



A Brighter Solution

AMP DISPLAY INC.

DF9@A-B5FM SPECIFICATIONS

+ "\$! B ' 7 C @ C F TFT MO8 ULE

CUSTOMER:	
CUSTOMER PART NO.	
AMP DISPLAY PART NO.	5 A !, \$\$ (, \$9&HA E K !H\$%<
APPROVED BY:	
DATE:	

APPROVED FOR SPECIFICATIONS

APPROVED FOR SPECIFICATION AND PROTOTYPES

AMP DISPLAY INC

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Preliminary

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RECORD OF REVISION

Revision Date	Page	Contents	Editor
2008 /2/ 26	-	New Release	Sunglin

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1. INTRODUCTION

Ampire Display Module AM800480 is a color active matrix TFT-LCD that uses amorphous silicon TFT as a switching device . This model is composed of a TFT-LCD panel , a driving circuit and a backlight system . This TFT-LCD has a high resolution (800(R.G.B) X 480) and can display up to 262,144 colors.

1-1. Features

- WVGA (15:9 diagonal) configuration
- Input interface voltage : 3.3V
- Data enable mode
- Maximum power consumption : below 3.5W

1-2. Applications

- Portable TV
- Car user DVD
- Industrial application
- HMI (Human machine interface)

2. PHYSICAL SPECIFICATIONS

Item	Specifications	unit
Display resolution(dot)	800RGB (W) x 480(H)	dots
Active area	152.4 (W) x 91.44 (H)	mm
Pixel pitch	0.1905 (W) x 0.1905 (H)	mm
Color configuration	R.G.B Vertical stripe	
Overall dimension	165.0(W)x104.0(H)x7.06(D)---(Typ)	mm
Weight	T.B.D	g
Surface treatment	--	
Brightness	400nit	cd/m ²
Contrast ratio	T.B.D	
Backlight unit	LED	
Display color	262,144	colors

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4. ELECTRICAL CHARACTERISTICS

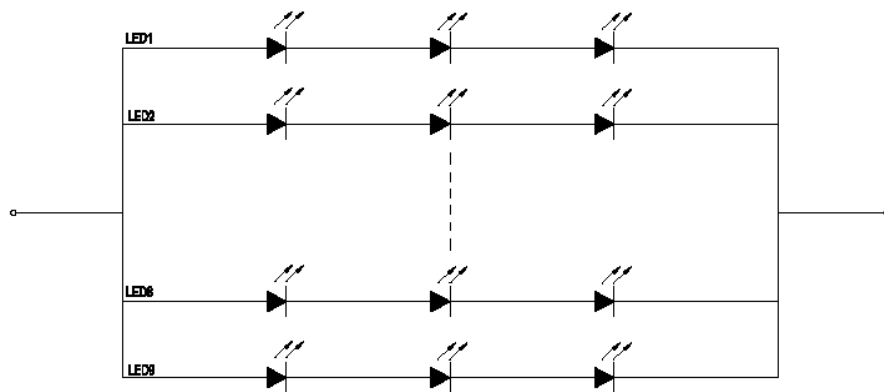
4-1 TFT LCD Module voltage

ITEM		SYMBOL	MIN	TYP	MAX	UNIT
Power Supply Voltage		V _{CC}	3.0	3.3	3.6	V
Power Supply Current		I _{CC}	-	300	350	mA
Logic Input Voltage	Input Voltage	V _{IN}	0	-	V _{CC}	V
	Threshold Voltage(High)	V _{TH}	0.7V _{CC}	-	V _{CC}	V
	Threshold Voltage(Low)	V _{TL}	0	-	0.3V _{CC}	V

3-2 Backlight unit

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
LED Voltage	V _L	--	10.5	--	V	1)
LED Current	I _L	--	180	--	mA	1)
LED life time	-	--	10K	-	Hr	2)

NOTE :



2) The LED Life Time define : Module brightness decay to 50% , Ta=25°C ,
I_L=20mA

