MIDAS DISPLAYS

Sauls Wharf House
Crittens Road
Great Yarmouth
Norfolk
NR31 0AG

Telephone +44 (0)1493 602602
Email:sales@midasdisplays.com
Email:tech@midasdisplays.com
www.midasdisplays.com

MDT0350AIH-MULTI	240 x 320	Multi Interface	TFT Module
(MCT035W0E240320PMLIPS)	**Specification**		
Version: 1	Date: 18/05/2017		
Revision			
1	18/05/2017	First issue	

Display Features			
Display Size	3.5"		
Resolution	240 x 320		
Orientation	Portrait		
Appearance	RGB		
Logic Voltage	2.8V		
Interface	Multi		
Brightness	500 cd/m²		
Touchscreen	---		
Module Size	63.00 x 85.00 x 3.00mm		
Operating Temperature	-30°C ~ +85°C		
Pinout	50 way FFC	Box Quantity	Weight / Display
Pitch	0.5mm	---	---

RoHS compliant

* - For full design functionality, please use this specification in conjunction with the HX8347A specification.(Provided Separately)

Display Accessories	
Part Number	**Description**
MPBV5 Kit	Interconnect board that converts a 50-way FFC to 50 crimp-wire connector.
MCIB-12	Uno32 Break-out Board with SD Card and LED Backlight Driver. The MCIB-12 Board can be used for any display with a 4 bit, 8 bit, I2C or SPI interface.

Optional Variants	
Appearances	**Voltage**

DESIGN • MANUFACTURE • SUPPLY

* Description

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This model is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 3.5'TFT-LCD contains 240x320 pixels, and can display up to 65K/262K colors.

* Features

-Low Input Voltage: 3.3V(TYP)

-Display Colors of TFT LCD: 65K/262K colors

-Interface: 8/16/18Bit MCU Interface

       3 SPI+16/18Bit RGB Interface

       3 line Serial Interface

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	53.28(H)*71.04（V） (3.5inch)	mm	-
Driver element	TFT active matrix	-	-
Display colors	65K/262K	colors	-
Number of pixels	240(RGB)*320	dots	-
Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.222(H)*0.222(V)	mm	-
Viewing angle	Free	o'clock	-
Controller IC	HX8347A	-	-
Display mode	Transmissive/ Normally Black	-	-
Operating temperature	-30～+85	℃	-
Storage temperature	-40～+90	℃	-

* Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		61.08		mm	-
	Vertical(V)		84.09		mm	-
	Depth(D)		2.6		mm	-
Weight			TBD		g	-

Block Diagram

```
         ┌─────────────────────────────┐
  LEDA ──┤        Back Light           │
  LEDK ──┤                             │
         └─────────────────────────────┘

         ┌─────────────────────────────┐
         │                             │
  Gate ▷ │       240(RGB)*320          │ ◁ Gate
         │          Panel              │
         │                             │
         └──────────────┬──────────────┘
                     Source
              ┌─────────────────┐
              │     Driver      │
              └────────△────────┘
                      FPC
```

Outline dimension

Pin table (No. / Pin Name):

NO.	Pin Name
1	GND
2	YU
3	XL
4	YD
5	XR
6	BS0
7	BS1
8	BS2
9	NRESET
10	VSYNC
11	HSYNC
12	PCLK
13	DE
14	DB17/R5, M15
15	DB16/R4
16	DB15/R3
17	DB14/R2
18	DB13/R1
19	DB12/R0/LSb
20	DB11/G5/MSb
21	DB10/G4
22	DB09/G3
23	DB08/G2
24	DB07/G1
25	DB06/G0/LSb
26	DB05/B5/MSb
27	DB04/B4
28	DB03/B3
29	DB02/B2
30	DB01/B1
31	DB0/B0/LSb
32	SDO
33	SDI
34	NRD
35	NWR
36	DNC,SCL
37	NCS
38	VCI
39	VCI
40	IOVCC
41	LEDK1
42	LEDK2
43	LEDK3
44	LEDK4
45	LEDK5
46	LEDK6
47	LEDK7
48	LEDK8
49	LEDA
50	GND

Interface type table:

BS2	BS1	BS0	Interface type	DB Pin in use
0	0	0	16-bit bus interface, 80-system 65K-Color	D15~D0:Data (TYP USED)
0	0	0	18-bit bus interface, 80-system 262K-Color	D17~D0:Data
0	1	1	8-bit bus interface, 80-system 262K-Color	D7~D0:Data (6+6+6)
1	1	1	Serial bus IF	DNC,SCL,SDO,SDI.
ID(0)				

FPC弯折出货示意图
FPC展开出货

NOTE:
1. If not use PIN, fix to the GND , IOVCC or NC.
2. If use RGB interface must select serial interface

LED(B/L) CIRCUIT

K1 K2 K3 K4 K5 K6 K7 K8
A1

LV:500cd/m2

NOTES:
1. DISPLAY TYPE: 3.5", TFT-LCD, 262K COLORS
2. DISPLAY MODE: NORMALLY BLACK
3. VIEWING DIRECTION: Free
4. DRIVER IC: HX8347A (COG)
5. VCI: 3.3V,IOVCC:1.8~3.3V
6. OPERATING TEMP: -30°C TO 85°C
   STORAGE TEMP: -40°C TO 90°C
7. BACK LIGHT: LED WHITE, 8 LED, 160mA, 3.2V±0.3V,LV:500cd/m2
8. RoHS COMPLIANT.

3.5"IPS
240(RGB)X320
Free

Dimensions:
40.47±0.5, 0.8MAX, 19.25±0.3
13.62, 9.4, 22.5, 1.5, 17.95, 3, 5
3±0.15 LCM, 1.15MIN, 1.2MAX Component, 0.13, 0.3±0.03(Conduct+Stiffener)
63±0.2 BL OD, 55.88 UP BEZEL, 55.28 UP POL, 53.28 LCD AA
3.56, 3.86, 4.86
4.58, 71.04 LCD AA, 3.58, 73.04 UP POL, 3.28, 73.64 UP BEZEL, 85±0.2 BL OD
42.47±0.5, 13.24±0.5, 9.5±0.3, 3.5, 0.5, 44±0.5, 25.5±0.1, W=0.3, P0.5*49=24.5, R0.3, 50

刻映线 记号线 记号线 Tape

Title block:

DRAWING NAME: MDT0350A1IH-M011T1
PARTS NO.: MDT0350A1IH-M011T1
Unit: mm
Page: 1/1
Drawn / Checked / Approve

