



**RAYSTAR**

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## RFF70AP-1IW-DBG

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### SPECIFICATION

CUSTOMER:

<b>APPROVED BY</b>	
<b>PCB VERSION</b>	
<b>DATE</b>	

FOR CUSTOMER USE ONLY

<b>SALES BY</b>	<b>APPROVED BY</b>	<b>CHECKED BY</b>	<b>PREPARED BY</b>

Release DATE:

TFT Display Inspection Specification: <https://www.raystar-optronics.com/download/products.htm>

Precaution in use of TFT module: <https://www.raystar-optronics.com/download/declaration.htm>

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## Revision History

VERSION	DATE	REVISED PAGE NO.	Note
0	2018/12/24		First issue

RAYSTAR OPTRONICS

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## 2.Summary

TFT 7.0" is a TN transmissive type color active matrix TFT liquid crystal display that use amorphous silicon TFT as switching devices. This module is a composed of a TFT\_LCD module, It is usually designed for industrial application and this module follows RoHs.

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### 3.General Specifications

- Size: 7.0 inch
- Dot Matrix: 800 x RGB x 480(TFT) dots
- Module dimension: 165.0(W) x 100.0(H) x 13.375(D) mm
- Active area: 154.08 x 85.92 mm
- Dot pitch: 0.0642 x 0.179 mm
- LCD type: TFT, Negative, Transmissive
- View Direction: 12 o'clock
- Gray Scale Inversion Direction: 6 o'clock
- Aspect Ratio: 16:9
- Backlight Type: LED, Normally White
- Controller IC: RA8875
- TFT Interface: Digital 8080 family MPU 8bit/16bit
- CTP IC: FT5426 or Equivalent
- CTP Interface: I2C
- CTP FW Version: 03
- With /Without TP: With CTP
- Surface: Glare

\*Color tone slight changed by temperature and driving voltage.

## 4.Interface

### 4.1. LCM PIN Definition

Pin	Symbol	Function	Remark
1	GND	System ground pin of the IC . Connect to system ground.	
2	VDD	Power Supply : +3.3V	
3	BLE	Backlight control signal , H: On \ L: Off	
4	RS	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 connect	
24	CTP_INT	CTP_ External interrupt to the host	
25	CS	Chip select	
26	RST	Hardware reset	
27	L/R	Left / right selection; Default L/R=H	Note 2,3
28	U/D	Up/down selection; ; Default U/D=L	Note 2,3
29	CTP_SCL	I2C clock input	
30	CTP_SDA	I2C data input and output	
31	CTP_RST	CTP_ External Reset, Low is active	
32	NC	No connect	
33	VLED-	Power for LED Driver IC(GND)	
34	VLED-	Power for LED Driver IC(GND)	
35	VLED+	Power for LED Driver IC(+5V)	
36	VLED+	Power for LED Driver IC(+5V)	

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

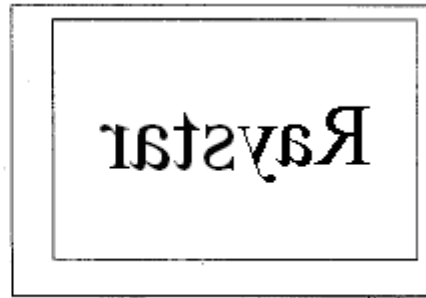
Note 2: Selection of scanning mode

Setting of scan control input		Scanning direction
U/D	L/R	
GND	VDD	Up to down, left to right
VDD	GND	Down to up, right to left
GND	GND	Up to down, right to left
VDD	VDD	Down to up, left to right

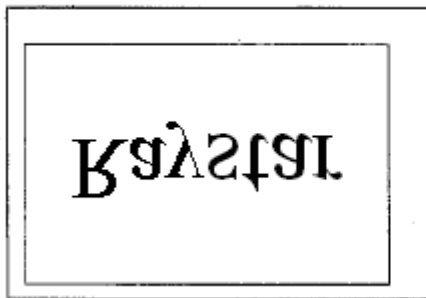
Note 3: Definition of scanning direction.Refer to the figure as below:



