OKAYA Electric America, Inc.

SPECIFICATIONS

DRAWING CODE _____

SAMPLE CODE _____

(This Code will be changed while mass production)

MASS PRODUCTION CODE **RH800480T-7x0CP-AP**

Customer Approved

Date:

Sales Sign	QC Confirmed	Checked By	Designer

Approval for Specifications Only

This specification is subject to change without notice

Approval for Specifications and Sample

OKAYA

Phone: 219-477-4488
Fax: 219-477-4856
www.okaya.com

OKAYA ELECTRIC AMERICA
52 Marks Road, Suite 1
Valparaiso, Indiana 46383

History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
08/26/2013	01	001	New Drawing.	-	譚超敏
12/02/2013	01	002	Modify Touch Data Add Frame & Modify FPC Position	4,10,11 12,13,17 Appendix	Lambert
12/24/2013	01	003	Modify Touch Data	4,10,11 14,15,16 17	Lambert
03/07/2014	01	004	First sample	-	Lambert
04/07/2014	02	005	Modify LCM Weight Modify LCM Outline Dimension LCM Drawing	4 4 Appendix	Lambert
04/30/2014	02	006	Modify LCM Outline Dimension LCM Drawing	4 Appendix	Lambert
06/23/2014	02	007	Second sample Modify LCM Drawing	- Appendix	Lambert

Total: 35 Page

Contents

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	800 * (RGB) * 480
LCD Type	a-Si TFT , Normally white , Transmissive type
Touch panel	True Multi-Touch Capacitive Touch Panel True Multi-touch with up to 10 Points of Absolution
Screen size(inch)	7.0 inch
Viewing Direction	6 O'clock
Surface treatment	Anti-Glare
Color configuration	RGB-stripe
Backlight Type	LED B/L
Weight	255 g
Interface	24 Bits RGB Interface
ROHS	THIS PRODUCT CONFORMS THE ROHS OF OKAYA

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	192.96 (W) * 110.76 (L) *8.46 (H)	mm

Touch panel

Item	Standard Value	Unit
Viewing Area	154.88 (W) * 86.72 (L)	mm

LCD panel

Item	Standard Value	Unit
Active Area	154.08 (W) * 85.92 (L)	mm

Note : For detailed information please refer to LCM drawing

1.3 Absolute Maximum Ratings

Module

Item	Symbol	Condition	Min.	Max.	Unit	Remark
Power Supply Voltage	DV_{DD}	GND=0	-0.3	5.0	V	-
	AV_{DD}		6.5	13.5	V	
	V_{GH}		-0.3	40	V	
	V_{GL}	AGND=0	-20	0.3	V	
	V_{GH} - V_{GL}	-	0	40	V	
Operating Temperature	T_{OP}	-	-20	+70	°C	
Storage Temperature	T_{ST}	-	-30	+80	°C	

The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

1.4 DC Electrical Characteristics

Module GND = 0V, Ta = 25°C

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply Voltage	DV_{DD}	3.0	3.3	3.6	V	-
	V_{GH}	15.3	16.0	16.7		
	V_{GL}	-7.7	-7.0	-6.3		
	AV_{DD}	10.2	10.4	10.6		
VCOM	V_{COM}	-	3.9	-	V	
Input signal Voltage	V_{IH}	$0.7DV_{DD}$	-	DV_{DD}	V	
	V_{IL}	0	-	$0.3DV_{DD}$		
Supply Current	IDV_{DD}	-	4	10	mA	DV_{DD} = 3.3

1.5 Optical Characteristics

TFT LCD Module DV_{DD} = 3.3 V, Ta=25°C

Item		Symbol	Condition	Min.	Typ.	Max.	unit	
Response time	Rise	Tr	Ta = 25°C θX, θY = 0°	-	10	20	ms	Note 2
	Fall	Tf		-	15	30		
Viewing angle	Top	θY+	CR ≥ 10	40	50	-	Deg.	Note 4
	Bottom	θY-		60	70	-		
	Left	θX-		60	70	-		
	Right	θX+		60	70	-		
Contrast ratio		CR	Ta = 25°C θX , θY = 0°	400	500	-		Note 3
Color of CIE Coordinate (With B/L & touch panel)	White	X		0.24	0.29	0.34	-	Note1
		Y		0.27	0.32	0.37		
	Red	X		0.51	0.56	0.61		
		Y		0.30	0.35	0.40		
	Green	X		0.28	0.33	0.38		
		Y		0.53	0.58	0.63		
	Blue	X		0.09	0.14	0.19		
		Y		0.02	0.07	0.12		
Average Brightness Pattern=white display (With B/L & touch panel) *1		IV	I_L = 160 mA	200	250	-	cd/m^2	Note1
Uniformity (With B/L & touch panel) *2		△B	I_L = 160 mA	70	-	-	%	Note1

Note 1:

*1：△B=B(min) / B(max) * 100%

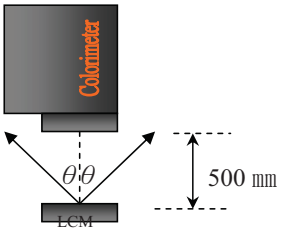
*2：Measurement Condition for Optical Characteristics:

a：Environment: 25℃±5℃ / 60±20%R.H，no wind，dark room below 10 Lux at typical lamp current and typical operating frequency.

b：Measurement Distance: 500 ± 50 ㎜ ，(θ= 0°)

c：Equipment: TOPCON BM-7 fast，(field 1°)，after 10 minutes operation.

d：The uncertainty of the C.I.E coordinate measurement ±0.01，Average Brightness ± 4%



Colorimeter=BM-7 fast

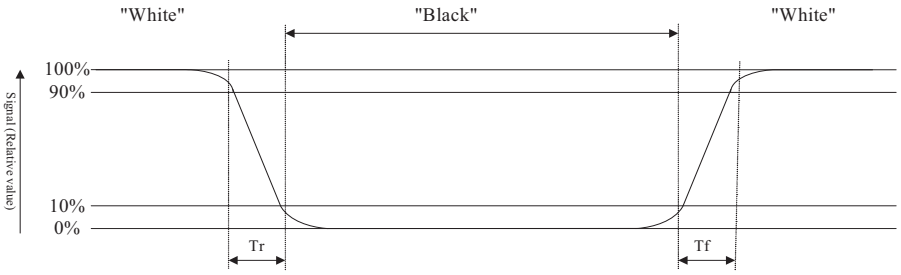
To be measured at the center area of panel with a viewing cone of 1° by Topcon luminance meter BM-7, after 10 minutes operation (module)

Note2: Definition of response time:

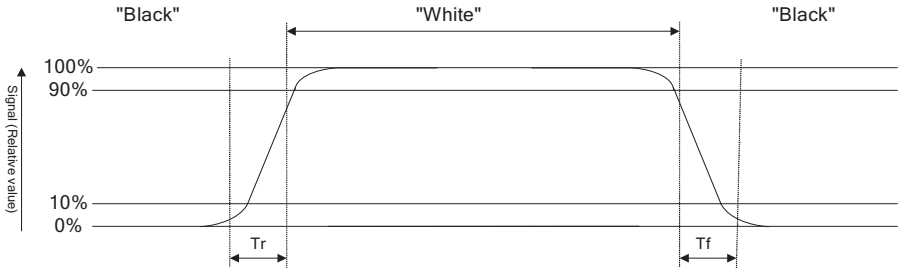
The output signals of photo detector are measured when the input signals are changed from “black” to “white”(falling time) and from “white” to “black”(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:

Normally White



Normally Black



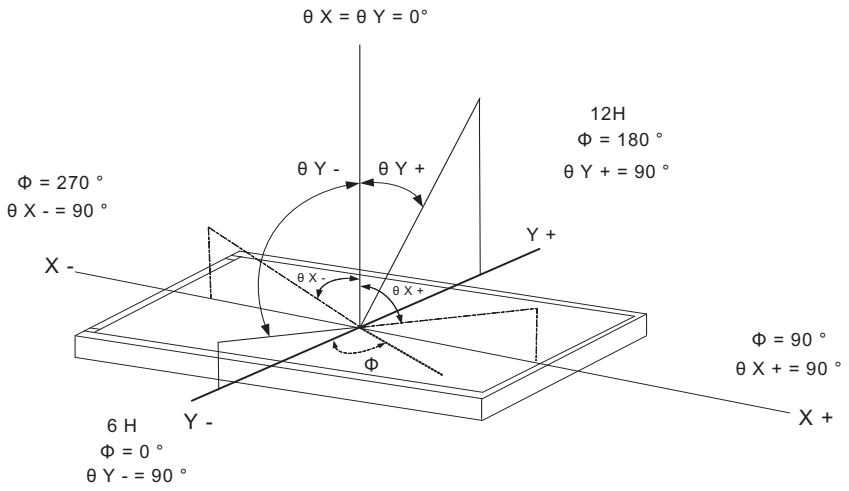
Note3: Definition of contrast ratio:

Contrast ratio is calculated with the following formula

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at “White” state}}{\text{Photo detector output when LCD is at “Black” state}}$$

Note4: Definition of viewing angle:

Refer to figure as below:



1.6 Backlight Characteristics

Maximum Ratings

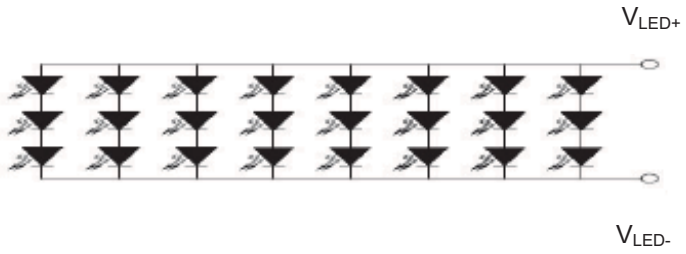
Item	Symbol	Min.	Max.	Unit	Remark
LED Forward Current	I_F	25		mA	One LED
LED Reverse Voltage	V_R	1.2		V	

Electrical / Optical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
LED Voltage	V_L	9.6	9.6	10.2	V	Note1
LED Current	I_L	140	160	180	mA	-
LED life time	-	20000	-	-	H_r	Note2

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and I_L=180mA.