TOLERANCE(公差)
X.X±0.3
X.XX±0.2
Scale 1:1

ReV	Revision content description	Date
A	FIRST 改版结构	2017/2/24
B		2017/4/8

Input terminal Pin Assignment

NO.	SYMBOL	DISCRIPTION	I/O
1	GND	Ground.	P
2	YU(NC)	Touch panel Top Film Terminal	A/D
3	XL(NC)	Touch panel LIFT Glass Terminal	A/D
4	YD(NC)	Touch panel Bottom Film Terminal	A/D
5	XR(NC)	Touch panel Right Glass Terminal	A/D
6	BS0	MPU Parallel interface bus and serial interface select If use RGB Interface must select serial interface. Fix this pin at VCI and GND.	I
7	BS1		I
8	BS2		I
9	NRESET	This signal will reset the device and must be applied to properly initialize the chip.	I
10	VSYNC	Frame synchronizing signal for RGB interface operation. fix this pin at VCI or GND when not in use.	I
11	HSYNC	Line synchronizing signal for RGB interface operation. fix this pin at VCI or GND when not in use	I
12	PCLK	Dot clock signal for RGB interface operation Fix this pin at VCI or GND when not in use.	I
13	DE	Data enable signal for RGB interface operation. fix this pin at VCI or GND when not in use.	I
14-31	DB17-DB0	18-bit parallel bi-directional data bus for MCU system and RGB interface mode . Fix to GND level when not in use	I
32	SDO	Serial data output pin in serial bus system interface. If not used, please open this pin.	O
33	SDI	Serial input signal.The data is applied on the rising edge of the SCL signal. If not used, fix this pin at VCI or GND.	I
34	NRD	Serves as a read signal and MCU read data at the rising edge. fix this pin at VCI or GND when not in use.	I
35	NWR	NWR pin, serves as a write signal	I
36	DNC_SCL	DNC_SCL pin as Serial Clock when operates in the serial interface	I

37	NCS	Chip select input pin ("Low" enable). fix this pin at VCI or GND when not in use.	I
38	VCI	Supply voltage(3.3V).	P
39	VCI	Supply voltage(3.3V).	P
40	IOVCC	Supply voltage(1.8-3.3V)	P
41	LEDK1	Cathode pin OF backlight	P
42	LEDK2	Cathode pin OF backlight	P
43	LEDK3	Cathode pin OF backlight	P
44	LEDK4	Cathode pin OF backlight	P
45	LEDK5	Cathode pin OF backlight	P
46	LEDK6	Cathode pin OF backlight	P
47	LEDK7	Cathode pin OF backlight	P
48	LEDK8	Cathode pin OF backlight	P
49	LEDA	Anode pin of backlight	P
50	GND	Ground.	P

DESIGN • MANUFACTURE • SUPPLY

LCD Optical Characteristics

Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR		--	800	--		
Response time	Rising	T_R		--	16	21	msec	
	Falling	T_F		--	19	24		
Color gamut		S(%)		--	72	--	%	
Color Filter Chromacicity	White	W_X	Θ=0 Normal viewing angle	0.336	0.340	0.344		
		W_Y		0.356	0.360	0.364		
	Red	R_X		0.618	0.620	0.622		
		R_Y		0.338	0.340	0.342		
	Green	G_X		0.348	0.350	0.352		
		G_Y		0.620	0.622	0.624		
	Blue	B_X		0.148	0.150	0.152		
		B_Y		0.033	0.035	0.037		
Viewing angle	Hor.	$Θ_L$	CR>10	--	80	--		
		$Θ_R$		--	80	--		
	Ver.	$Θ_U$		--	80	--		
		$Θ_D$		--	80	--		
Option View Direction			Free					

Measuring Condition

■ Measuring surrounding：dark room

■ Ambient temperature：25±2℃

■ 15min. warm-up time.

Measuring Equipment

Note 1: Ambient temperature = 25°C.

Note 2: To be measured with a viewing cone of 2°by Topcon luminance meter BM-5A.

Note 3: To be measured with Otsuta chromaticity meter LCF-2100M, CF only measure under C light simulation.

Note 4: CTC shipping status is cell without polarizer. Transmittance of Specification is cell with polarizer. The tolerance of Transmittance is ±10%.

Note 5: Definition of response time:

The output signals of TRD-100 are measured when the input signals are changed to "White" (falling time) and from "White" to "Black" (rising time), respectively. The interval is between the 10% and 90% of amplitudes. Refer to figure as below.
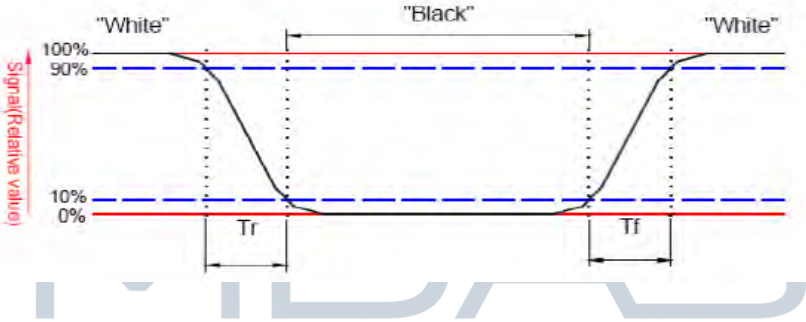
Note 6: Definition of contrast ratio:

Contrast ratio is calculated by the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "white" state}}{\text{Brightness on the "black" state}}$$

Note 7: Definition of viewing angle
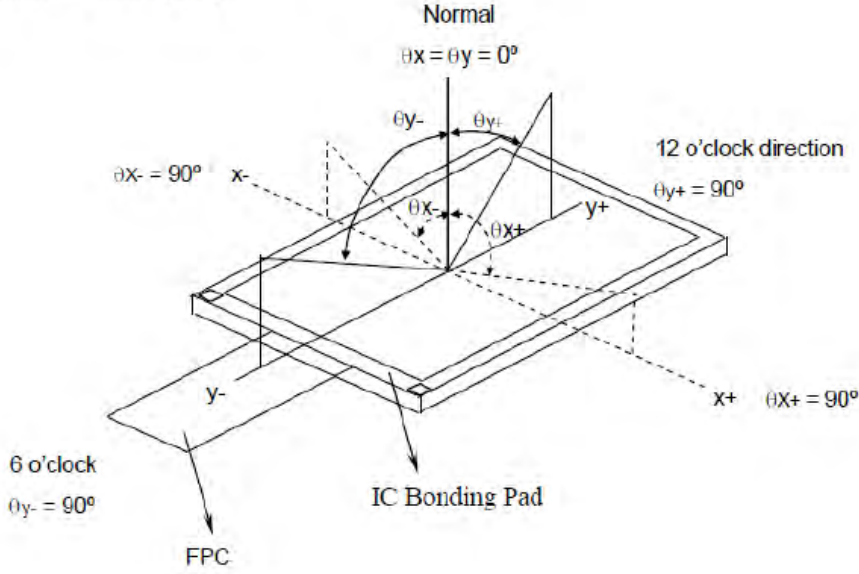
Note 8: Optical characteristic measurement setup.
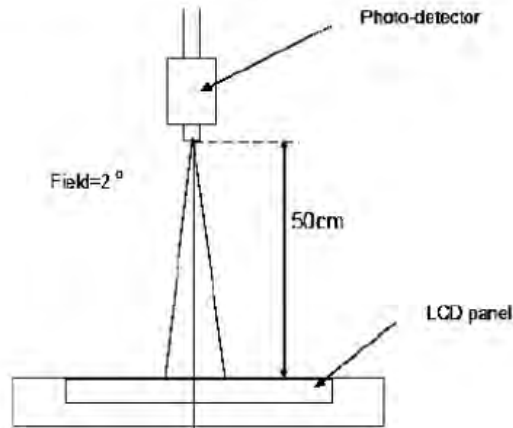
Note 9:
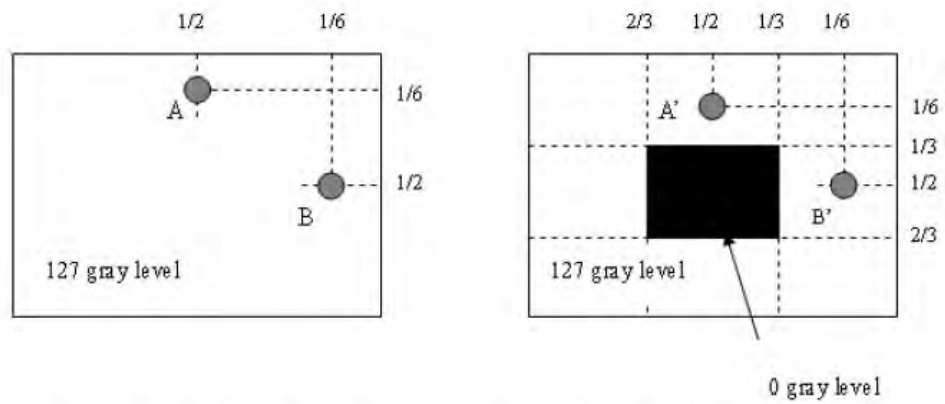
I LA-LA' I / LA x 100%= 2% max., LA and LA' are brightness at location A and A'.
I LB-LB' I / LB x 100%= 2% max., LB and LB' are brightness at location B and B'.