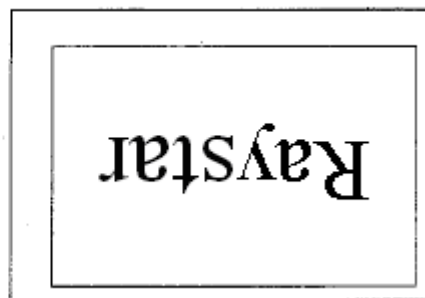
U/D=L, L/R=H



U/D=L, L/R=L



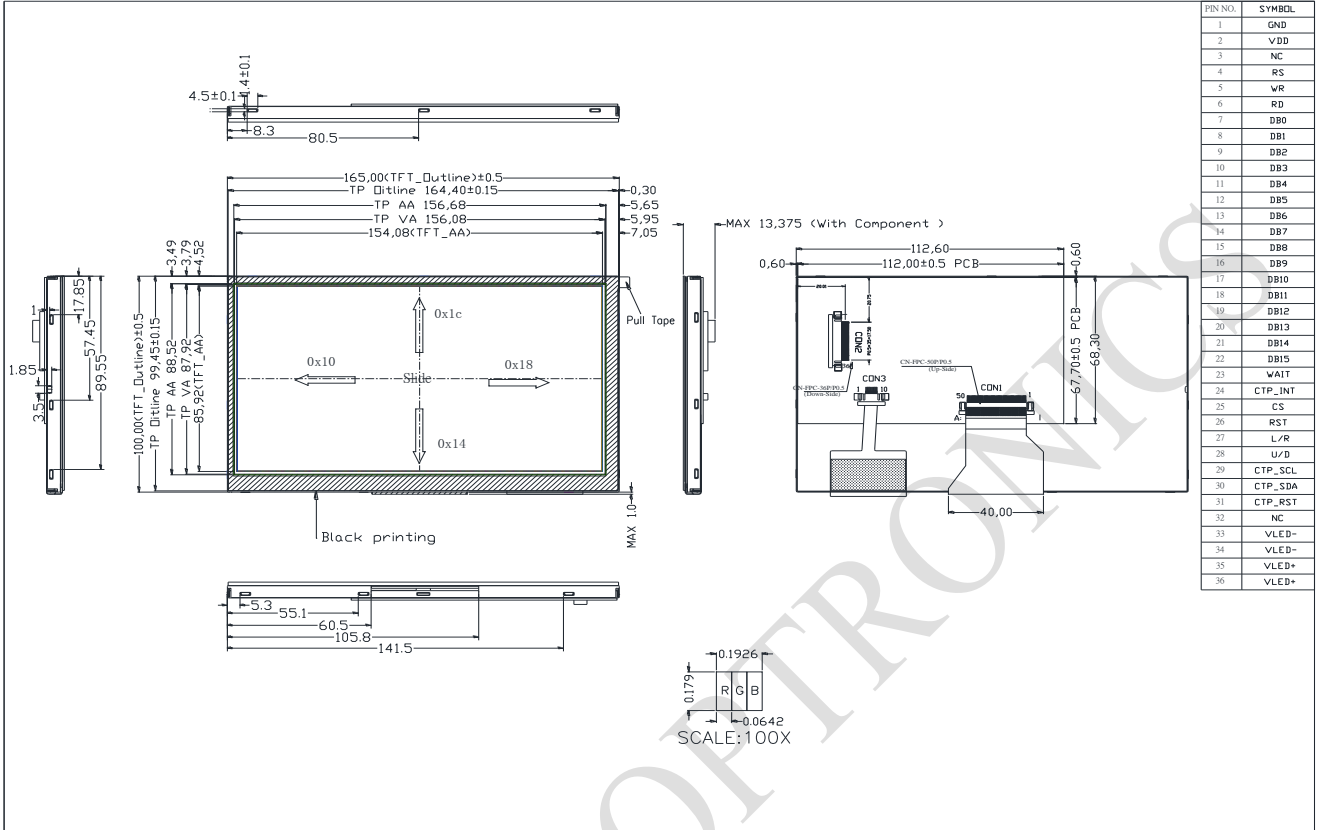
U/D=H, L/R=H



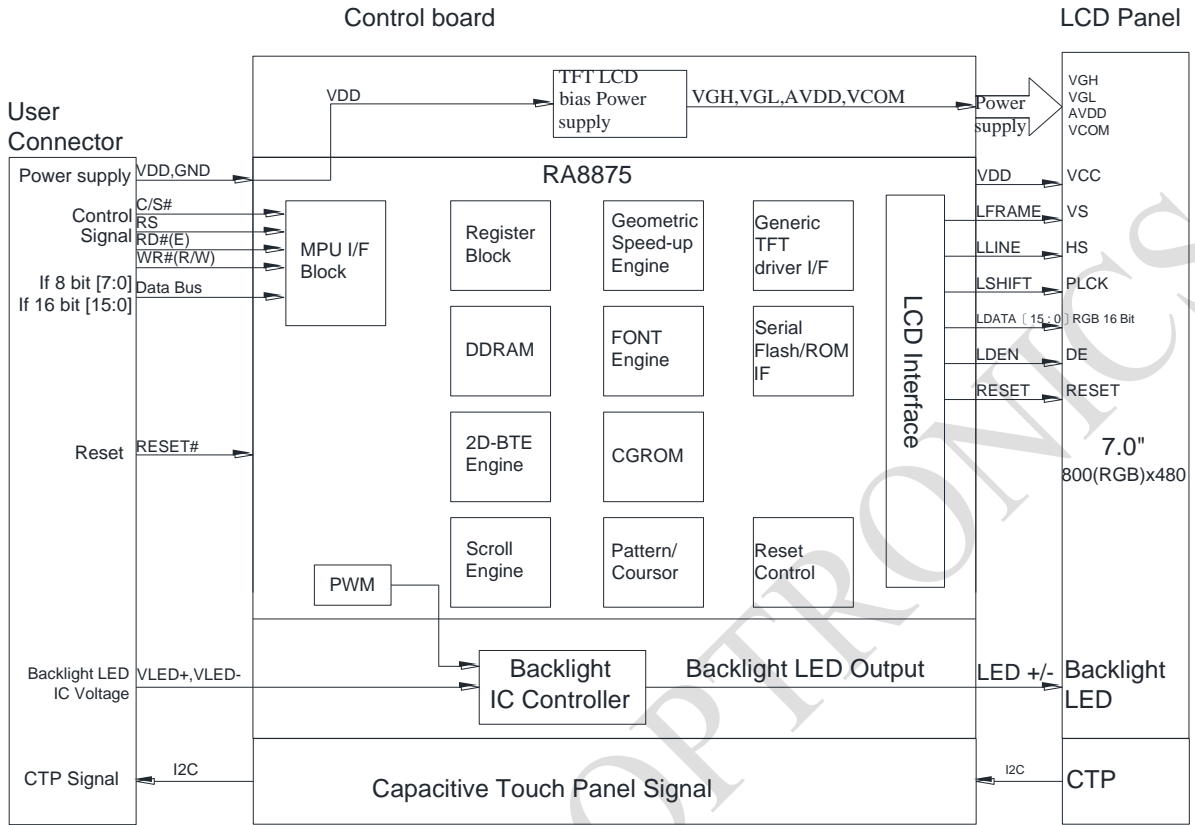
U/D=H, L/R=L



# 5. Contour Drawing



## 6. Block Diagram



## 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

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

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## 8. Electrical Characteristics

### 8.1. Operating conditions:

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
Supply Voltage For LCM	VDD	—	3.2	3.3	3.4	V	—
Supply Current For LCM	IDD	—	—	120	180	mA	Note1

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

### 8.2. Backlight driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Operation Current For LED Driver	VLED=5V	400	—	600	mA	Note 1,2
Power Consumption	VLED=5V	2000	—	3000	mW	Note 1,2
Supply Voltage For LED Driver	VLED+	—	5	—	V	—
LED Life Time	—	—	50,000	—	Hr	Note 2,3,4

Note 1 : Base on VLED= 5V 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

## 9.DC CHARATERISTICS

Parameter	Symbol	Rating			Unit	Condition
		Min	Typ	Max		
Low level input voltage	VIL	GND	-	0.2 VDD	V	
High level input voltage	VIH	0.8 VDD	-	VDD	V	

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# 10.AC CHARATERISTICS

## 10.1. Parallel I/F Protocol

The following timing charts are used to describe the timing specification of the standard 8080 and 6800 interfaces.