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and I_L=160mA. The LED lifetime could be decreased if operating I_L is lager than 160mA.



1.7 Touch Panel Characteristics

Features

Item	Standard Value
Touch Panel Size	7”
Touch type	Projective capacitive touch panel
Input Method	True Multi-touch with up to 10 Points of Absolution X and Y Coordinates
Output Interface	I^2C
IC	FT5406

Mechanical Specifications

Item	Standard Value	Unit
Viewing Area	154.88 (W) * 86.72 (L)	mm
Number of sensing channel	22 x 12	mm

Absolute Maximum Ratings

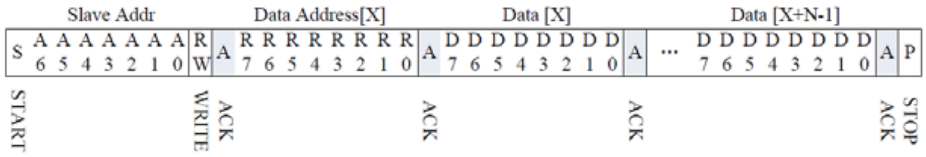
Item	Symbol	Condition	Min.	Max.	Unit
Supply voltage	TPVDD	-	-0.3	3.6	V
Operating Temperature	T_{OP}	-	-20	+70	°C
Storage Temperature	T_{ST}	-	-30	+80	°C

DC Electrical Characteristics

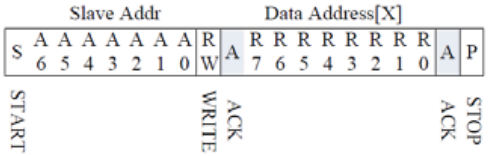
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage	TPVDD	-	3.0	3.3	3.6	V
Input High Voltage	VIH	-	0.7 TPVDD	-	TPVDD	V
Input Low Voltage	VIL	-	-0.3	-	0.3 TPVDD	V
Output High Voltage	VOH	IOH=-0.1mA	0.7 TPVDD	-	-	V
Output Low Voltage	VOL	IOL=+0.1mA	-	-	0.3 TPVDD	V

I²C Read/Write Interface description

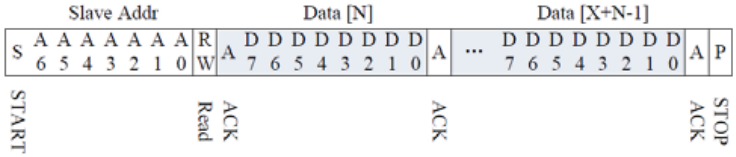
Write N bytes to I2C slave



Set Data Address



Read X bytes from I2C Slave

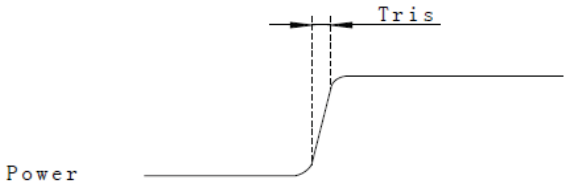


Mnemonics Description

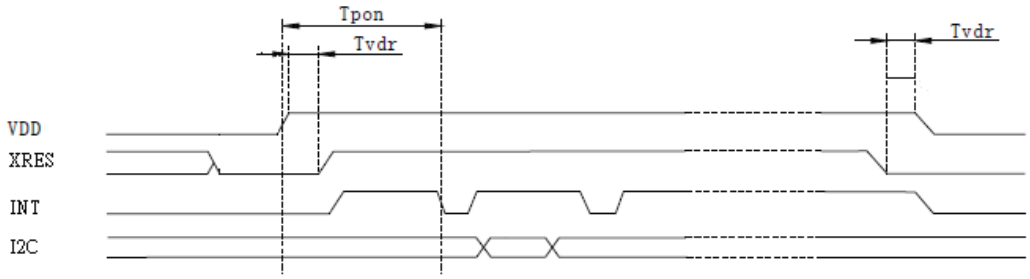
Mnemonics	Description
S	I2C Start or I2C Restart
A[6:0]	Slave address A[6:0]:0111000b
R/ W	'1' for read, '0'for write
A(N)	ACK(NACK)
P	STOP: the indication of the end of a packet (if this bit is missing, S will indicate the end of the current packet and the beginning of the next packet)

Timing Characteristics

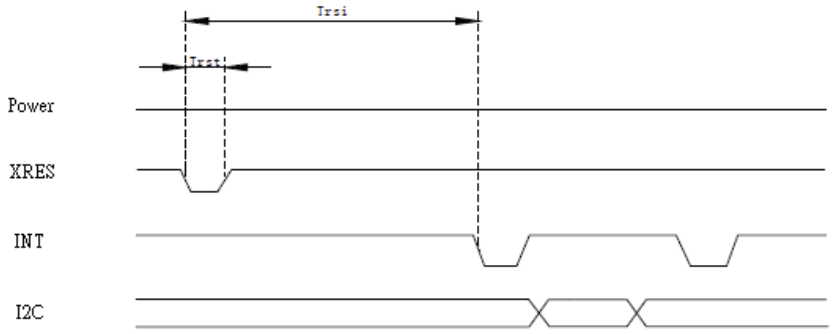
Parameter	Unit	Min	Max
SCL frequency	KHz	0	400
Bus free time between a STOP and START condition	us	4.7	\
Hold time (repeated) START condition	us	4.0	\
Data setup time	ns	250	\
Setup time for a repeated START condition	us	4.7	\
Setup Time for STOP condition	us	4.0	\



Power on time



Power on Sequence



Reset Sequence

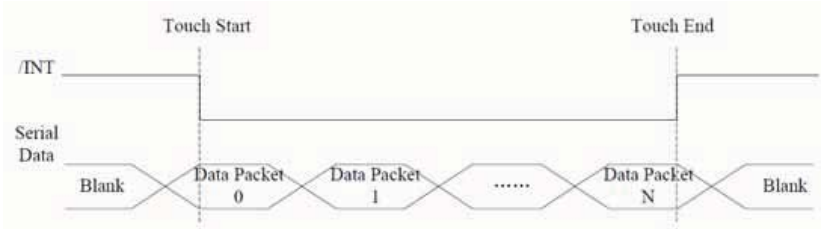
Power on / Reset Sequence Parameters

Parameter	Description	Min	Max	Units
Tris	Rise time from 0.1VDD to 0.9VDD	--	5	ms
Tpon	Time of starting to report point after powering on	200	--	ms
Tvdr	Reset time after VDD powering on	1	--	ms
Trsi	Time of starting to report point after resetting	200	--	ms
Trst	Reset time	1	--	ms

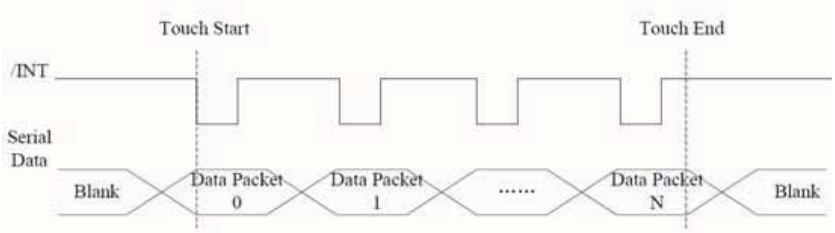
Interrupt signal from CTP to Host

As for standard CTP, host need to use both interrupt control signal and serial data interface to get the touch data. There are two kind of method to use interrupt: interrupt trigger and interrupt query.

Here is the timing to get touch data.



Interrupt query mode



Interrupt trigger mode

Host use general I2C protocol to read the touch data or the information from CTP . CTP will send host a interrupt signal when there is a valid touch. Then host can use the serial data interface to get the touch data. If there is no valid touch detected, the /INT will not be pulled up, the host do not need to read the touch data.