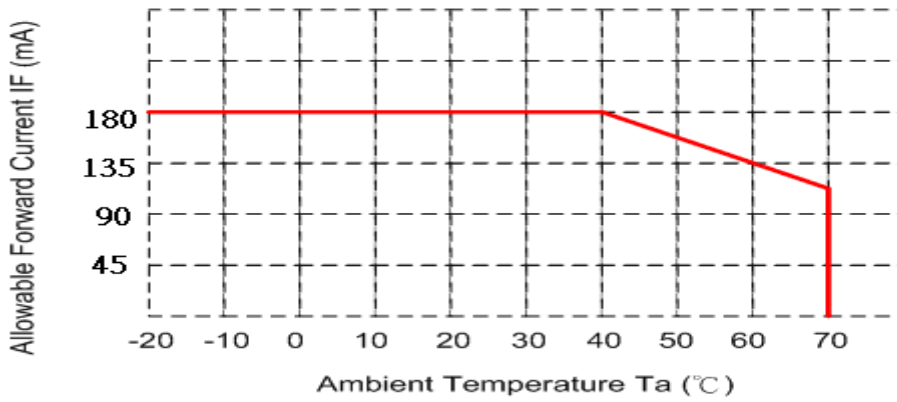
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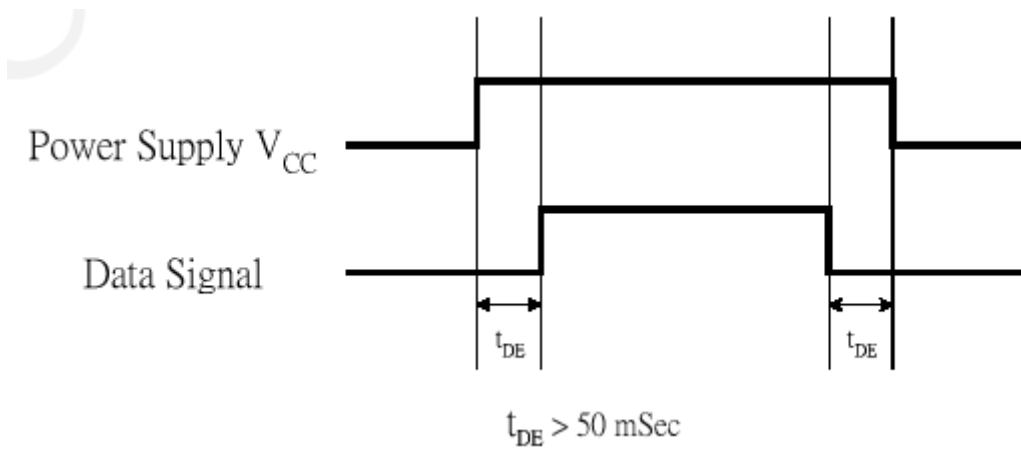
- The constant current source is needed for white LED back-light driving.

When LCM is operated over 60°C ambient temperature, the I_{LED} of the LED back-light should

be adjusted to 135mA max



4-3 Power Sequence



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5. INTERFACE

1.FPC Connector is used for the module electronics interface. The recommended model is FH-19-40S-0.5SH manufactured by Hirose.

Pin no	Symbol	Function	Remarks
1	Vss	Ground	
2	CK	Clock signal for sampling each data signal	
3	VSS	Ground	
4	R0	Red data (LSB)	
5	R1	Red data	
6	R2	Red data	
7	R3	Red data	
8	R4	Red data	
9	R5	Red data(MSB)	
10	Vss	Ground	
11	G0	Green data (LSB)	
12	G1	Green data	
13	G2	Green data	
14	G3	Green data	
15	G4	Green data	
16	G5	Green data(MSB)	
17	Vss	Ground	
18	B0	Blue data(LSB)	
19	B1	Blue data	
20	B2	Blue data	
21	B3	Blue data	
22	B4	Blue data	
23	B5	Blue data(MSB)	
24	Vss	Ground	
25	NC	No connection	
26	HENAB	Horizontal data enable	
27	NC	No connection	
28	Vss	Ground	
29	NC	No connection	
30	NC	No connection	
31	NC	No connection	
32	NC	No connection	
33	Vss	Ground	
34	HVR	Horizontally and Vertically inverted	Note1
35	RST	Reset signal for controlled IC	
36	VCC	3.3V power supply	
37	VCC	3.3V power supply	
38	VCC	3.3V power supply	
39	Vss	Ground	
40	Vss	Ground	

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**Note1: HVR="High": Regular video
HVR="Low" Horizontally and vertically inverted video**

AC Electrical Characteristics (VCC=3.3V, AVDD=8.4V, AVSS=GND=0V, TA=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLK frequency	Fclk	-	40	47	MHz	-
CLK pulse width	Tcw	6	-	-	ns	-
Data set-up time	Tsu	4	-	-	ns	D00~D55, REV and DIO1/2 to CLK
Data hold time	Thd	2	-	-	ns	D00~D55, REV and DIO1/2 to CLK
Propagation delay of DIO2/1	Tphl	6	10	15	ns	CL=25pF (Output)
Time that the last data to LD	Tld	1	-	-	Tcph	-
Pulse width of LD	Twld	2	-	-	Tcph	-
Time that LD to DIO1/2	Tlds	5	-	-	Tcph	-
POL set-up time	Tpsu	6	-	-	ns	POL to LD
POL hold time	Tphd	6	-	-	ns	POL to LD
Output stable time	Tst	-	-	12	us	10% or 90% target voltage, CL=60pF, R=2kΩ