6800 – 8/16-bit Interface

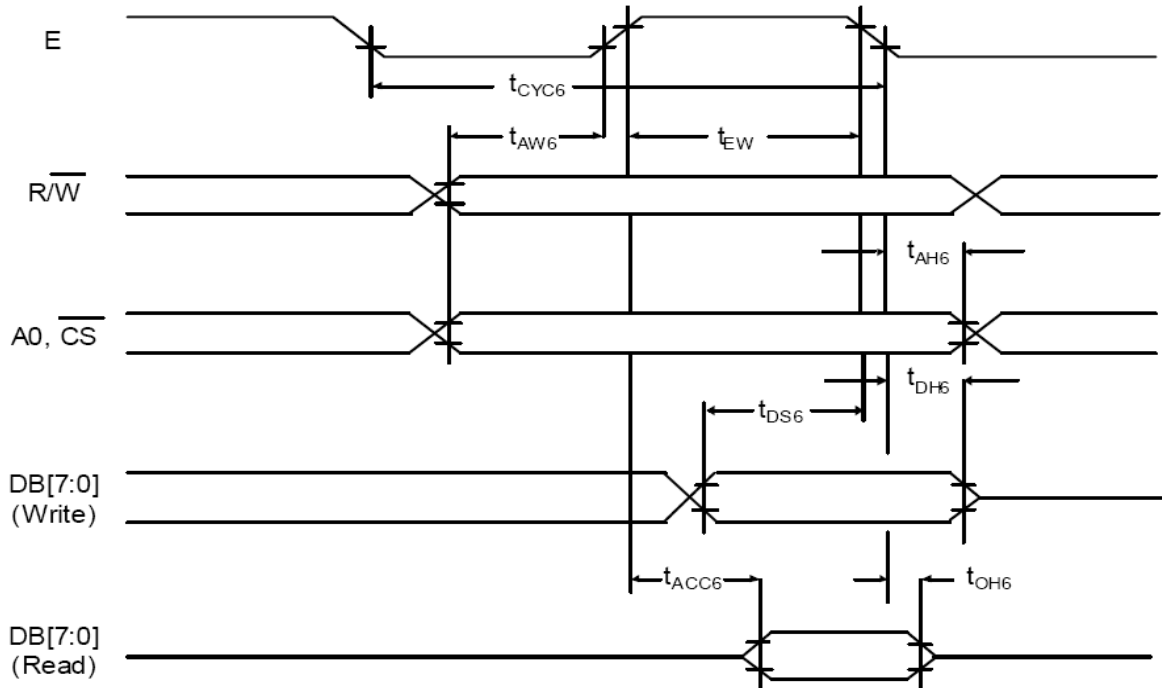


Figure 1: 6800 MCU Waveform

Table 1: 6800 MCU I/F Timing

Symbol	Parameter	Rating		Unit	Symbol
		Min.	Max		
$t_{CYC6}$	Cycle time	50	--	ns	tc is one system clock period: $t_c = 1/SYS\_CLK$
$t_{EW}$	Strobe Pulse width	20	--	ns	
$t_{AW6}$	Address setup time	0	--	ns	
$t_{AH6}$	Address hold time	10	--	ns	
$t_{DS6}$	Data setup time	20	--	ns	
$t_{DH6}$	Data hold time	10	--	ns	
$t_{ACC6}$	Data output access time	0	20	ns	
$t_{OH6}$	Data output hold time	0	20	ns	

8080 – 8/16-bit Interface

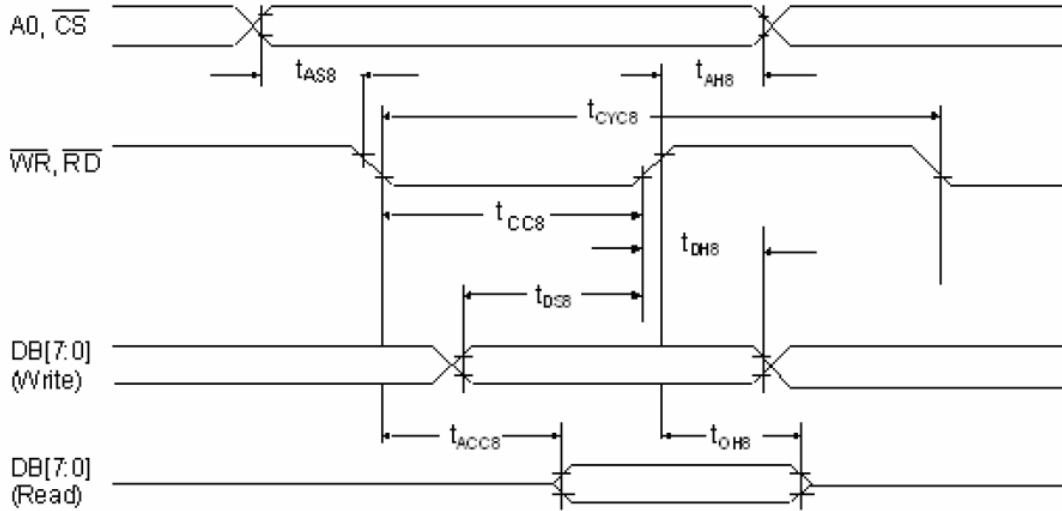


Figure 2: 8080 Waveform  
Table 2: 8080 MCU I/F Timing

Symbol	Parameter	Rating		Unit	Symbol
		Min.	Max.		
tCYC8	Cycle time	50	--	ns	tc is one system clock period: tc = 1/SYS_CLK
tCC8	Strobe Pulse width	20	--	ns	
tAS8	Address setup time	0	--	ns	
tAH8	Address hold time	10	--	ns	
tDS8	Data setup time	20	--	ns	
tDH8	Data hold time	10	--	ns	
tACC8	Data output access time	0	20	ns	
tOH8	Data output hold time	0	20	ns	

The data bus width of RA8875 can be selected to 8-bit/16-bit by setting the Bit [1:0] of SYSR. When Bit [1:0] of SYSR is cleared to “00”, then the data bus is 8-bit. If Bit [1:0] of SYSR is set to “11”, then the data transition is set as 16-bit. No matter what type of MCU I/F is selected (6800/8080), both of them can be changed the bus width when need. But if the 8-bit is used, it needs double transmission time than 16-bit bus and all of the registers must be accessed by 8-bit data.

The continuous data write speed determines the display update speed. The cycle-to-cycle interval must be larger than 4 times of system clock period. Over the specification may cause the data lose or function fail. Please refer to Figure 6-5 and Figure 6-6 for waveform detail. In order to reduce the transmission interference between MCU interface and RA8875, It is suggested that a small capacitor to the GND should be added at the signal of CS#, RD#, and WR#. If using cable to connect MCU and RA8875, please keep the cable length less than 20cm. Otherwise it's suggested to add 1~10Kohm pull-up resistors on pins CS#, RD#, WR# and RS.