NOTE: “valid touch” may have different definition in various systems. For example, in some systems, the valid touch is defined as there is one more valid touch point. But in some other systems, the valid touch is defined as one more valid touch with valid gestures. In usual, /INT will be pulled up when there is a valid touch point, and to be low when a touch finishes.

As for interrupt trigger mode, /INT signal will be low if there is a touch detected. But for per update of valid touch data, CTP will produce a valid pulse for /INT signal, host can read the touch data periodically according to the frequency of this pulse. In this mode, the pulse frequency is the touch data update frequency.

CTP Register Mapping

Address	Name	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Host Access
00h	DEVIDE_MODE	-	Device Mode[2:0]			-	-	-	-	WR
01h	GEST_ID	Gesture ID[7:0]								R
02h	TD_STATUS	-	-	-	-	Number of touch points[3:0]				R
03h	TOUCH1_XH	1st Event Flag		-	-	1st Touch X Position[11:8]				R
04h	TOUCH1_XL	1st Touch X Position[7:0]								R
05h	TOUCH1_YH	1st Touch ID[3:0]				1st Touch Y Position[11:8]				R
06h	TOUCH1_YL	1st Touch Y Position[7:0]								R
07h	-	-								R
08h	-	-								R
09h	TOUCH2_XH	2st Event Flag		-	-	2st Touch X Position[11:8]				R
0Ah	TOUCH2_XL	2st Touch X Position[7:0]								R
0Bh	TOUCH2_YH	2st Touch ID[3:0]				2st Touch Y Position[11:8]				R
0Ch	TOUCH2_YL	2st Touch Y Position[7:0]								R
0Dh	-	-								R
0Eh	-	-								R
0Fh	TOUCH3_XH	3st Event Flag		-	-	3st Touch X Position[11:8]				R
10h	TOUCH3_XL	3st Touch X Position[7:0]								R
11h	TOUCH3_YH	3st Touch ID[3:0]				3st Touch Y Position[11:8]				R
12h	TOUCH3_YL	3st Touch Y Position[7:0]								R
13h	-	-								R
14h	-	-								R
15h	TOUCH4_XH	4st Event Flag		-	-	4st Touch X Position[11:8]				R
16h	TOUCH4_XL	4st Touch X Position[7:0]								R
17h	TOUCH4_YH	4st Touch ID[3:0]				4st Touch Y Position[11:8]				R
18h	TOUCH4_YL	4st Touch Y Position[7:0]								R
19h	-	-								R
1Ah	-	-								R
1Bh	TOUCH5_XH	5st Event Flag		-		5st Touch X Position[11:8]				R
1Ch	TOUCH5_XL	5st Touch X Position[7:0]								R
1Dh	TOUCH5_YH	5st Touch ID[3:0]				5st Touch Y Position[11:8]				R
1Eh	TOUCH5_YL	5st Touch Y Position[7:0]								R
1Fh	-	-								R
20h	-	-								R

Address	Name	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Host Access
21h	TOUCH6_XH	6st Event Flag		-	-	6st Touch X Position[11:8]				R
22h	TOUCH6_XL	6st Touch X Position[7:0]								R
23h	TOUCH6_YH	6st Touch ID[3:0]				6st Touch Y Position[11:8]				R
24h	TOUCH6_YL	6st Touch Y Position[7:0]								R
25h	-	-								R
26h	-	-								R
27h	TOUCH7_XH	7st Event Flag		-	-	7st Touch X Position[11:8]				R
28h	TOUCH7_XL	7st Touch X Position[7:0]								R
29h	TOUCH7_YH	7st Touch ID[3:0]				7st Touch Y Position[11:8]				R
2ah	TOUCH7_YL	7st Touch Y Position[7:0]								R
2bh	-	-								R
2ch	-	-								R
2dh	TOUCH8_XH	8st Event Flag		-	-	8st Touch X Position[11:8]				R
2eh	TOUCH8_XL	8st Touch X Position[7:0]								R
2fh	TOUCH8_YH	8st Touch ID[3:0]				8st Touch Y Position[11:8]				R
30h	TOUCH8_YL	8st Touch Y Position[7:0]								R
31h	-	-								R
32h	-	-								R
33h	TOUCH9_XH	9st Event Flag		-	-	9st Touch X Position[11:8]				R
34h	TOUCH9_XL	9st Touch X Position[7:0]								R
35h	TOUCH9_YH	9st Touch ID[3:0]				9st Touch Y Position[11:8]				R
36h	TOUCH9_YL	9st Touch Y Position[7:0]								R
37h	-	-								R
38h	-	-								R
39h	TOUCH10_XH	10st Event Flag		-	-	10st Touch X Position[11:8]				R
3ah	TOUCH10_XL	10st Touch X Position[7:0]								R
3bh	TOUCH10_YH	10st Touch ID[3:0]				10st Touch Y Position[11:8]				R
3ch	TOUCH10_YL	10st Touch Y Position[7:0]								R
3dh	-	-								R
3eh	-	-								R
3fh	-	-								R

DEVICE_MODE

This register is the device mode register, configure it to determine the current mode of the chip.

Address	Bit Address	Register Name	Description
00h	6 : 4	Device Mode [2:0]	000b Work Mode 100b Factory Mode – read raw data

GEST_ID

This register describes the gesture of a valid touch.

Address	Bit Address	Register Name	Description
01h	7 : 0	Gesture ID [7:0]	0x10 Move UP 0x14 Move Left 0x18 Move Down 0x1C Move Right 0x48 Zoom In 0x49 Zoom Out

TD_STATUS

This register is the Touch Data status register.

Address	Bit Address	Register Name	Description
02h	7 : 4	Reserved	
	3 : 0	Number of touch points[3:0]	How many points detected. 1-5 is valid.

TOUCHn_XH

This register describes MSB of the X coordinate of the nth touch point and the corresponding event flag.

Address	Bit Address	Register Name	Description
03h ~ 39h	7 : 6	Event Flag	00b: Put Down 01b: Put Up 10b: Contact 11b: Reserved
	5 : 4		Reserved
	3 : 0	Touch X Position [11:8]	MSB of Touch X Position in pixels

TOUCHn_XL

This register describes LSB of the X coordinate of the nth touch point

Address	Bit Address	Register Name	Description
04h ~ 3Ah	7 : 0	Touch X Position [7:0]	LSB of the Touch X Position in pixels

TOUCHn_YH

This register describes MSB of the Y coordinate of the nth touch point and corresponding touch ID.

Address	Bit Address	Register Name	Description
05h ~ 3Bh	7 : 4	Touch ID[3:0]	Touch ID of Touch Point
	3 : 0	Touch Y Position [11:8]	MSB of Touch Y Position in pixels

TOUCHn_YL

This register describes LSB of the Y coordinate of the nth touch point.

Address	Bit Address	Register Name	Description
06h ~ 3Ch	7:0	Touch Y Position[7:0]	LSB of The Touch Y Position in pixels

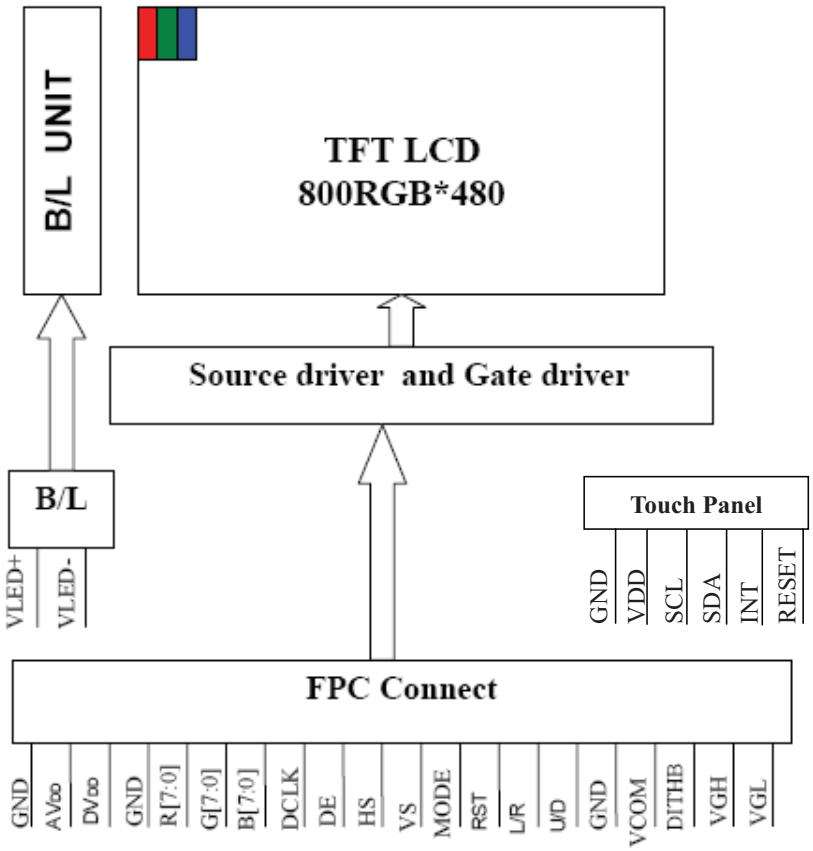
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