Electrical Characteristics

Absolute Maximum Rating (Ta=25 VSS=0V)

Characteristics	Symbol	Min.	Max.	Unit
Digital Supply Voltage	VCI	-0.3	4.2	**V**
Digital interface supple Voltage	IOVCC	-0.3	3.3	**V**
Operating temperature	T_{OP}	-30	+85	℃
Storage temperature	T_{ST}	-40	+90	℃

NOTE:

If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	VCI	2.5	2.8	3.3	V	
Digital interface supple Voltage	IOVCC	1.65	1.8	3.3	V	
Normal mode Current consumption	IDD	--	9	--	mA	
Level input voltage	V_{IH}	0.7IOVCC		IOVCC	V	
	V_{IL}	GND		0.3IOVCC	V	
Level output voltage	V_{OH}	0.8IOVCC		IOVCC	V	
	V_{OL}	GND		0.2IOVCC	V	

LED Backlight Characteristics

The back-light system is edge-lighting type with 8chips White LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I_F	120	160	--	mA	
Forward Voltage	V_F	--	3.2	--	V	
LCM Luminance	L_V	--	450	--	cd/m2	Note3
LED life time	Hr	50000	--	--	Hour	Note1,2
Uniformity	AVg	80	--	--	%	Note3

Note (1) :

LED life time (Hr) can be defined as the time in which it continues to operate under the condition:

Ta=25±3 ℃, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note (2) The "LED life time" is defined as the module brightness decrease to 50% original brightness at

Ta=25℃ and IL=160mA. The LED lifetime could be decreased if operating IL is larger than 160mA. The

constant current driving method is suggested.
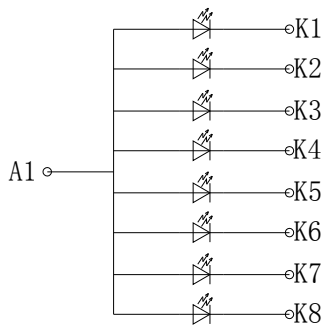
LED(B/L) CIRCUIT

LED WHITE, 8 LED, 160mA, 3.2V±0.3V

NOTE 3：Luminance Uniformity of these 9 points is defined as below:
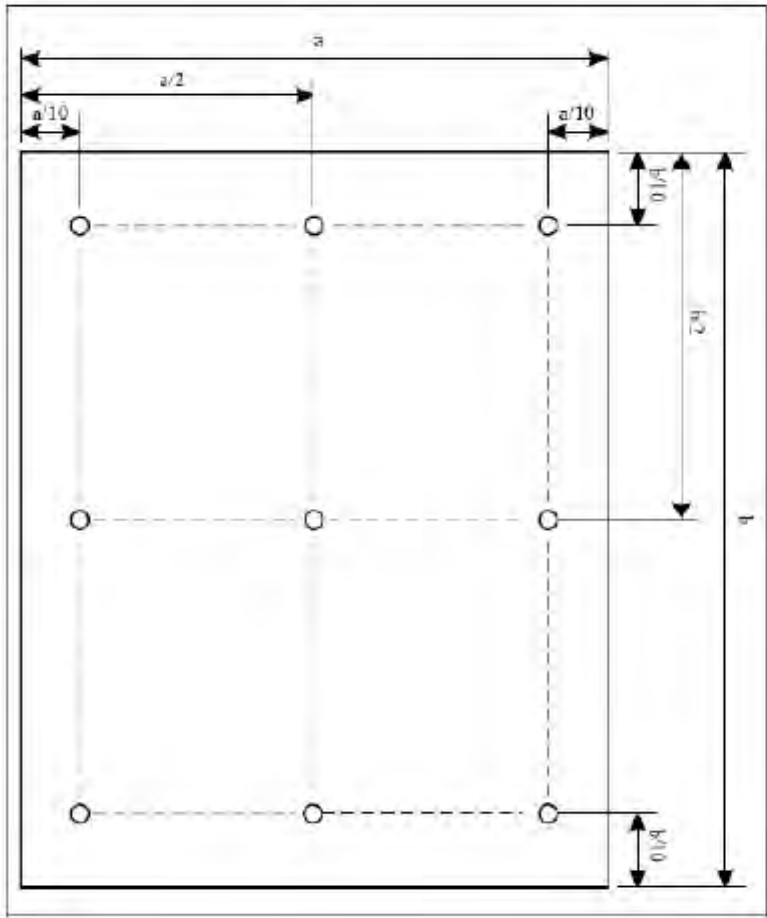
$$Uniformity = \frac{minimum\ luminance\ in\ 9\ points\ (1\text{-}9)}{maximum\ luminance\ in\ 9\ points\ (1\text{-}9)}$$

$$Luminance = \frac{Total\ Luminance\ of\ 9\ points}{9}$$

AC Characteristic

Display Parallel 8-bit Interface Timing Characteristics (8080 system)

Write to the register

| NCS |
| DNC_SCL |
| NRD_E |
| NWR_RNW |
| D7-0 | "index" write to index register | Command write to the register |