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MPU6800 Data Write Speed Limit

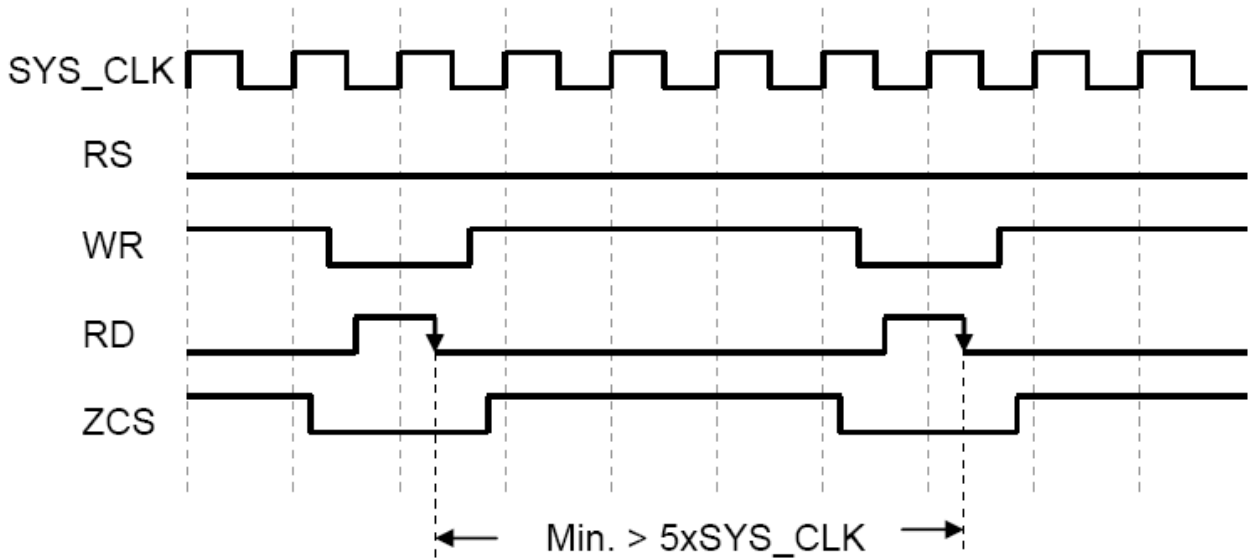


Figure 3: 6800 I/F Continuous Data Write Cycle Waveform

MPU8080 Data Write Speed Limit

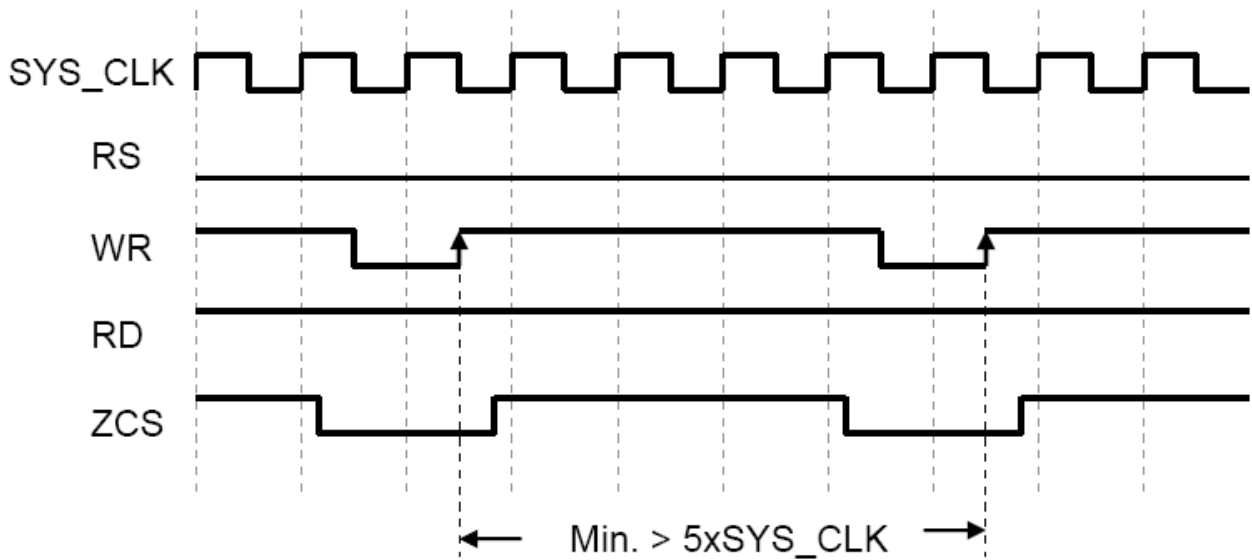


Figure4: 8080 I/F Continuous Data Write Cycle Waveform



## 11. Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark	
Response time	Tr	$\theta=0^\circ, \phi=0^\circ$	-	10	20	.ms	Note 3	
	Tf		-	15	30	.ms		
Contrast ratio	CR	At optimized viewing angle	400	500	-	-	Note 4	
Color Chromaticity	White	Wx	$\theta=0^\circ, \phi=0^\circ$	0.26	0.31	0.36		Note 2,6,7
		Wy		0.28	0.33	0.38		
Viewing angle (Gray Scale Inversion Direction)	Hor.	$\theta_R$	$CR \geq 10$	60	70	-	Deg.	Note 1
		$\theta_L$		60	70	-		
	Ver.	$\phi_T$		40	50	-		
		$\phi_B$		60	70	-		
Brightness	-	-	280	380	-	cd/m <sup>2</sup>	Center of display	
Uniformity	(U)	-	70	-	-	%	Note 5	

Ta=25±2°C, VLED / ILED= 5V / 400mA

Note 1: Definition of viewing angle range

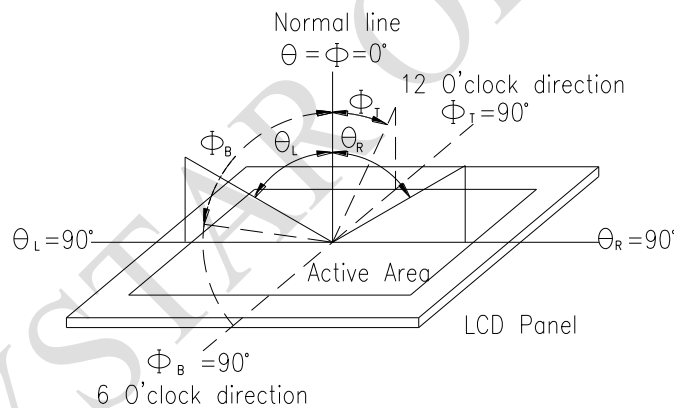


Fig. 11.1. Definition of viewing angle

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.