2.2 Interface Pin Description

TFT LCM Interface

Pin NO.	SYMBOL	DESCRIPTION	Remark
1	V_{LED+}	Power For LED backlight (+).	Power
2	V_{LED+}	Power For LED backlight (+).	Power
3	V_{LED-}	Power For LED backlight (-).	Power
4	V_{LED-}	Power For LED backlight (-).	Power
5	GND	Power ground.	Power
6	V_{com}	Common voltage.	I
7	DV_{DD}	Power for Digital Circuit.	I
8	MODE	DE/SYNC mode select.	I,Note 1
9	DE	Data Input Enable.	I
10	VS	Vertical Sync Input.	I
11	HS	Horizontal Sync Input.	I
12	B7	Blue Data(MSB).	I
13	B6	Blue Data.	I
14	B5	Blue Data.	I
15	B4	Blue Data.	I
16	B3	Blue Data.	I
17	B2	Blue Data.	I
18	B1	Blue Data.	I:Note 2
19	B0	Blue Data(LSB).	I:Note 2
20	G7	Green Data(MSB).	I
21	G6	Green Data.	I
22	G5	Green Data.	I
23	G4	Green Data.	I
24	G3	Green Data.	I
25	G2	Green Data.	I
26	G1	Green Data.	I:Note 2
27	G0	Green Data(LSB).	I:Note 2
28	R7	Red Data(MSB).	I
29	R6	Red Data.	I
30	R5	Red Data.	I
31	R4	Red Data.	I
32	R3	Red Data.	I
33	R2	Red Data.	I
34	R1	Red Data.	I:Note 2
35	R0	Red Data(LSB).	I:Note 2

Pin NO.	SYMBOL	DESCRIPTION	Remark
36	GND	Power Ground	Power
37	DCLK	Sample clock	I:Note 3
38	GND	Power Ground.	Power
39	L/R	Left / right selection.	I:Note 4,5
40	U/D	Left / right selection.	I:Note 4,5
41	V_{GH}	Gate On Voltage.	Power
42	V_{GL}	Gate OFF Voltage.	Power
43	AV_{DD}	Power for Analog Circuit.	Power
44	RESET	Global reset pin.	I:Note 6
45	NC	No connection.	-
46	V_{COM}	Common Voltage.	I
47	DITHB	Dithering Function.	I:Note 7
48	GND	Power Ground.	Power
49	NC	No connection.	-
50	NC	No connection.	-

Capacitive Touch Panel (CTP) Interface

Pin No.	Symbol	Function	Remark
1	GND	Ground.	Power
2	TPVDD	Power.	Power
3	SCL	I^2C Clock.	I
4	SDA	I^2C Data.	I / O
5	INT	The interrupt from the CTP to the Host H: CTP interrupt not requested L: CTP request interrupt	O
6	RESET	RESET.	I

I: input, O: output, P: Power

Note 1: DE/SYNC mode select. Normally pull high.
When select DE mode, MODE="1", VS and HS must pull high.
When select SYNC mode, MODE= "0", DE must be grounded.

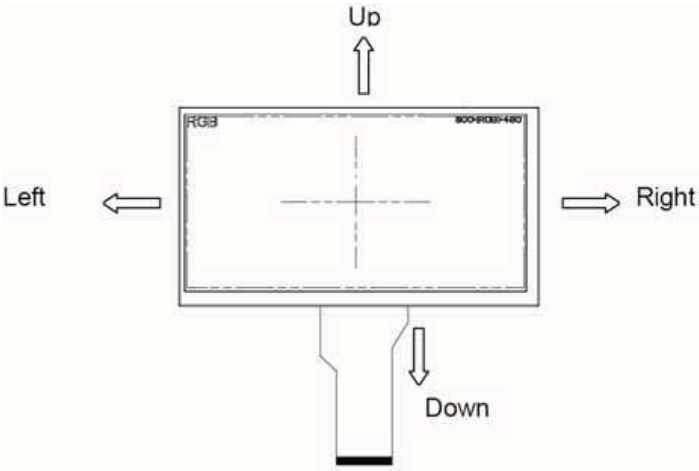
Note 2: When input 18 bits RGB data, the two low bits of R,G and B data must be grounded.

Note 3: Data shall be latched at the falling edge of DCLK.

Note 4: Selection of scanning mode.

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

Note 5: Definition of scanning direction.
Refer to the figure as below:

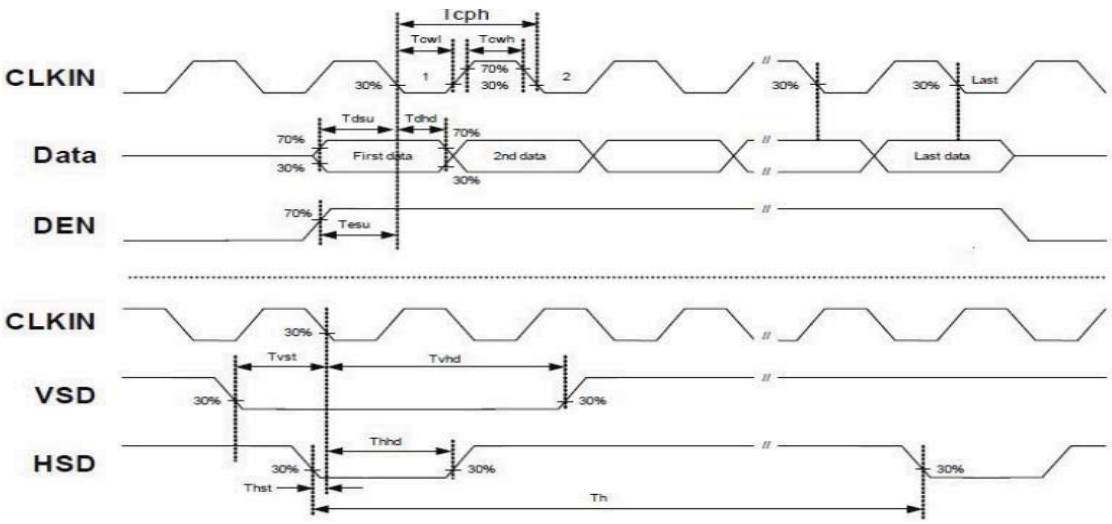


Note 6: Global reset pin. Active low to enter reset state. Suggest to connect with an RC reset circuit for stability. Normally pull high.

Note 7: Dithering function enable control, normally pull high.
When DITHB=" 1" ,Disable internal dithering function,
When DITHB=" 0" ,Enable internal dithering function

2.3 Timing Characteristics

2.3.1 Signal AC Characteristics



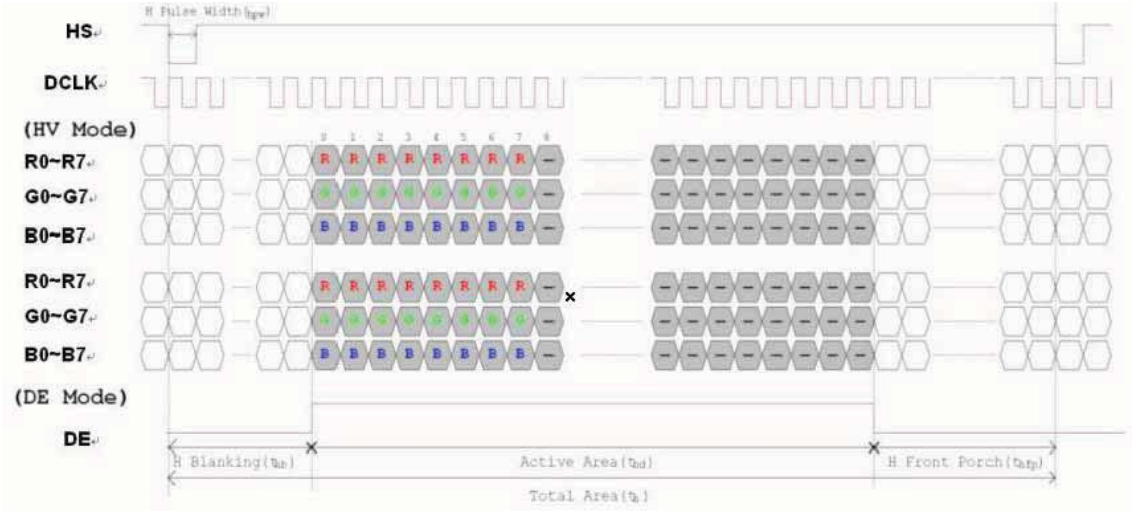
Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
HS setup time	T_{hst}	8	-	-	ns	
HS hold time	T_{hhd}	8	-	-	ns	
VS setup time	T_{vst}	8	-	-	ns	
VS setup time	T_{vhd}	8	-	-	ns	
VS setup time	T_{dsu}	8	-	-	ns	
VS setup time	T_{dhd}	8	-	-	ns	
DE setup time	T_{esu}	8	-	-	ns	
DE hole time	T_{ehd}	8	-	-	ns	
DV_{DD} Power On Slew rate	T_{POR}	-	-	20	ms	From 0 to 90%DV_{DD}
RESET pulse width	T_{Rst}	1	-	-	ms	
DCLK cycle time	T_{coh}	20	-	-	ns	
DCLK pulse duty	T_{cwh}	40	50	60	%	

