			<div>DATE</div> <div>2014/08/25</div>
			<div>初版</div> <div>2014/08/25</div>
			<div>版次 Ver</div> <div>0</div>

1.包裝材料規格表 (Packaging Material) :(per carton)

NO.	Item	Model	Dimensions	Quantity
1	成品 (LCM)	A7H\$(' @ 5		216
2	TRAY 盤 (2)	PKCA1XXXXXXXXXXXX0350	315mm*265mm	36
3	BP01 內盒(3)Product Box	PK3Y1XXXXXXXXXXXX0001	332*280*100mm	6
4	泡棉(4)Foam	-----		6
5	外紙箱(5)Carton	PK4X1XXXXXXXXXXXX0000	565*340*320mm	1
6				
7				
8				
9				

2.單箱數量規格表(Packaging Specifications and Quantity) :

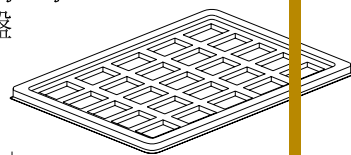
(1)LCM quantity per box : no per tray 6 x no of tray 6 = 36

(2)Total LCM quantity in carton : quantity per box 36 x no of boxes 6 = 216

特 記 事 項 (REMARK)

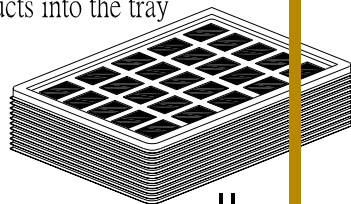
1. Label Specifications : MOOEL: LOT NO : QUANTITY: CHECK:	
--	--

Use empty tray
空盤

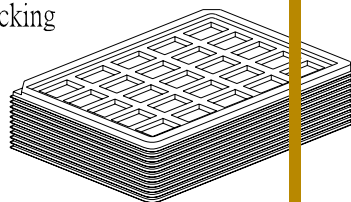


+

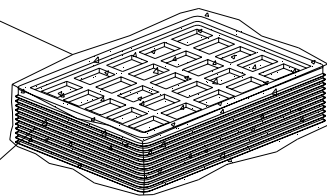
Put products into the tray



Tray stacking



(1) POF

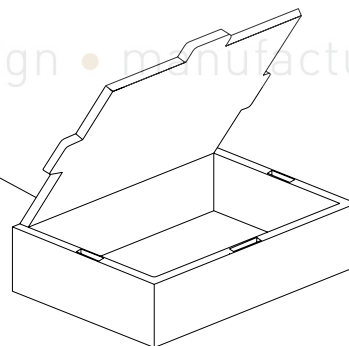


(2) Tray

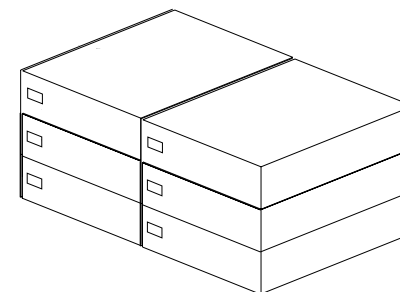
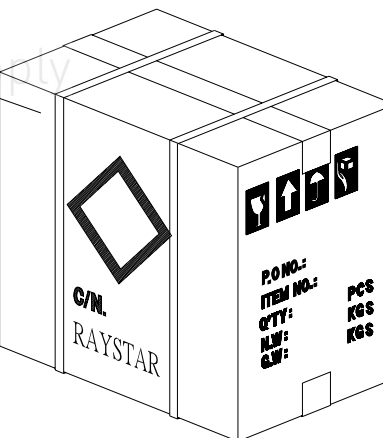
(4) 泡棉Foam



(3) Product Box



(5) Carton



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14. Initial Code For Reference

```
void Initial_code()
{
    Write_Command(0x01);
    Delay_ms(10);
    Write_Command(0xe0);
    Write_Parameter(0x01);
    Delay_ms(50);
    Write_Command(0xe0);
    Write_Parameter(0x03);
    Delay_ms(5);

    Write_Command(0xb0);
    Write_Parameter(0x08);
    Write_Parameter(0x80);
    Write_Parameter(0x01);
    Write_Parameter(0xdf);
    Write_Parameter(0x01);
    Write_Parameter(0x0f);
    Write_Parameter(0x00);

    Write_Command(0xf0);
    Write_Parameter(0x03); //0x03 is 16bit(565 format);0x00 is for 8-bit,pixel data format

    //Set the MN of PLL
    Write_Command(0xe2);
    Write_Parameter(0x1d);
    Write_Parameter(0x02);
    Write_Parameter(0x54);

    Write_Command(0xe6);
    Write_Parameter(0x01);
    Write_Parameter(0x99);
    Write_Parameter(0x9a);

    //Set front porch and back porch
    Write_Command(0xb4);
    Write_Parameter(0x02);
```

```
Write_Parameter(0x0d);  
Write_Parameter(0x00);  
Write_Parameter(0x14);  
Write_Parameter(0x05);  
Write_Parameter(0x00);  
Write_Parameter(0x00);  
Write_Parameter(0x00);
```

```
Write_Command(0xb6);  
Write_Parameter(0x01);  
Write_Parameter(0x24);  
Write_Parameter(0x00);  
Write_Parameter(0x0a);  
Write_Parameter(0x05);  
Write_Parameter(0x00);  
Write_Parameter(0x00);
```

```
Write_Command(0x2a);  
Write_Parameter(0x00);  
Write_Parameter(0x00);  
Write_Parameter(0x01);  
Write_Parameter(0xdf);
```

```
Write_Command(0x2b);  
Write_Parameter(0x00);  
Write_Parameter(0x00);  
Write_Parameter(0x01);  
Write_Parameter(0x0f);
```

```
Write_Command(0x29);  
Write_Command(0x2c);
```

```
}
```

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