6. INPUT SIGNAL :**6-1 Timing Specification****SYNC mode input signal characteristics(800X480)**

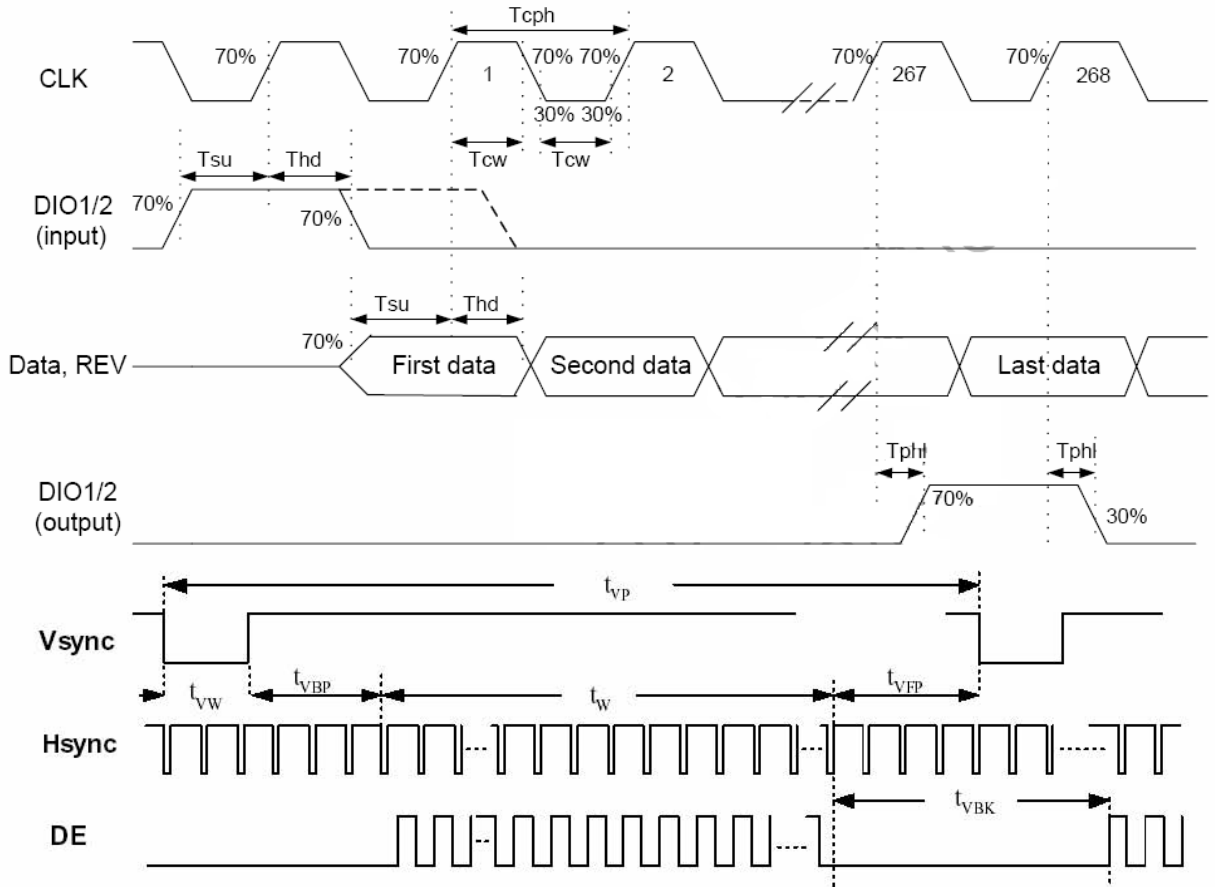
ITEM	Symbol	SPEC			UNIT	Conditions
		Min	Typ	Max		
CLK Frequency	Fclk	-	40	47	MHZ	
CLK pulse width	Tcw	6	-	-	ns	D00~D55 REV and DIO1/2 to CLK
Data Setup Time	Tsu	4	-	-	ns	D00~D55 REV and DIO1/2 to CLK
Data Hold Time	Thd	2	-	-	ns	CL=25pF(output)
Propagation delay of DIO2/1	Tphl	6	10	15	ns	
Time that the last data to LD	Tld	1	-	-	Tcph	
Pulse width of LD	Twld	2	-	-	Tcph	
Time that LD to DIO1/2	Tlds	5	-	-	Tcph	
POL set-up time	Tpsu	6	-	-	ns	POL TO LD
POL hold time	Tphd	6	-	-	ns	POL TO LD
Output stable time	Tst	-	-	12	us	10% OR 90% target voltage, CL=60pF, R=2kΩ