2.3.2 Input Timing Setting

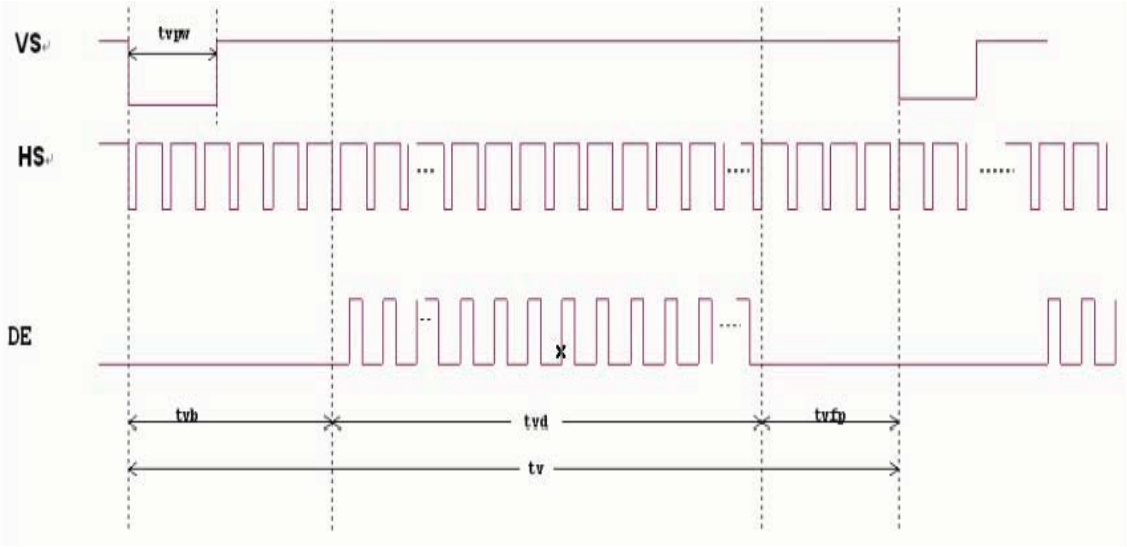
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	Thd		800		DCLK	
DCLK Frequency	Fclk	26.4	33.3	46.8	MHz	
One Horizontal Line	Th	862	1056	1200	DCLK	
HS pulse width	Thpw	1		40	DCLK	
HS Blanking	Thb	46	46	46	DCLK	
HS Front Porch	Thfp	16	210	354	DCLK	

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	Tvd		480		TH	
VS period time	Tv	510	525	650	TH	
VS pulse width	Tvpw	1		20	TH	
VS Blanking	Tvb	23	23	23	TH	
VS Front Porch	Tvfp	7	22	147	TH	

Horizontal input timing diaqram

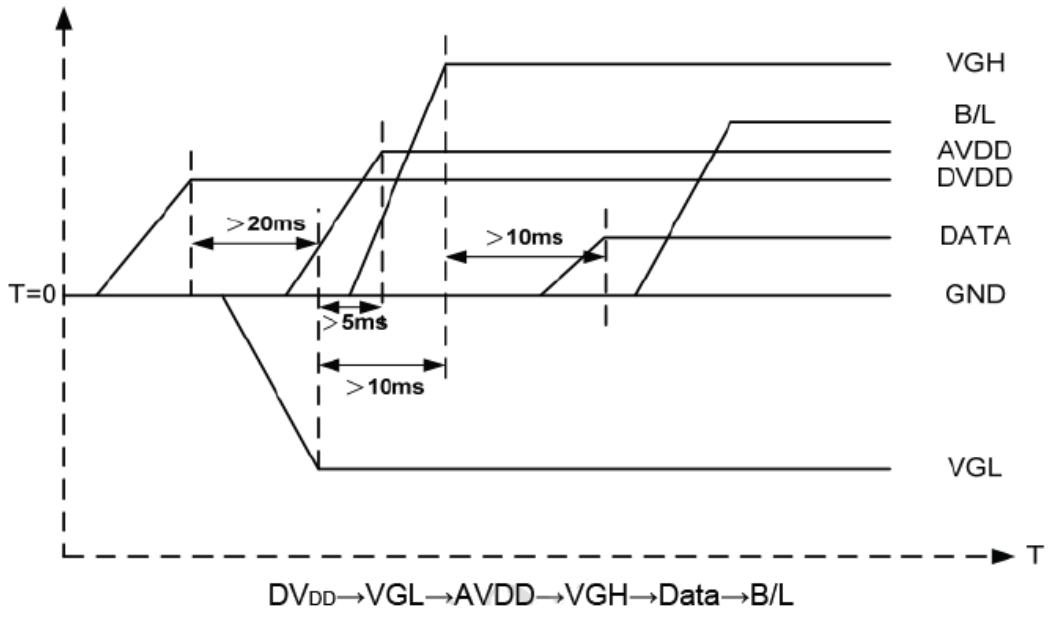


Vertical input timing diaqram

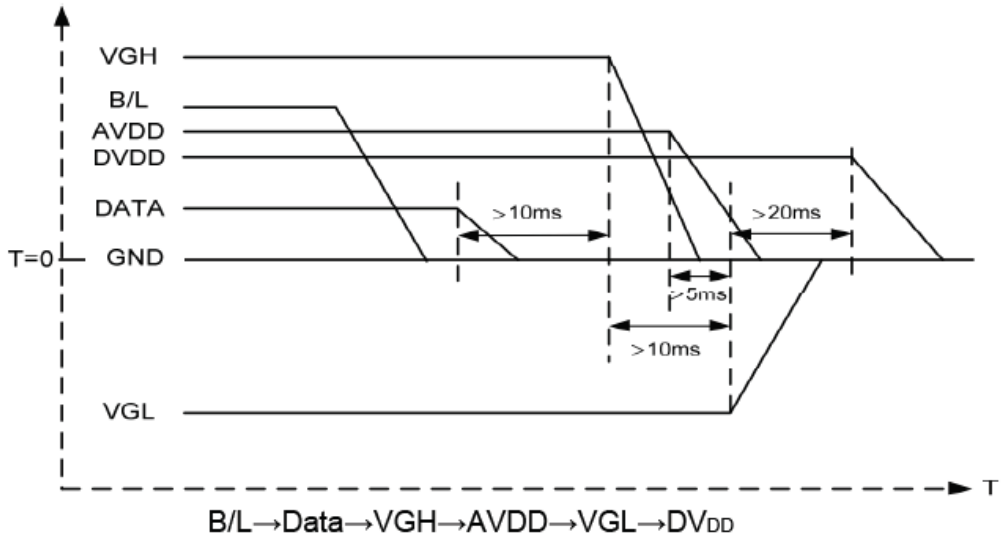


2.3.3 Power On/Off Characteristics

a. Power on:

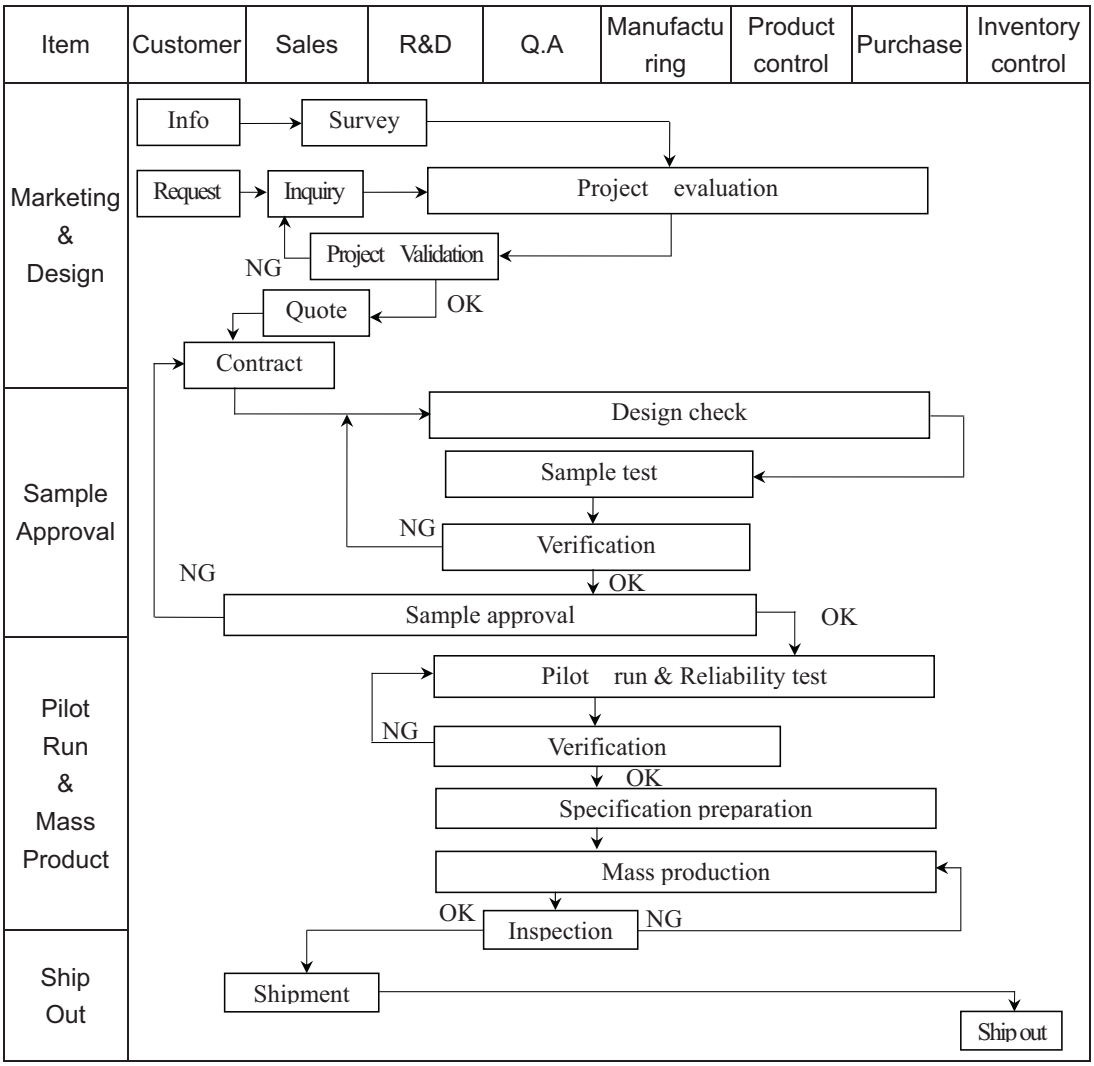


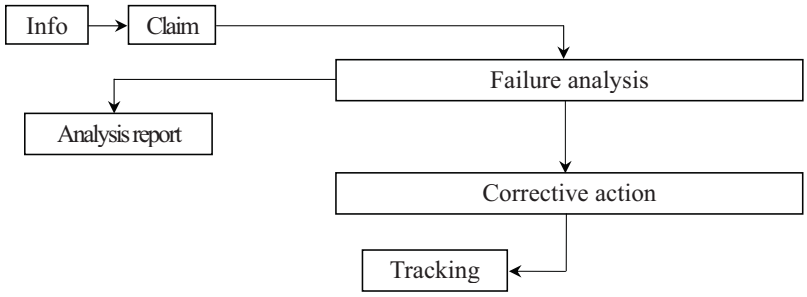
b. Power off:



3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart



Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Sales Service								
Q.A Activity	1. ISO 9001 Maintenance Activities 2. Process improvement proposal 3. Equipment calibration 4. Education And Training Activities 5. Standardization Management							

3.2. Inspection Specification

◆Scope：The document shall be applied to TFT-LCD Module for 3.5″ ~10″ (Ver.B01).

◆Inspection Standard：MIL-STD-105E Table Normal Inspection Single Sampling Level Ⅱ.

◆Equipment：Gauge、MIL-STD、Powertip Tester、Sample

◆Defect Level：Major Defect AQL： 0.4 ； Minor Defect AQL： 1.5

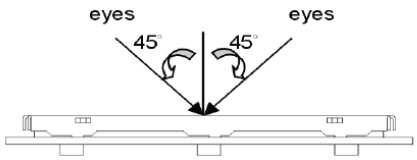
◆OUT Going Defect Level：Sampling.

◆Standard of the product appearance test：

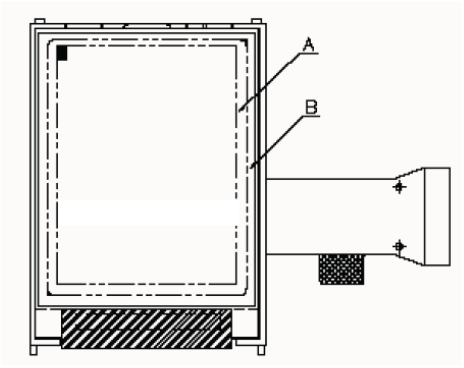
a. Manner of appearance test：

(1). The test best be under 20W×2 fluorescent light，and distance of view must be at 30 cm.

(2). The test direction is base on about around 45° of vertical line.



(3). Definition of area.



A area : viewing area

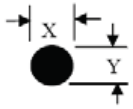
B area : Outside of viewing area

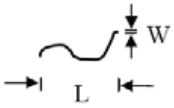
(4). Standard of inspection： (Unit：mm)

◆Specification For TFT-LCD Module 3.5″ ~10″ : (Ver.B01)

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td rowspan="3">01</td><td rowspan="3">Product condition</td><td>1.1 The part number is inconsistent with work order of production.</td><td>Major</td></tr>
<tr><td>1.2 Mixed product types.</td><td>Major</td></tr>
<tr><td>1.3 Assembled in inverse direction.</td><td>Major</td></tr>
<tr><td>02</td><td>Quantity</td><td>2.1 The quantity is inconsistent with work order of production.</td><td>Major</td></tr>
<tr><td>03</td><td>Outline dimension</td><td>3.1 Product dimension and structure must conform to structure diagram.</td><td>Major</td></tr>
<tr><td rowspan="5">04</td><td rowspan="5">Electrical Testing</td><td>4.1 Missing line character and icon.</td><td>Major</td></tr>
<tr><td>4.2 No function or no display.</td><td>Major</td></tr>
<tr><td>4.3 Display malfunction.</td><td>Major</td></tr>
<tr><td>4.4 LCD viewing angle defect.</td><td>Major</td></tr>
<tr><td>4.5 Current consumption exceeds product specifications.</td><td>Major</td></tr>
<tr><td>05</td><td>Dot defect
(Bright dot、Dark dot)
On -display</td><td>
<table>
<tr><th colspan="2">Item</th><th>Acceptance (Q'ty)</th></tr>
<tr><td rowspan="4">Dot Defect</td><td>Bright Dot</td><td>≦ 4</td></tr>
<tr><td>Dark Dot</td><td>≦ 5</td></tr>
<tr><td>Joint Dot</td><td>≦ 3</td></tr>
<tr><td>Total</td><td>≦ 7</td></tr>
</table>
5.1 Inspection pattern：full white , full black , Red , Green and blue screens.
5.2 It is defined as dot defect if defect area ＞1/2 dot.
5.3 The distance between two dot defect ≧5 mm.
</td><td>Minor</td></tr>
</table>

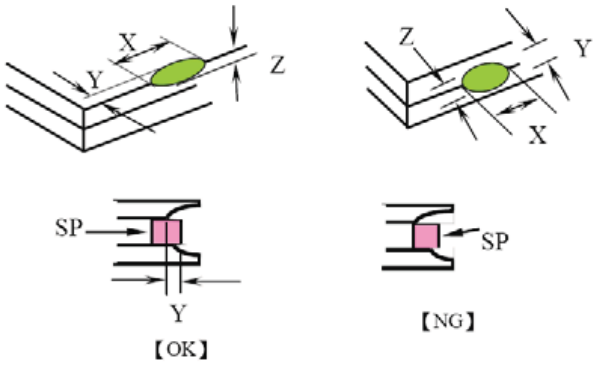
◆Specification For TFT-LCD Module 3.5″ ~10″ : (Ver.B01)

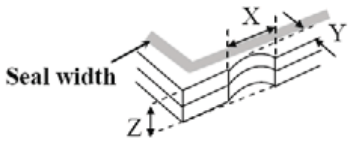
<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td>06</td><td>Black or white dot、scratch、contamination
Round type
 