Read the register
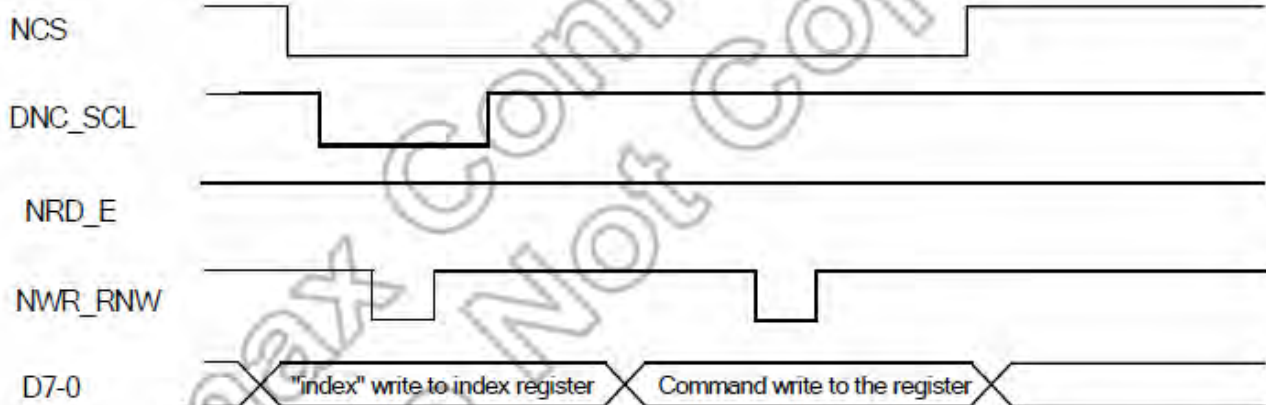
| NCS |
| DNC_SCL |
| NRD_E |
| NWR_RNW |
| D7-0 | "index" write to index register | Command read from the register |
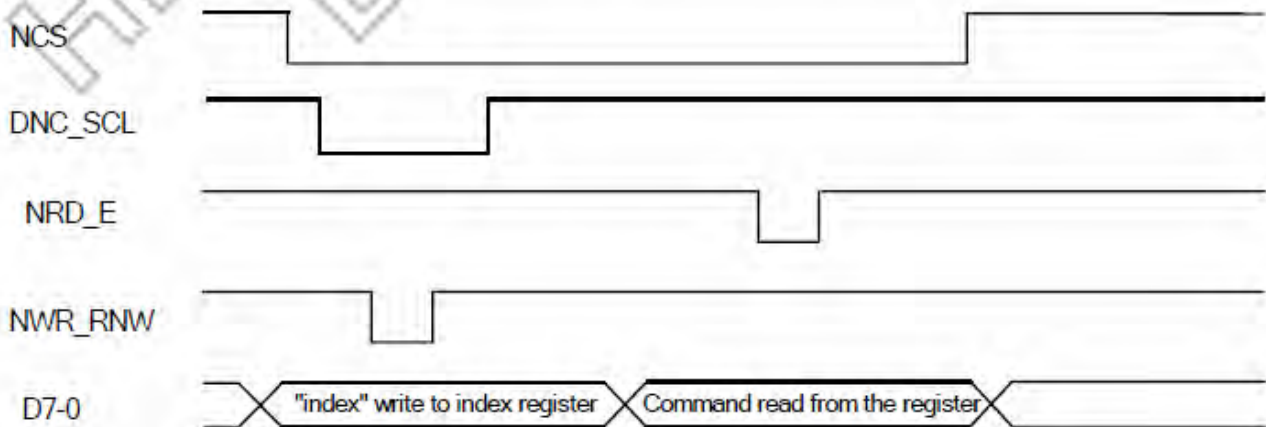
Display Parallel 16/18-bit Interface Timing Characteristics (8080 system)

Write to the graphic RAM   (16-bit 65K Color / 18-bit bit 262K Color)

NCS

DNC_SCL

NRD_E

NWR_RNW

D15-0/
D17-0

"22"h write to index register   Display data write to RAM   Display data write to RAM

nth pixel, Address = N   (n+1) pixel, Address = N +1
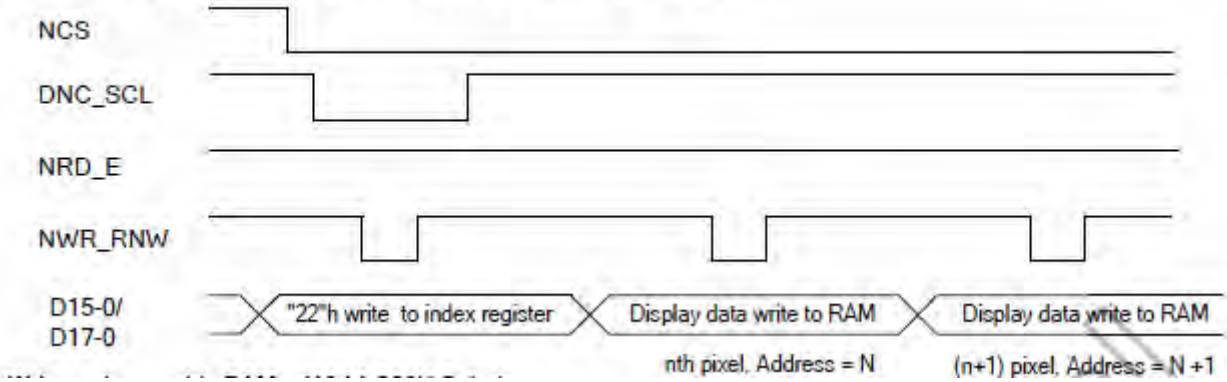
Read the graphic RAM   (18-bit 262K Color)

NCS

DNC_SCL

NRD_E

NWR_RNW

D17-0

"22"h

dummy read data   1st read data
1 pixel data
(The format refer 18-bit Interface)
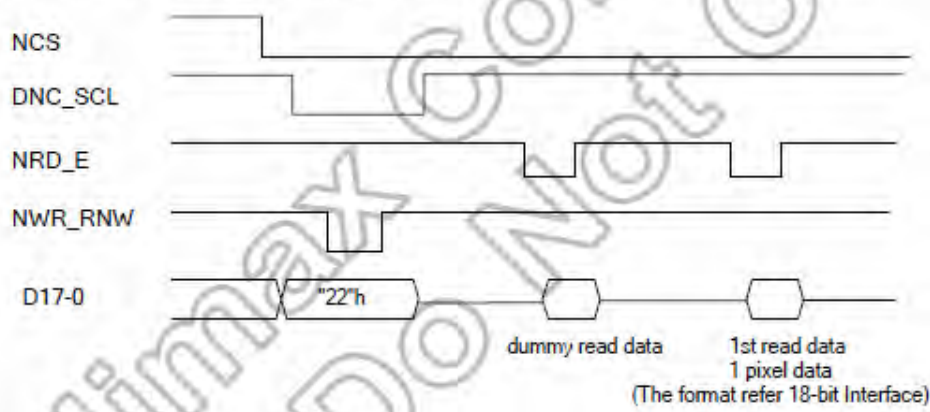
Display Serial Interface Timing Characteristics (3-line SPI system)