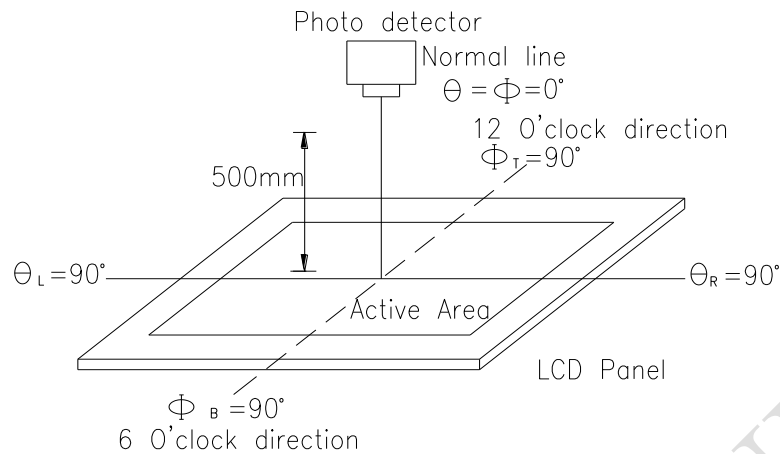
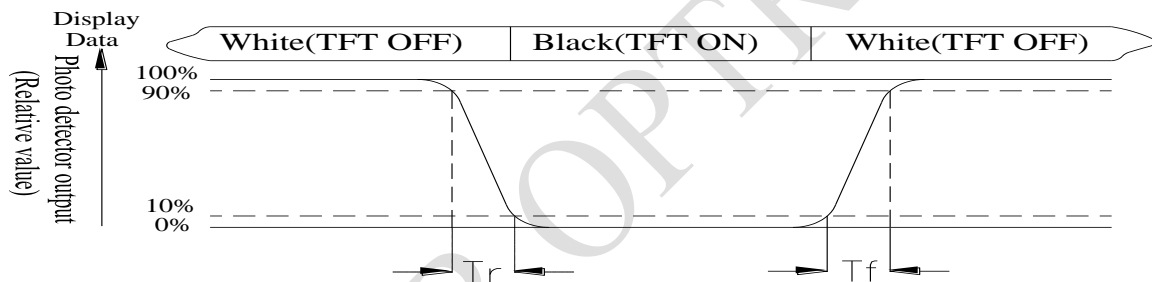


Fig. 11.2. Optical measurement system setup

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: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (reference the picture in below). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) =  $L_{min}/L_{max} \times 100\%$

L = Active area length

W = Active area width

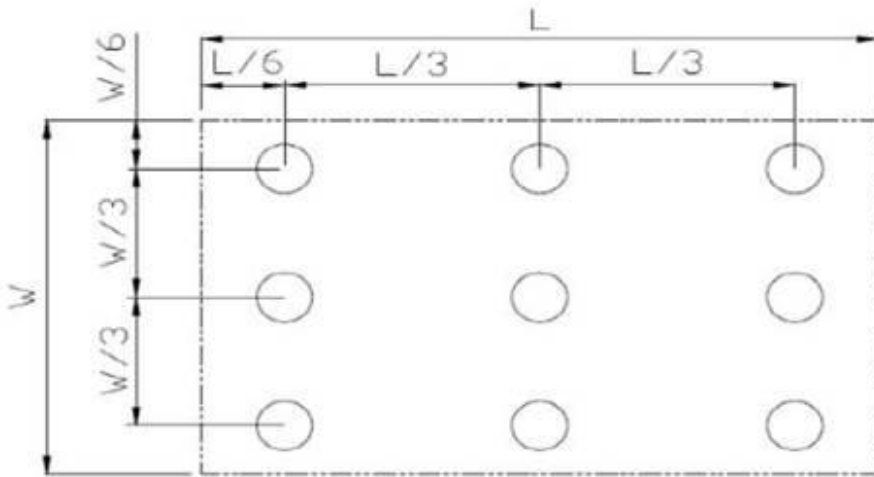


Fig11.3. Definition of uniformity

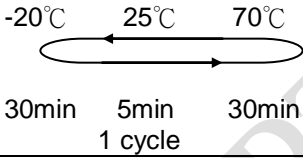
Note 6: Definition of color chromaticity (CIE 1931)

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.

## 12. Reliability

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

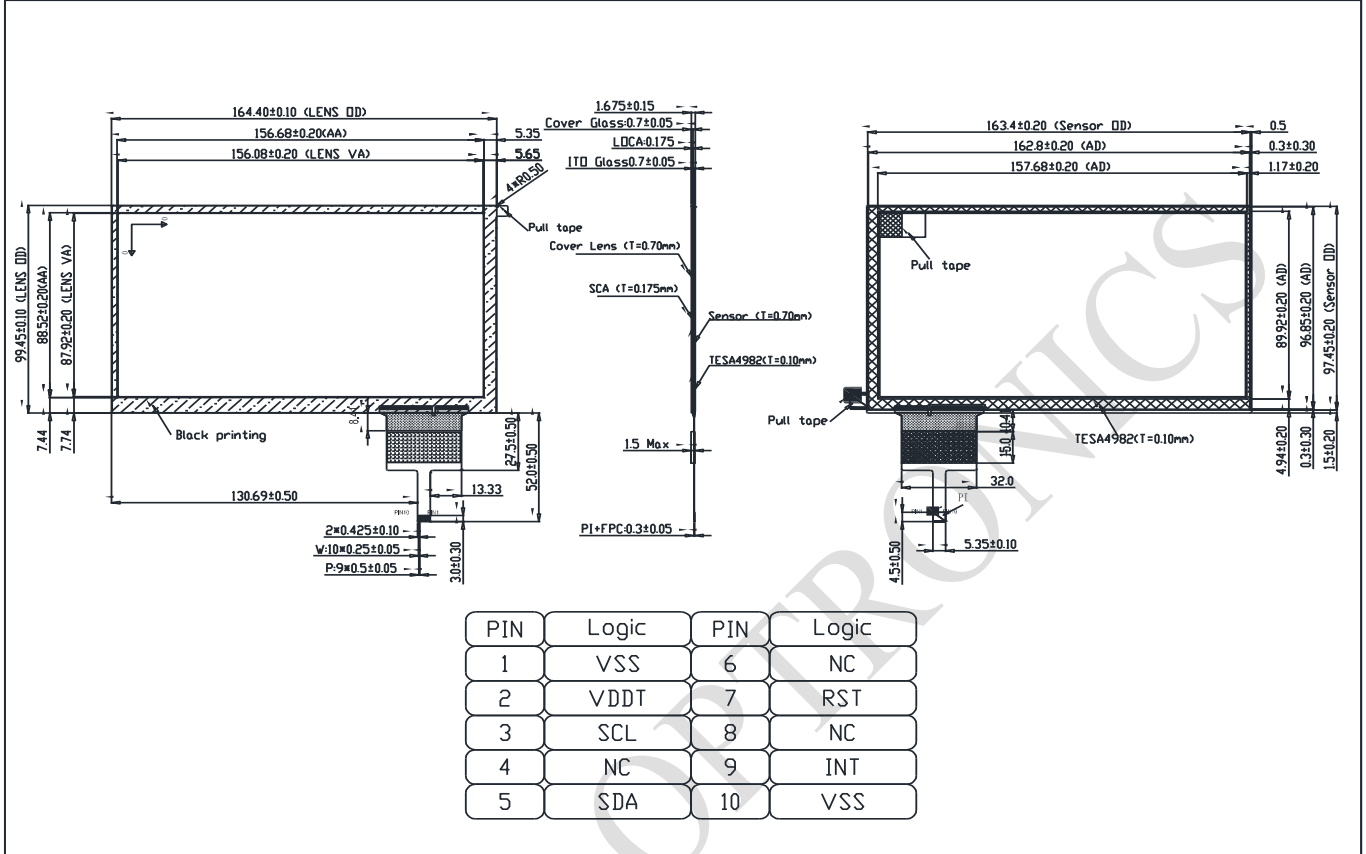
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature 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	60°C, 90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation  <div style="text-align: center;">  <p>-20°C      25°C      70°C</p> <p>30min    5min    30min</p> <p>1 cycle</p> </div>	-20°C/70°C 10 cycles	—
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 1.5mm 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=±600V(contact) ,±800v(air), RS=330Ω CS=150pF 10 times	—