Φ=(x+y) / 2
Line type
 
</td><td>6.1 Round type (Non-display or display) :
<table><tr><th rowspan="2">Dimension (diameter : Φ)</th><th colspan="2">Acceptance (Q'ty)</th></tr><tr><th>A area</th><th>B area</th></tr><tr><td>Φ ≦ 0.25</td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>0.25 < Φ ≦ 0.50</td><td>5</td></tr><tr><td>Φ > 0.50</td><td>0</td></tr><tr><td>Total</td><td>5</td></tr></table>
6.2 Line type(Non-display or display) :
<table><tr><th rowspan="2">Length (L)</th><th rowspan="2">Width (W)</th><th colspan="2">Acceptance (Q'ty)</th></tr><tr><th>A area</th><th>B area</th></tr><tr><td>---</td><td>W ≦ 0.03</td><td>Ignore</td><td rowspan="5">Ignore</td></tr><tr><td>L ≦10.0</td><td>0.03 < W ≦ 0.05</td><td>4</td></tr><tr><td>L ≦5.0</td><td>0.05 < W ≦ 0.10</td><td>2</td></tr><tr><td>---</td><td>W >0.10</td><td>As round type</td></tr><tr><td colspan="2">Total</td><td>5</td></tr></table></td><td>Minor</td></tr>
<tr><td>07</td><td>Polarizer Bubble</td><td><table><tr><th rowspan="2">Dimension (diameter : Φ)</th><th colspan="2">Acceptance (Q'ty)</th></tr><tr><th>A area</th><th>B area</th></tr><tr><td>Φ ≦ 0.25</td><td>Ignore</td><td rowspan="5">Ignore</td></tr><tr><td>0.25 < Φ ≦ 0.50</td><td>4</td></tr><tr><td>0.50 < Φ ≦ 0.80</td><td>1</td></tr><tr><td>Φ > 0.80</td><td>0</td></tr><tr><td>Total</td><td>5</td></tr></table></td><td>Minor</td></tr>
</table>

◆Specification For TFT-LCD Module 3.5″ ~10″ : (Ver.B01)

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td>08</td><td>The crack of glass</td><td>
Symbols :
X : The length of crack　　Y : The width of crack.
Z : The thickness of crack　　W : terminal length
t : The thickness of glass　　a : LCD side length

8.1 General glass chip :
8.1.1 Chip on panel surface and crack between panels:


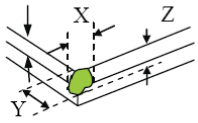
【OK】　【NG】


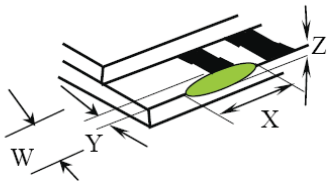
<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦ a</td><td>Crack can't enter viewing area</td><td>≦1/2 t</td></tr>
<tr><td>≦ a</td><td>Crack can't exceed the half of SP width.</td><td>1/2 t ＜ Z ≦2 t</td></tr>
</table>
</td><td>Minor</td></tr>
</table>

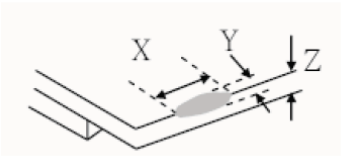
◆Specification For TFT-LCD Module 3.5″ ~10″ : (Ver.B01)

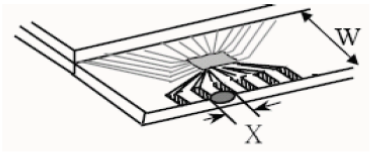
<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td rowspan="2">08</td><td rowspan="2">The crack of glass</td><td>
Symbols :

X : The length of crack　　Y : The width of crack.
Z : The thickness of crack　　W : terminal length
t : The thickness of glass　　a : LCD side length

8.1.2 Corner crack :


<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦1/5 a</td><td>Crack can't enter viewing area</td><td>Z ≦ 1/2 t</td></tr>
<tr><td>≦1/5 a</td><td>Crack can't exceed the half of SP width.</td><td>1/2 t < Z ≦ 2 t</td></tr>
</table>
</td><td rowspan="2">Minor</td></tr>
<tr><td>
8.2 Protrusion over terminal :
8.2.1 Chip on electrode pad :




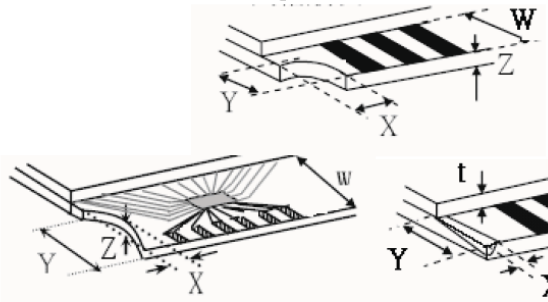


<table>
<tr><th></th><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>Front</td><td>≦ a</td><td>≦ 1/2 W</td><td>≦ t</td></tr>
<tr><td>Back</td><td>≦ a</td><td>≦ W</td><td>≦ 1/2 t</td></tr>
</table>
</td></tr>
</table>

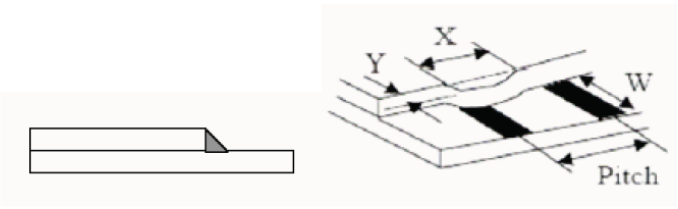
◆Specification For TFT-LCD Module 3.5″ ~10″ : (Ver.B01)

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td>08</td><td>The crack of glass</td><td>
Symbols :

X : The length of crack Y : The width of crack.
Z : The thickness of crack W : terminal length
t : The thickness of glass a : LCD side length

8.2.2 Non-conductive portion :


<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦ 1/3 a</td><td>≦ W</td><td>≦t</td></tr>
</table>
⊙ If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications.

8.2.3 Glass remain :


<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦ a</td><td>≦ 1/3 W</td><td>≦t</td></tr>
</table>
</td><td>Minor</td></tr>
</table>

4. RELIABILITY TEST

4.1 Reliability Test Condition

(Ver.B01)

NO.	TEST ITEM	TEST CONDITION
1	High Temperature Storage Test	Keep in +80 ±2℃ 96 hrs Surrounding temperature, then storage at normal condition 4hrs.
2	Low Temperature Storage Test	Keep in -30 ±2℃ 96 hrs Surrounding temperature, then storage at normal condition 4hrs.
3	High Temperature / High Humidity Storage Test	Keep in +60℃ / 90% R.H duration for 96 hrs Surrounding temperature, then storage at normal condition 4hrs. (Excluding the polarizer)
4	Temperature Cycling Storage Test	-30℃ → +25℃ → +80℃ → +25℃ (30mins) (5mins) (30mins) (5mins) 10 Cycle Surrounding temperature, then storage at normal condition 4hrs.
5	ESD Test	Air Discharge: Apply 2 KV with 5 times Discharge for each polarity +/- Contact Discharge: Apply 250 V with 5 times discharge for each polarity +/- 1. Temperature ambiance : 15℃～35℃ 2. Humidity relative : 30%～60% 3. Energy Storage Capacitance(Cs+Cd) : 150pF±10% 4. Discharge Resistance(Rd) : 330Ω±10% 5. Discharge, mode of operation : Single Discharge (time between successive discharges at least 1 sec) (Tolerance if the output voltage indication : ±5%)
6	Vibration Test (Packaged)	1. Sine wave 10～55 Hz frequency (1 min) 2. The amplitude of vibration :1. 5 mm 3. Each direction (X、Y、Z) duration for 2 Hrs
7	Drop Test (Packaged)	Packing Weight (Kg) / Drop Height (cm) 0 ~ 45.4 / 122 45.4 ~ 90.8 / 76 90.8 ~ 454 / 61 Over 454 / 46 Drop direction :※1 corner / 3 edges / 6 sides each 1times

5. PRECAUTION RELATING PRODUCT HANDLING

5.1 SAFETY

5.1.1 If the LCD panel breaks , be careful not to get the liquid crystal to touch your skin.

5.1.2 If the liquid crystal touches your skin or clothes , please wash it off immediately by using soap and water.

5.2 HANDLING

5.2.1 Avoid any strong mechanical shock which can break the glass.

5.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module , be sure to ground your body and any electrical equipment you may be using.

5.2.3 Do not remove the panel or frame from the module.

5.2.4 The polarizing plate of the display is very fragile. So , please handle it very carefully ,do not touch , push or rub the exposed polarizing with anything harder than an HB pencil lead (glass , tweezers , etc.)