A) TransferTiming Format in Serial Bus Interface for Index Register or Register Write
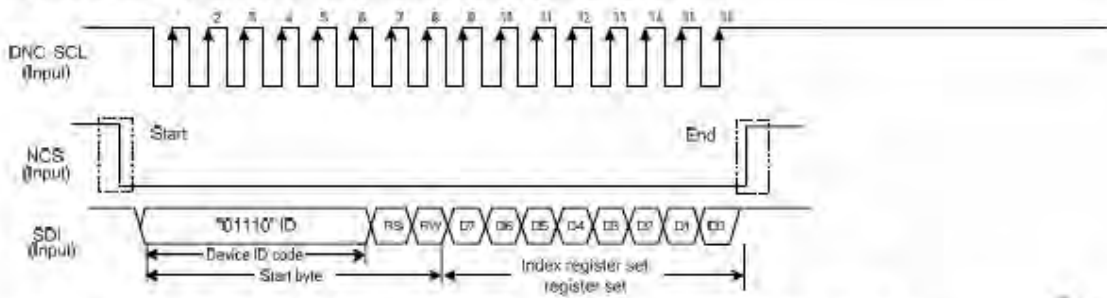
B) TransferTiming Format in Serial Bus Interface for GRAM write (index = "22h") , TRI(1-0) = 00
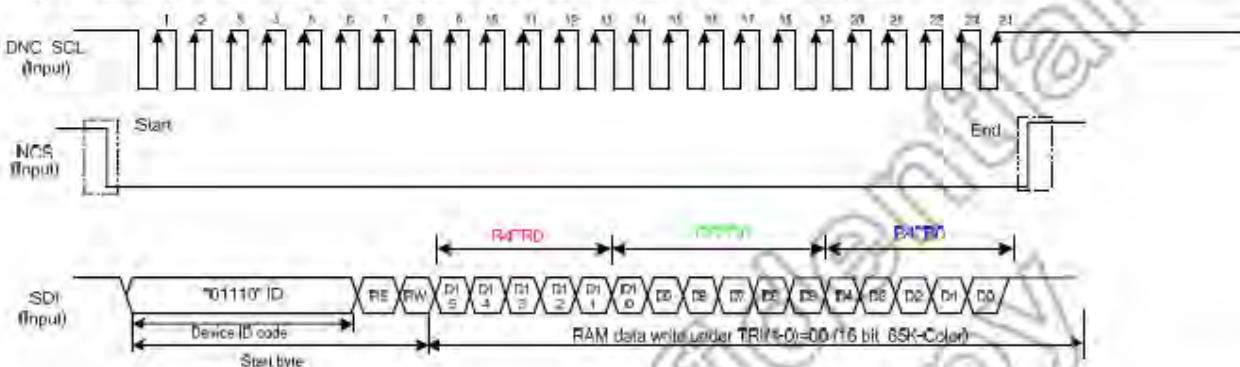
C) TransferTiming Format in Serial Bus Interface for GRAM Write (index = "22"h) , TRI(1-0) =01
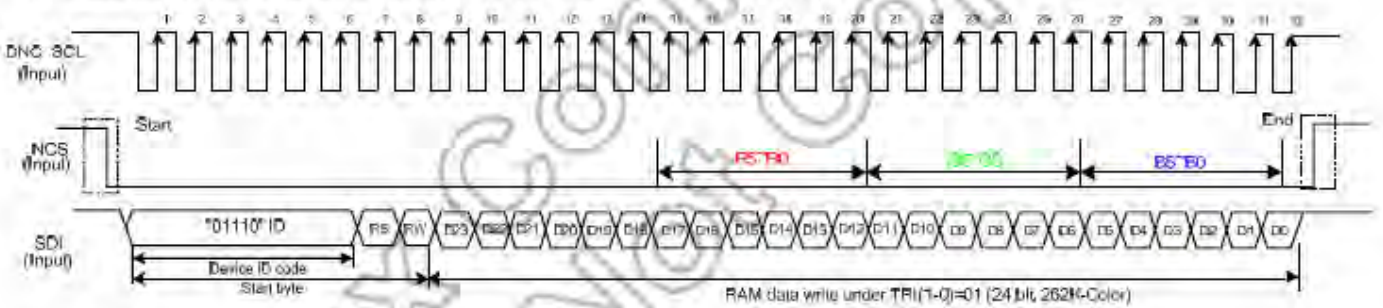
D) TransferTiming Format in Serial Bus Interface for GRAM Write (index = "22"h) , TRI(1-0) = 1x
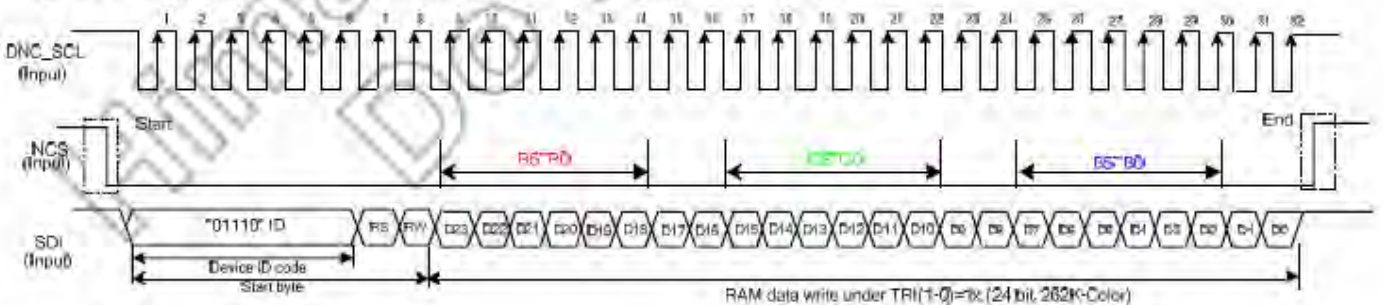
A) TransferTiming Format in Serial Bus Interface for Register Read
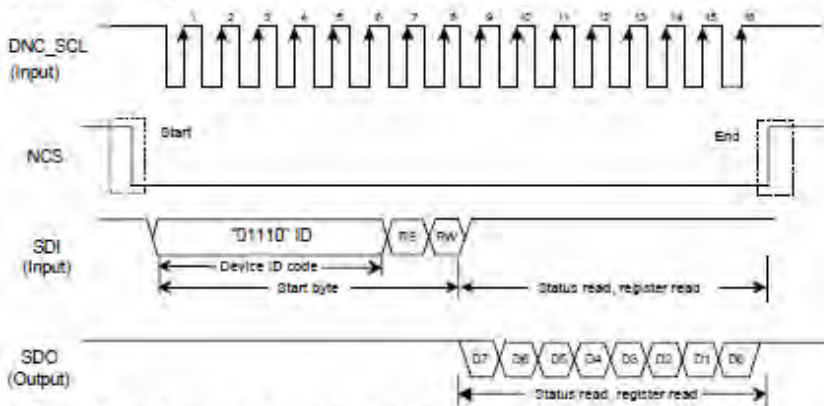
B) TransferTiming Format in Serial Bus Interface for GRAM Read (index = "22'h) , TR|(1-0) = 00
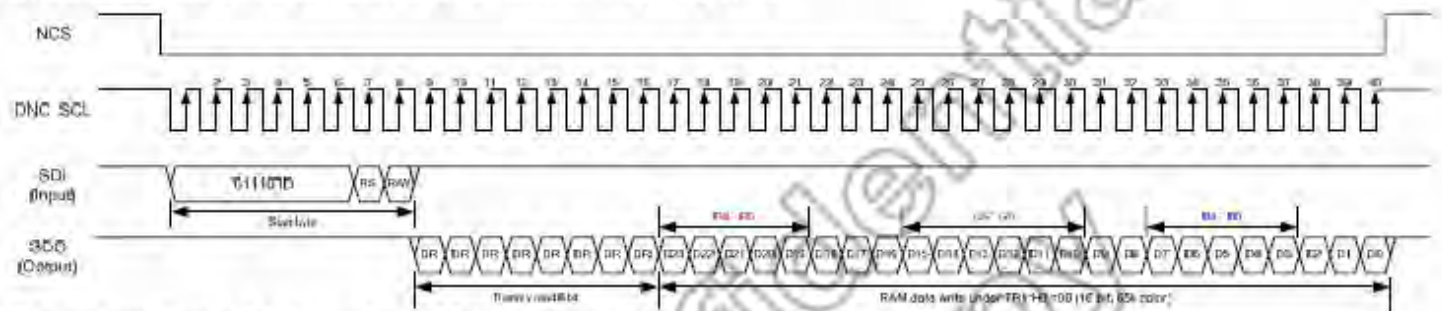
C) TransferTiming Format in Serial Bus Interface for GRAM Read (index = "22'h) , TR|(1-0) = fv or 01
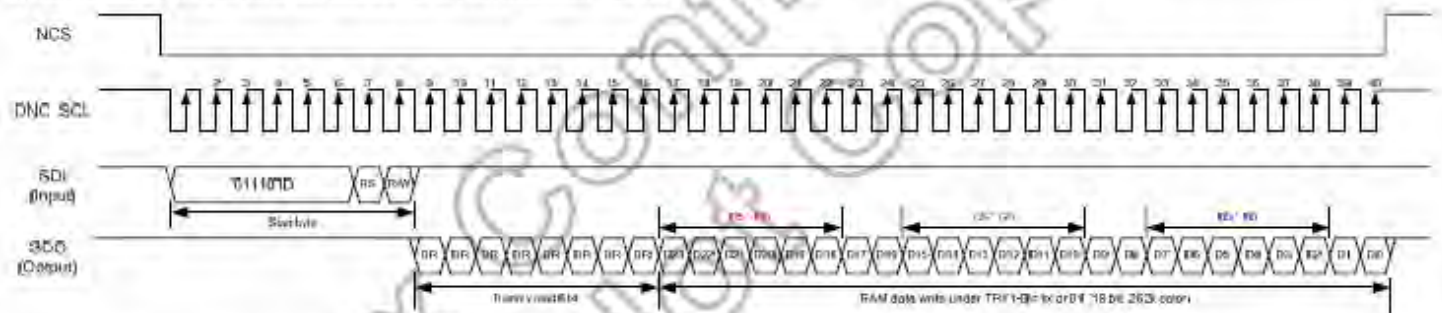
D) Timing Format of GRAM -Data Read
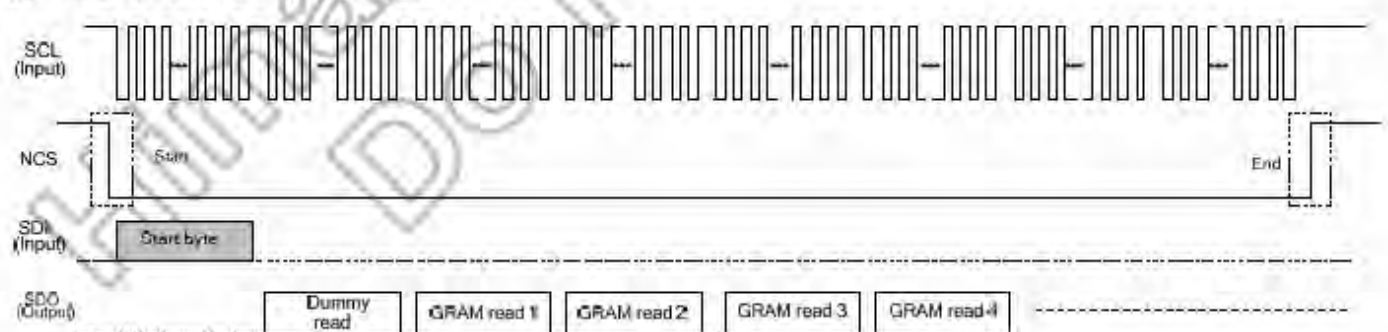
Note A RAM data read operation follows 8bit dummy read operations