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.

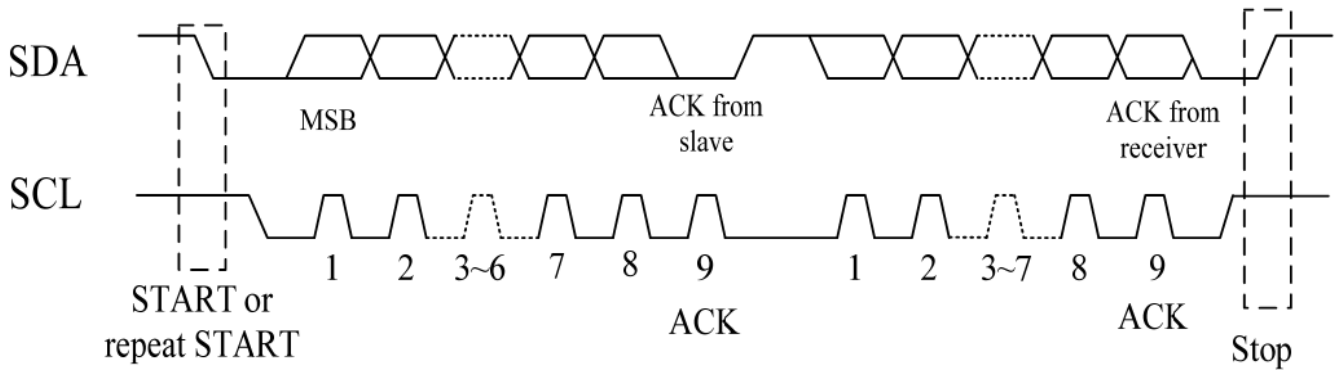
Note3: The packing have to including into the vibration testing.

### 13.Touch Panel Information

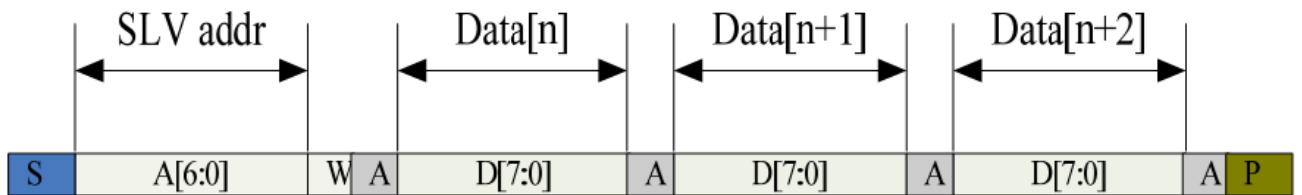


PIN	Logic	PIN	Logic
1	VSS	6	NC
2	VDDT	7	RST
3	SCL	8	NC
4	NC	9	INT
5	SDA	10	VSS

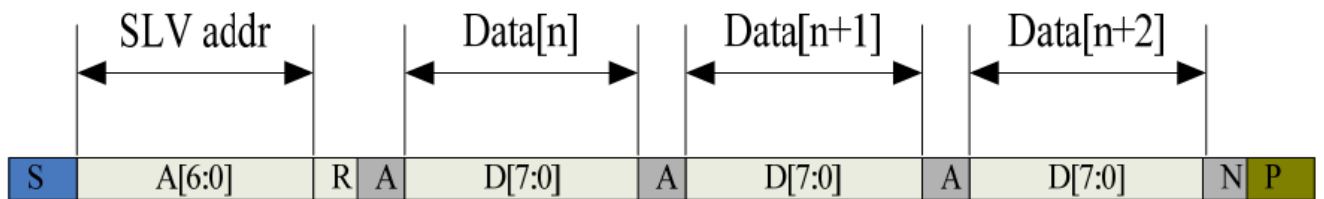
13.1. CTP I2C Timing:



I2C Serial Data Transfer Format



I2C master write, slave read



I2C master read, slave write



Mnemonics	Description
S	I2C Start or I2C Restart
A[6:0]	Slave address
R/W	READ/WRITE bit, '1' for read, '0' for write
A(N)	ACK(NACK) bit
P	STOP: the indication of the end of a packet (if this bit is missing, S will indicate the end of the current packet and the beginning of the next packet)

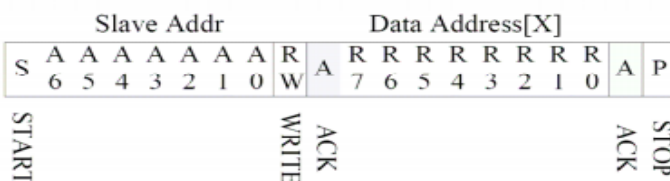
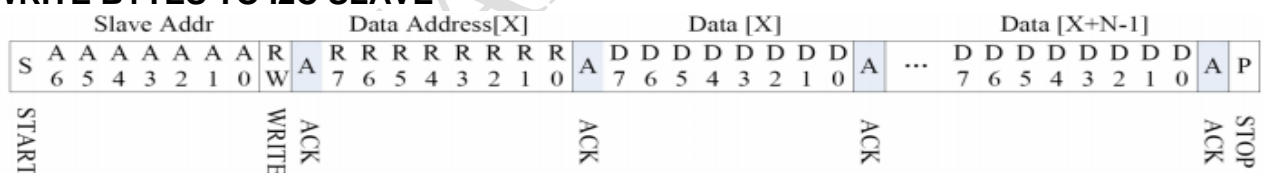
Lists the meanings of the mnemonics used in the above figures