5.2.5 Do not wipe the polarizing plate with a dry cloth , as it may easily scratch the surface of plate.

5.2.6 Do not touch the display area with bare hands , this will stain the display area.

5.2.7 Do not use ketonics solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.

5.2.8 To control temperature and time of soldering is 320±10℃and 3-5 sec.

5.2.9 To avoid liquid (include organic solvent) stained on LCM .

5.3 STORAGE

5.3.1 Store the panel or module in a dark place where the temperature is 25℃ ±5℃ and the humidity is below 65% RH.

5.3.2 Do not place the module near organics solvents or corrosive gases.

5.3.3 Do not crush , shake , or jolt the module.

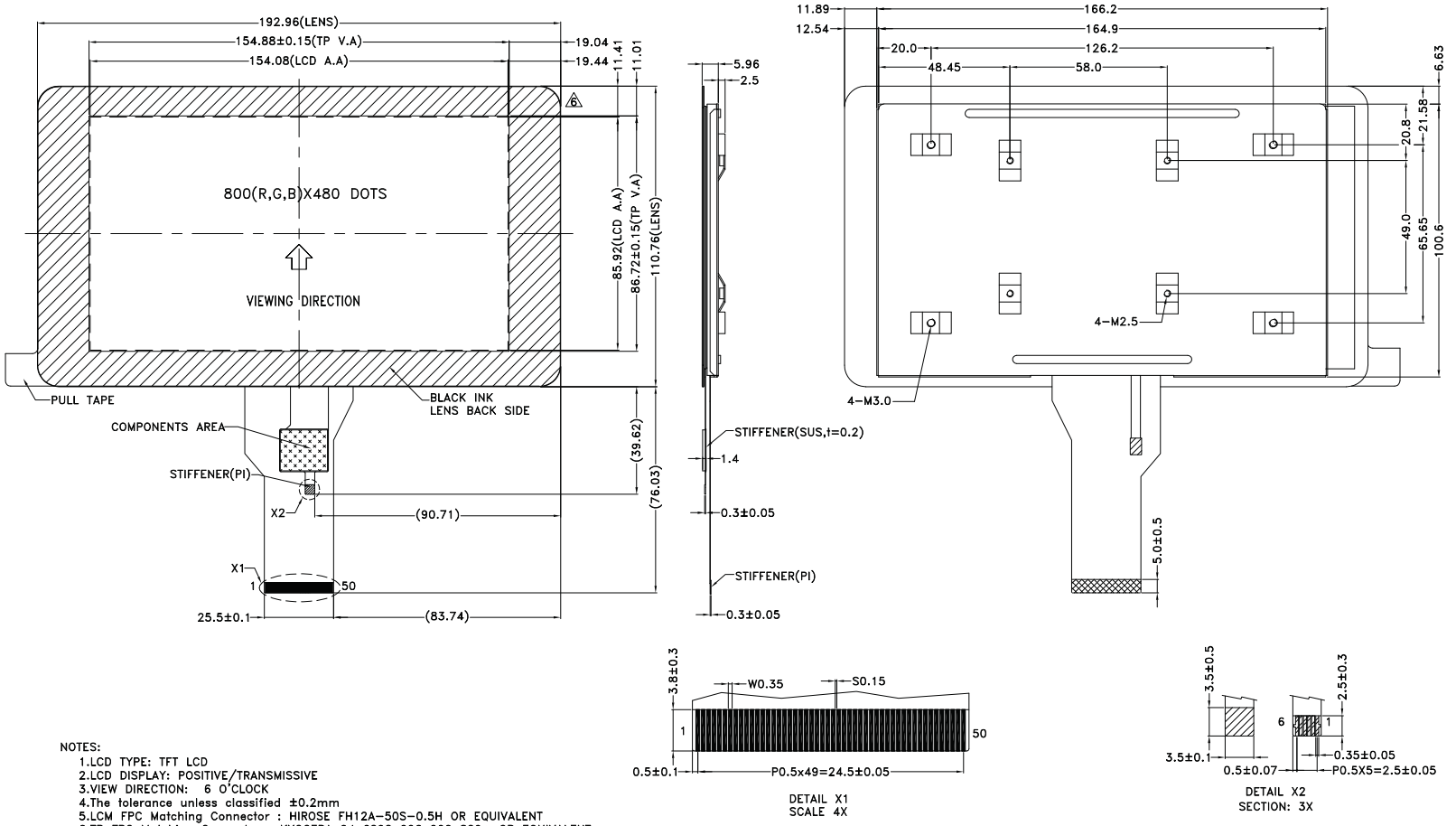
5.4 TERMS OF WARRANTY

5.4.1 Applicable warrant period

The period is within thirteen months since the date of shipping out under normal using and storage conditions.

5.4.2 Unaccepted responsibility

This product has been manufactured to your company’s specification as a part for use in your company’s general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment , we cannot take responsibility if the product is used in nuclear power control equipment , aerospace equipment , fire and security systems or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required.



NOTES:
1. LCD TYPE: TFT LCD
2. LCD DISPLAY: POSITIVE/TRANSMISSIVE
3. VIEW DIRECTION: 6 O'CLOCK
4. The tolerance unless classified ±0.2mm
5. LCM FPC Matching Connector : HIROSE FH12A-50S-0.5H OR EQUIVALENT
6. TP FPC Matching Connector : KYOCERA 04 6292 006 000 829+ OR EQUIVALENT

REV	REV BY	REVISER	DATE
007			
006	Cancel Logo	Stone	2014/06/27
005	Modify Frame Design	Stone	2014/04/29
004	Modify Coverlens Dimension & Logo	Stone	2014/04/03
003	Modify FPC Position	Stone	2013/12/23
002	Add Frame & Modify FPC Position	Stone	2013/12/03
001	NEW DRAWING	Sally	2013/08/26

PART NO: RH800480T-7x0CP-AP

DRAWING NAME :

TITLE: LCD MODULE DRAWING

Design	Stone	(3)	Surface		
Check	Sam	Unit	MM	Material	
Approve	Oliver	Scale	1:1	Thickness	
		Page	1/1	Quantity	

Precision Level	Tolerance / Length(Min) (mm)
-	1 ~ 4
-	4 ~ 16
-	16 ~ 63
-	63 ~ 250
-	250 ~ 1000

PT-A-054-01

Ver.002

Documents NO.	

LCM包裝規格書
LCM Packaging Specifications (For Tray)

Approve	Check	Contact
Oliver	Sam	Stone

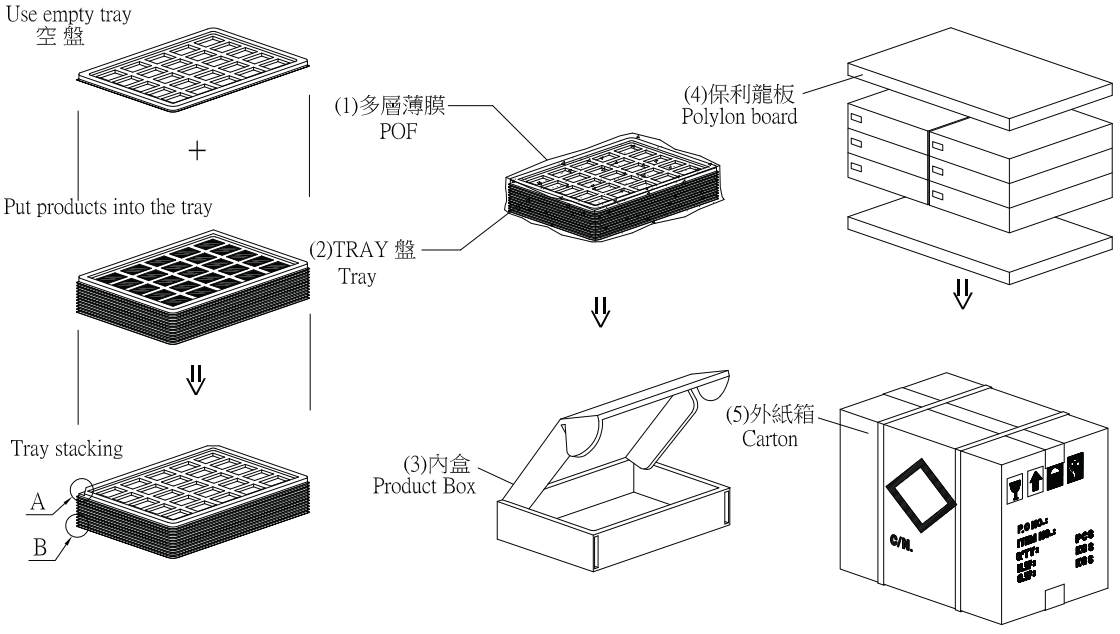
1.包裝材料規格表 (Packaging Material) : (per carton)

No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCD)	RH800480T-7x0CP-AP	192.96 X 108.76	0.25	48	12
2	多層薄膜(1)POF	OTFILM0BA03ABA	————	——	6	——
3	TRAY 盤 (2)Tray	TY00000000256	352 X 260 X 16.8	0.1	30	3.0
4	內盒(3)Product Box	BX36627063ABBA	383 X 270 X 66	0.2692	6	1.6152
5	保利龍板(4)Polylon board	OTPLB00PL08ABA	550 X 393 X 20	0.0284	2	0.0568
6	外紙箱(5)Carton	BX57041027CCBA	570 X 410 X 265	1.4208	1	1.4208
7						
8						
9						

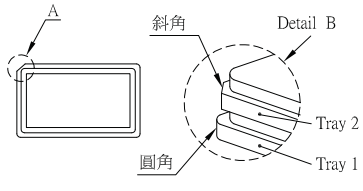
2.一 整箱總重量 (Total LCD Weight in carton) : 18.1 Kg±10%

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

(1)LCD quantity per box : no per tray	2	x no of tray	4	=	8
(2)Total LCD quantity in carton : quantity per box	8	x no of boxes	6	=	48



特 記 事 項 (REMARK)



5. TRAY盤相疊時,需旋轉180度,請詳見B視圖
Rotate tray 180 degrees and place on top of stack.
Check the tray stack using Fig. B.