Parallel RGB Interface Timing Characteristics
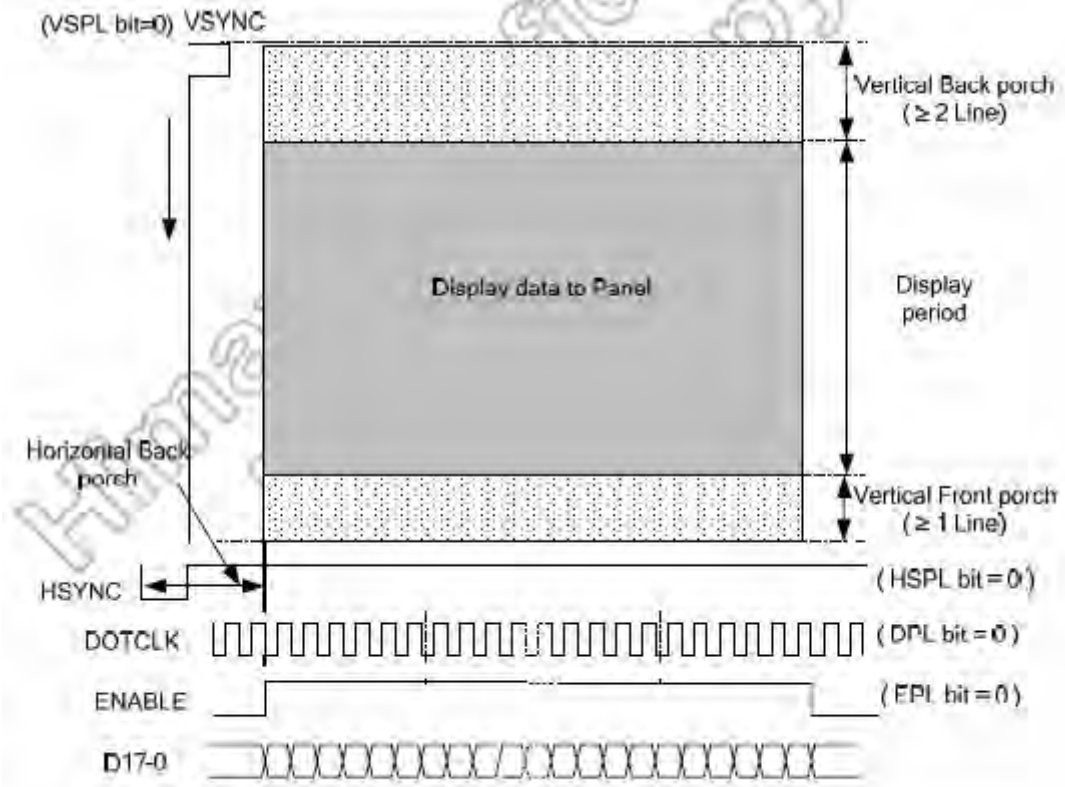
Figure 5. 17 RGB Interface Circuit Input Timing