Parameter	Unit	Min	Max
SCL frequency	KHz	0	400
Bus free time between a STOP and START condition	us	1.3	\
Hold time (repeated) START condition	us	0.6	\
Data setup time	ns	100	\
Setup time for a repeated START condition	us	0.6	\
Setup time for STOP condition	us	0.6	\

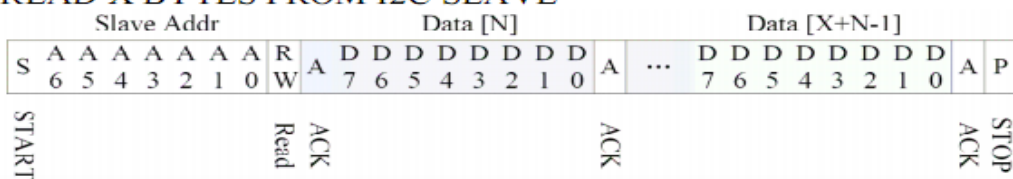
Interface Timing Characteristics

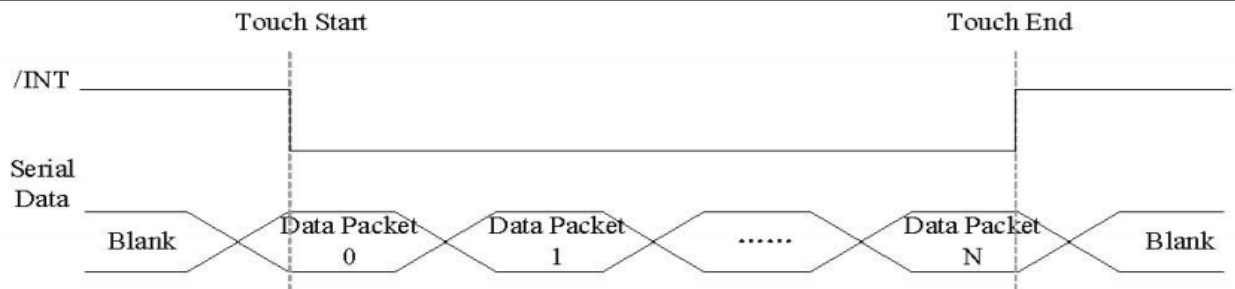
AS FOR STANDARD CTPM, HOST NEED TO USE BOTH INTERRUPT CONTROL SIGNAL AND SERIAL DATA INTERFACE TO GET THE TOUCH DATA. HERE IS THE TIMING TO GET TOUCH DATA.

**WRITE BYTES TO I2C SLAVE**



**READ X BYTES FROM I2C SLAVE**





Address: 0X38

### TOUCH DATA READ PROTOCOL

NAME	VALUE	DESCRIPTION
START CH	0X00	START COMMAND FOR CTPM TOUCH DATA PACKET,HOST MUST SEND CTPM A START CH COMMAND BEFORE READ TOUCH DATA
Lst READ BYTE ~ LAST READ BYTE		TOUCH DATA PACKET SENT BY CTPM,EACH BYTE HAS 8-BIT DATA ,A TOUCH DATA PACKET CONSISTS OF N BYTE

Address	Name	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Host Access
00h	Devide__Mode	—	Device Model[2:0]			—				RW
01h	Gest_ID	Gesture ID[7:0]								R
02h	TD__Status	—				Number of touch points[3:0]				R
03h	Touch1__XH	1 <sup>st</sup> Event Flag		—		1 <sup>st</sup> Touch X Position[11:8]				R
04h	Touch1__XL	1 <sup>st</sup> Touch X Position[7:0]								R
05h	Touch1__YH	1 <sup>st</sup> Touch ID[3:0]				1 <sup>st</sup> Touch Y Position[11:8]				R
06h	Touch1__YL	1 <sup>st</sup> Touch Y Position[7:0]								R
09h	Touch2__XH	2 <sup>nd</sup> Event Flag		—		2 <sup>nd</sup> Touch X Position[11:8]				R
0Ah	Touch2__XL	2 <sup>nd</sup> Touch X Position[7:0]								R
0Bh	Touch2__YH	2nd Touch ID[3:0]				2ndTouch Y Position[11:8]				R
0Ch	Touch2__YL	2nd Touch Y Position[7:0]								R
0Fh	Touch3__XH	3rdEvent Flag		—		3rdTouch X Position[11:8]				R

10h	Touch3__XL	3rd Touch X Position[7:0]		R	
11h	Touch3__YH	3rdTouch ID[3:0]	3rdTouch Y Position[11:8]	R	
12h	Touch3__YL	3rd Touch Y Position[7:0]		R	
15h	Touch4__XH	4thEvent Flag	—	4thTouch X Position[11:8]	R
16h	Touch4__XL	4th Touch X Position[7:0]		R	
17h	Touch4__YH	4thTouch ID[3:0]	4thTouch Y Position[11:8]	R	
18h	Touch4__YL	4th Touch Y Position[7:0]		R	
1Bh	Touch5__XH	5thEvent Flag	—	5thTouch X Position[11:8]	R
1Ch	Touch5__XL	5th Touch X Position[7:0]		R	
1Dh	Touch5__YH	5thTouch ID[3:0]	5thTouch Y Position[11:8]	R	
1Eh	Touch5__YL	5th Touch Y Position[7:0]		R	

## 14. Initial Code For Reference

```
void Initial_RA8875()
{
    RES = 1;
    Delay1ms (10);
    RES = 0;      //Active low
    Delay1ms (50);
    RES = 1;
    Delay1ms (100);

    LCD_CmdWrite(0x88);
    LCD_DataWrite(0x0b);
    LCD_DataRead();
    Delay1ms(1);
    LCD_CmdWrite(0x89);
    LCD_DataWrite(0x02);
    LCD_DataRead();
    Delay1ms(1);

    LCD_CmdWrite(0x10);
    LCD_DataWrite(0x0F);

    LCD_CmdWrite(0x04); LCD_DataWrite(0x81);
    Delay1ms(1);

    LCD_CmdWrite(0x14);
    LCD_DataWrite(0x63);
    LCD_CmdWrite(0x15);
    LCD_DataWrite(0x03);
    LCD_CmdWrite(0x16);
    LCD_DataWrite(0x03);
    LCD_CmdWrite(0x17);
    LCD_DataWrite(0x02);
    LCD_CmdWrite(0x18);
    LCD_DataWrite(0x00);

    LCD_CmdWrite(0x19);
    LCD_DataWrite(0xdf);
    LCD_CmdWrite(0x1a);
    LCD_DataWrite(0x01);
    LCD_CmdWrite(0x1b);
    LCD_DataWrite(0x14);
    LCD_CmdWrite(0x1c);
    LCD_DataWrite(0x00);
    LCD_CmdWrite(0x1d);
    LCD_DataWrite(0x06);
    LCD_CmdWrite(0x1e);
    LCD_DataWrite(0x00);
}
```