DESIGN • MANUFACTURE • SUPPLY

16 bit/pixel color order (R 5-bit, G 6-bit, B 5-bit), 65,536 colors (CSEL(2-0) = "101")
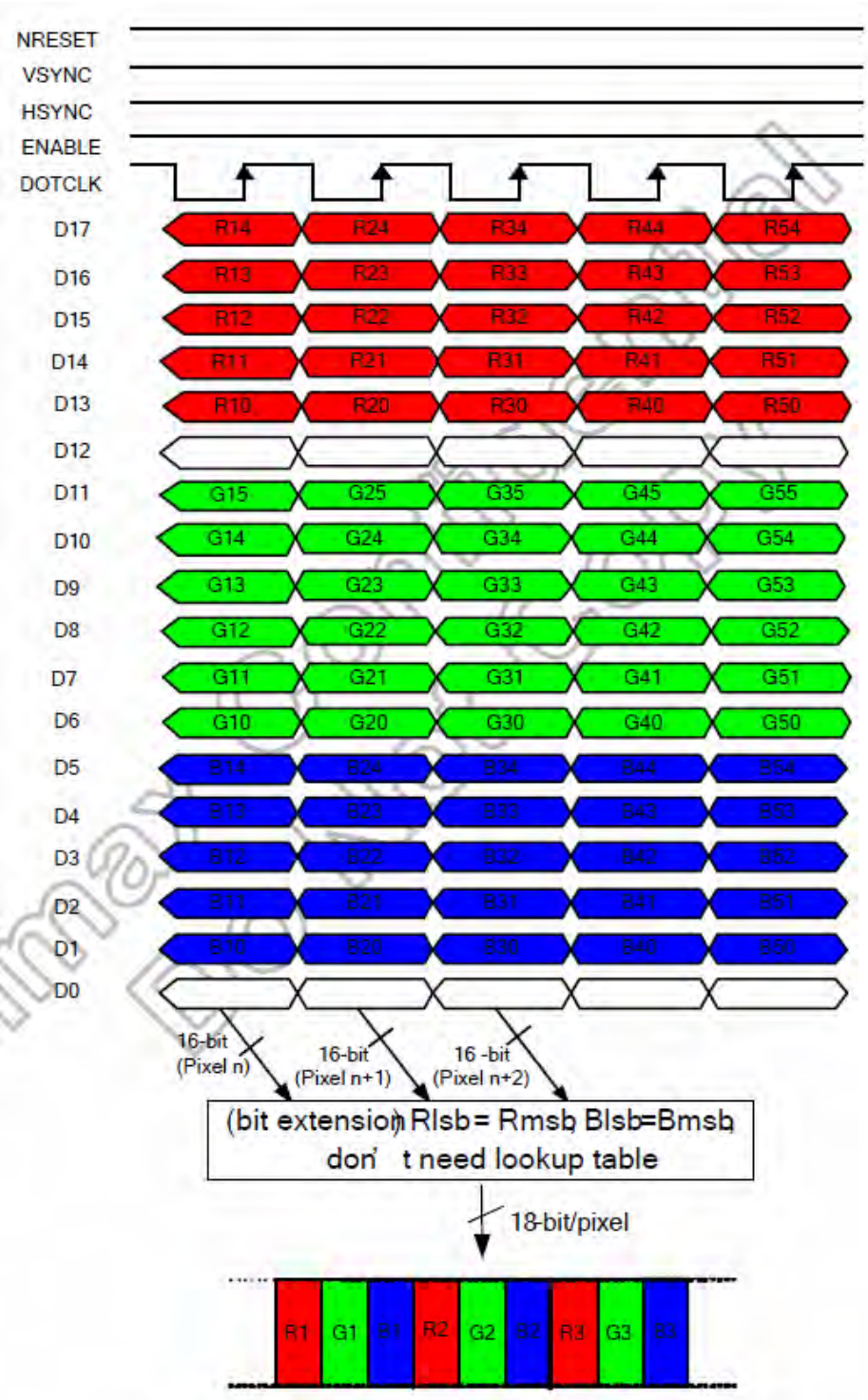
Figure 5. 18 16-Bit / Pixel Data Input of RGB Interface

18 bit/pixel color order (R 6-bit, G 6-bit, B 6-bit), 262,144 colors (CSEL(2-0) = "110")

Figure 5. 19 18-Bit / Pixel Data Input of RGB Interface

LCD Module Out-Going Quality Level

VISUAL & FUNCTION INSPECTION STANDARD

Inspection conditions

Inspection performed under the following conditions is recommended.

       Temperature : 25±5℃

       Humidity :   65%±10%RH

       Viewing Angle : Normal viewing Angle.

       Illumination: Single fluorescent lamp (300 to 700Lux)

       Viewing distance:30-50cm
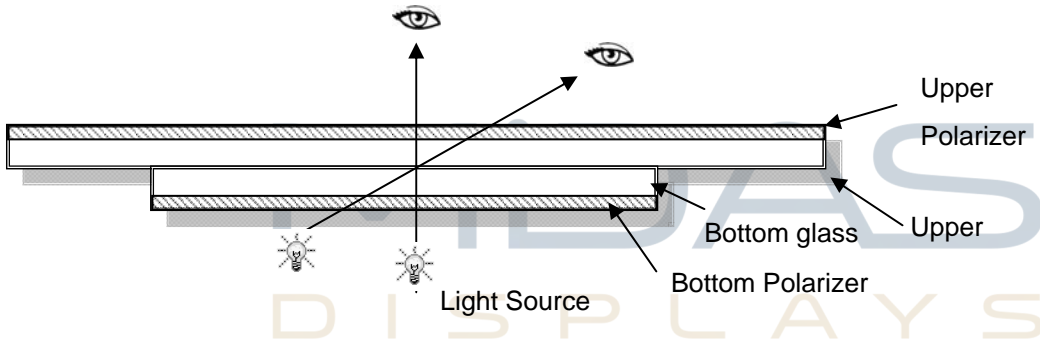
Definition
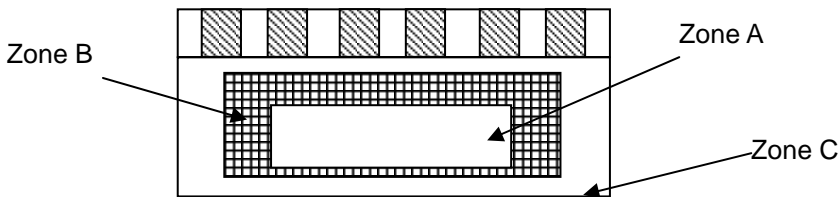
Zone A : Effective Viewing   Area(Character or Digit can be seen)

Zone B : Viewing Area except Zone A

Zone C : Outside (Zone A+Zone B) which can not be seen after assembly by customer .)

Note:

As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function
or appearance after assembly by customer.

Sampling Plan

According to GB/T 2828-2003 ; , normal inspection, Class Ⅱ

AQL:
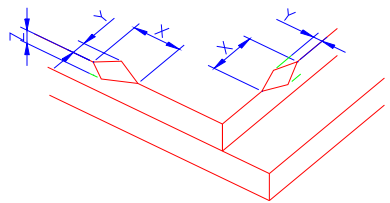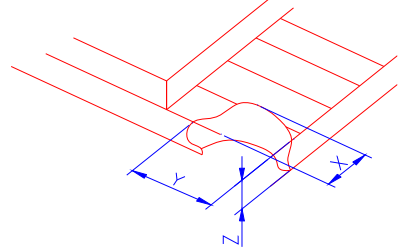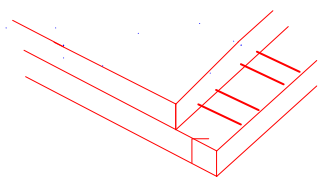
Major defect	Minor defect
0.65	1.5

LCD: Liquid Crystal Display , TP: Touch Panel , LCM: Liquid Crystal Module
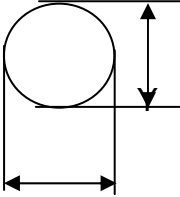
No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. 4) TP no function	Major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Soldering appearance	Good soldering , Peeling off is not allowed.	
6	LCD/Polarizer/TP	Black/White spot/line, scratch, crack, etc.	

Criteria (Visual)

Number	Items	Criteria(mm)
1.0 LCD Crack/Broken NOTE: X: Length Y: Width Z: Height L: Length of ITO, T: Height of LCD	(1) The edge of LCD broken	 | X	Y	Z
≤3.0mm	<Inner border line of the seal	≤T	
	(2)LCD corner broken	 | X	Y	Z
≤3.0mm	≤L	≤T	
	(3) LCD crack	 Crack Not allowed

Number	Items	Criteria (mm)		
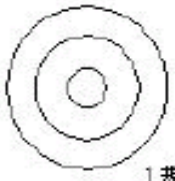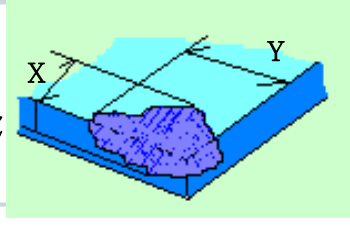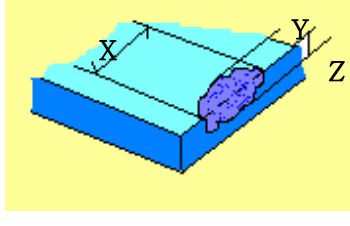
Number	Items	Criteria (mm)
2.0	Spot defect	① light dot（LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain）

① light dot（LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain）

Zone / Size (mm)	Accep able Qty		
	A	B	C
Φ≤0.30	Ignore		Ignor
0.20<Φ≤0.3	3(distance≧10mm)		
0.25<Φ≤0.35	2		
Φ > 0.4	0		

②Dim spot（LCD/TP/Polarizer dim dot, light leakage、 dark spot）

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.3	Ignore		Ignore
0.2<Φ≤0.3	3(distance≧10mm)		
0.25<Φ≤0.35	2		
Φ > 0.4	0		

③ Polarizer accidented spot

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.3	Ignore		Ignore
0.25<Φ≤0.5	2(distance≧10mm)		
Φ>0.5	0		

In the spot defect illustration: X, $\Phi=(X+Y)/2$

Line defect (LCD/TP/Polarizer black/white line, scratch, stain)

Width(mm)	Length(mm	Acceptable Qty		
		A	B	C
Φ≤0.05	Igno e	Ignore		Ignore
0.04<W≤0.07	L≤3.0	N≤2		
0.06<W≤0.09	L≤2.0	N≤2		
0.09<W	Define as spot defect			

3.0	Polarizer Bubble	Zone / Size (mm)	Acceptable Qty			
			A	B	C	
		Φ≤0.2	Ignore		Ignore	
		0.2<Φ≤0.4	3(distance≧10 m)			
		0.4<Φ≤0.6	2			
		0.6<Φ	0			

4.0	SMT	According to IPC-A-610C class Ⅱ standard . Function defect and missing part are major defect ,the others are minor defect.

		TP bubble/ accidented spot	Size Φ(mm)	Acceptable Qty		
				A	B	C
			Φ≤0.3	Ignore		Ignore
			0.25<Φ≤0.3	3 （distance≧		
			0.25<Φ≤0.35	2		
			0.4<Φ	0		
		Assembly deflection	beyond the edge of backlight ≤0.15mm			

5.0	TP Related	Newton Ring	Newton Ring area>1/3 TP area NG Newton Ring area≤1/3 TP area OK	 1 规律性 2.非规律性 似牛顿环
		TP corner broken X：length Y：width Z：height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>X≤3.0mm</td><td>Y≤3.0mm</td><td>Z<LCD thicknes</td></tr></table>* Circuitry broken is not allowed.	
		TP edge broken X：length Y：width Z：height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>X≤6.0mm</td><td>Y≤2.0mm</td><td>Z<LCD thicknes</td></tr></table>* Circuitry broken is not allowed.	

Criteria (functional items)

Number	Items	Criteria (mm)
1	No display	Not allowed
2	Missing segment	Not allowed
3	Short	Not allowed
4	Backlight no lighting	Not allowed
5	TP no function	Not allowed

Reliability Test Result

Condition

Item	Condition	Sample Size	Test Result	Note
Low Temperature Operating Life test	-30℃, 96HR	3ea	pass	-
Thermal Humidity Operating Life test	850℃90％RH, 96HR	3ea	pass	-
Temperature Cycle ON/OFF test	-30℃ ↔ 85℃, ON/OFF, 20CYC	3ea	pass	(1)
High Temperature Storage test	90℃, 96HR	3ea	pass	-
Low Temperature Storage test	－40℃, 96HR	3ea	pass	-
ESD test	150pF, 330Ω , ±6KV(Contact)/± 8KV(Air), 5 points/panel, 10 times/point	3ea	pass	
Thermal Shock Resistance	The sample should be allowed to stand the following 5 cycles of operation: TSTL for 30 minutes -> normal temperature for 5 minutes -> TSTH for 30 minutes -> normal temperature for 5 minutes, as one cycle, then taking it out and drying it at normal temperature, and allowing it stand for 24 hours	3ea	pass	
Box Drop Test	1 Corner 3 Edges 6 faces, 66㎝(MEDIUM BOX)	1box	pass	-

Note (1) ON Time over 10 seconds, OFF Time under 10 seconds

Cautions and Handling Precautions

Handling and Operating the Module

(1) When the module is assembled, it should be attached to the system firmly.

Do not warp or twist the module during assembly work.

(2) Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.

(3) Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.

(4) Do not allow drops of water or chemicals to remain on the display surface.

If you have the droplets for a long time, staining and discoloration may occur.

(5) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.

(6) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane.

Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

(7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.

(8) Protect the module from static; it may cause damage to the CMOS ICs.

(9) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

(10) Do not disassemble the module.

(11) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.

(12) Pins of I/F connector shall not be touched directly with bare hands.

(13) Do not connect, disconnect the module in the "Power ON" condition.

(14) Power supply should always be turned on/off by the item 6.1 Power On Sequence &6.2 Power Off Sequence

Storage and Transportation.

(1) Do not leave the panel in high temperature, and high humidity for a long time.

It is highly recommended to store the module with temperature from 0 to 35 ℃ and relative humidity of less than 70%

(2) Do not store the TFT-LCD module in direct sunlight.

(3) The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.

(4) It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module.

In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.

(5) This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.