---

```
LCD_CmdWrite(0x1f);  
LCD_DataWrite(0x01);
```

```
LCD_CmdWrite(0x30);  
LCD_DataWrite(0x00);  
LCD_CmdWrite(0x31);  
LCD_DataWrite(0x00);  
LCD_CmdWrite(0x34);  
LCD_DataWrite(0x1F);  
LCD_CmdWrite(0x35);  
LCD_DataWrite(0x03);
```

```
LCD_CmdWrite(0x32);  
LCD_DataWrite(0x00);  
LCD_CmdWrite(0x33);  
LCD_DataWrite(0x00);  
LCD_CmdWrite(0x36);  
LCD_DataWrite(0xdf);  
LCD_CmdWrite(0x37);  
LCD_DataWrite(0x01);
```

```
}
```

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<b>LCM Sample Estimate Feedback Sheet</b>		
<b>Module Number :</b> _____		
<b>1 、 <u>Panel Specification</u> :</b>		
1. Panel Type :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
2. View Direction :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
3. Numbers of Dots :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
4. View Area :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
5. Active Area :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
6. Operating Temperature :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
7. Storage Temperature :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
8. Others : _____		
<b>2 、 <u>Mechanical Specification</u> :</b>		
1. PCB Size :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
2. Frame Size :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
3. Material of Frame :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
4. Connector Position :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
5. Fix Hole Position :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
6. Backlight Position :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
7. Thickness of PCB :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
8. Height of Frame to PCB :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
9. Height of Module :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
10. Others :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
<b>3 、 <u>Relative Hole Size</u> :</b>		
1. Pitch of Connector :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
2. Hole size of Connector :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
3. Mounting Hole size :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
4. Mounting Hole Type :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
5. Others :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
<b>4 、 <u>Backlight Specification</u> :</b>		
1. B/L Type :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
2. B/L Color :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
3. B/L Driving Voltage (Reference for LED Type) : <input type="checkbox"/> Pass <input type="checkbox"/> NG , _____		
4. B/L Driving Current :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
5. Brightness of B/L :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
6. B/L Solder Method :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
7. Others :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____

**Module Number :** \_\_\_\_\_

**5 · Electronic Characteristics of Module :**

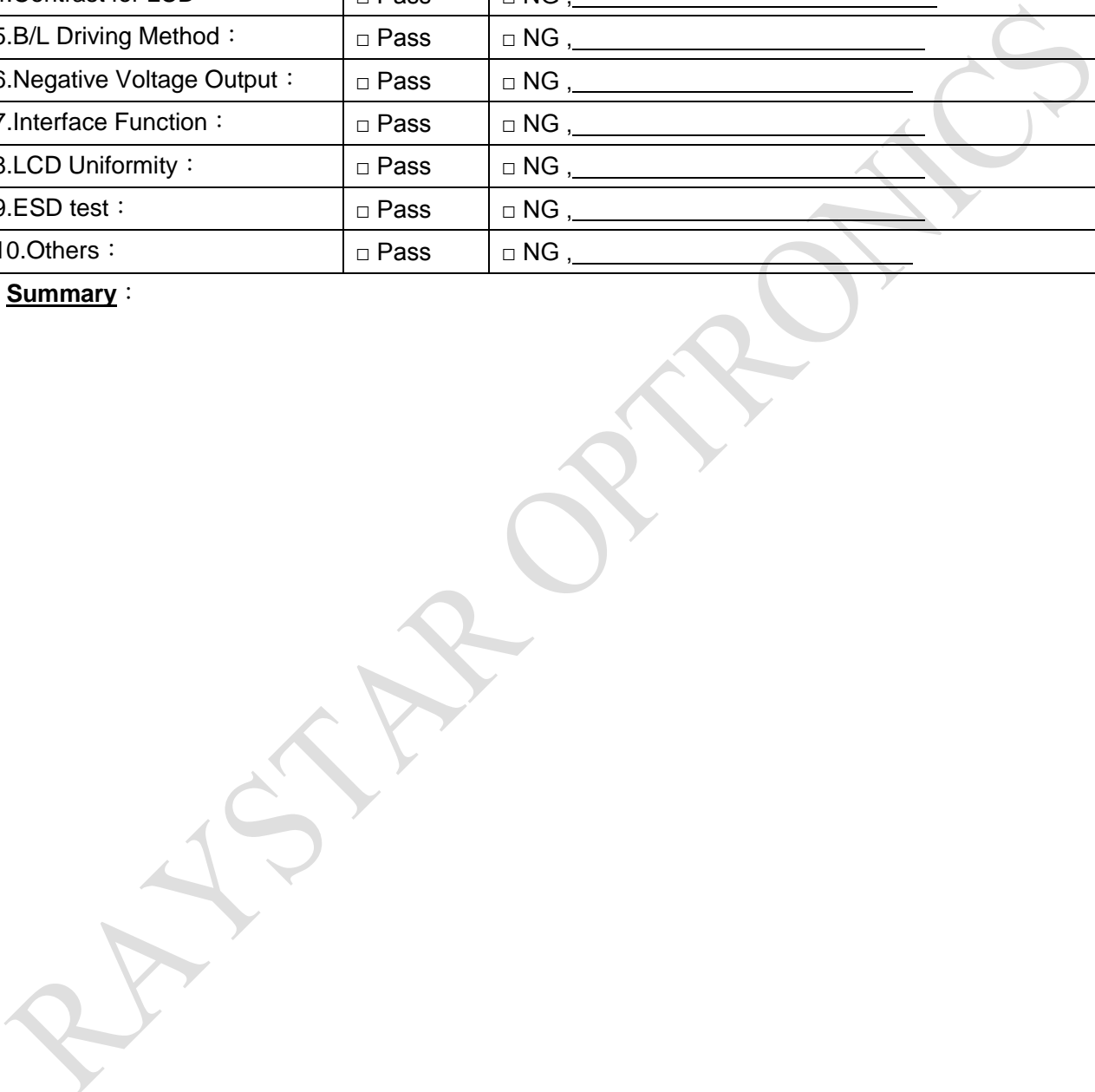
1.Input Voltage :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
2.Supply Current :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
3.Driving Voltage for LCD :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
4.Contrast for LCD :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
5.B/L Driving Method :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
6.Negative Voltage Output :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
7.Interface Function :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
8.LCD Uniformity :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
9.ESD test :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
10.Others :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____

**6 · Summary :**

**Sales signature :** \_\_\_\_\_

**Customer Signature :** \_\_\_\_\_

**Date :**    /    /    \_\_\_\_\_



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