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6-2 Timing Characteristic

- EDGSL=L or open



7. OPTICAL CHARACTERISTICS

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Response Time	$T_r + T_f$	$\Theta = \Phi = 0^\circ$	-	25	50	ms	(1)	
Contrast ratio	CR		--	T.B.D	-	-	(2)(3)	
Viewing Angle	Vertical	$CR \geq 10$	--	120	-	Deg.	(5)	
	Horizontal		Φ	--	140			-
Luminance	L	$\Theta = \Phi = 0^\circ$	--	400	-	cd/m ²	(3)(4)	
Luminance Uniformity	ΔL		-	70	-	%	(3)(4)	
Color chromaticity	Red	Rx	$\Theta = \Phi = 0^\circ$	0.572	0.612	0.652	-	(3)
		Ry		0.304	0.344	0.384		
	Green	Gx		0.268	0.308	0.348		
		Gy		0.506	0.546	0.586		
	Blue	Bx		0.094	0.134	0.174		
		By		0.119	0.159	0.199		
	White	Wx		0.267	0.307	0.347		
		Wy		0.309	0.349	0.389		

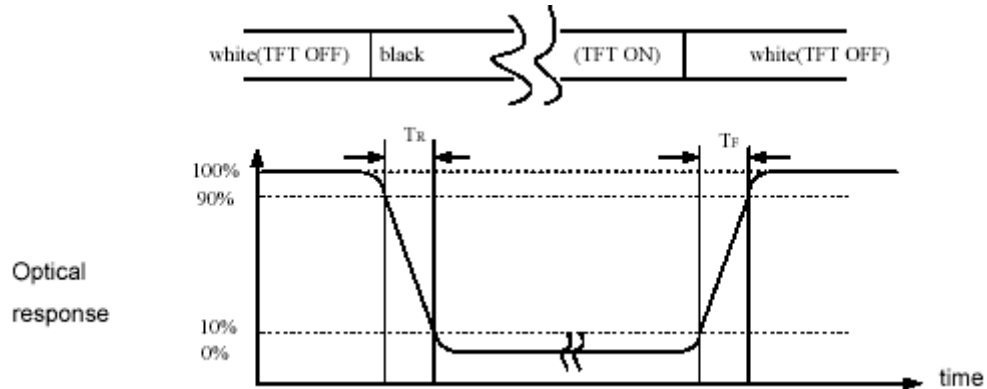
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NOTE :

- These items are measured by BM-7 in the dark room (no ambient light)
- T.B.D means To be define.

(1) Definition of Response Time (White-Black)



(2) Definition of Contrast Ratio

Measure contrast ratio on the below 5 points(refer to figure,#1~#5point) and take the average value

Contrast ratio is calculated with the following formula :

$$\text{Contrast Ratio(CR)} = (\text{White})\text{Luminance of ON} \div (\text{Black})\text{Luminance of OFF}$$

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(3) Definition of Luminance :

Measure white luminance on the same 5 points and take the average value

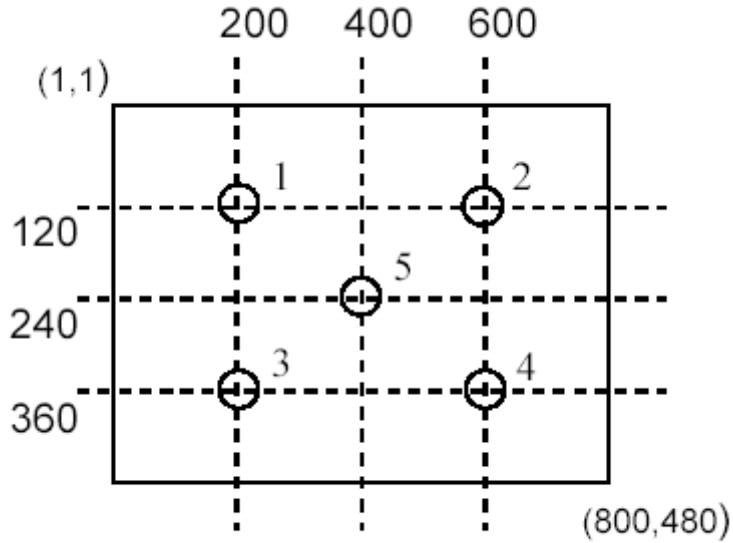


Fig.1 Measuring point

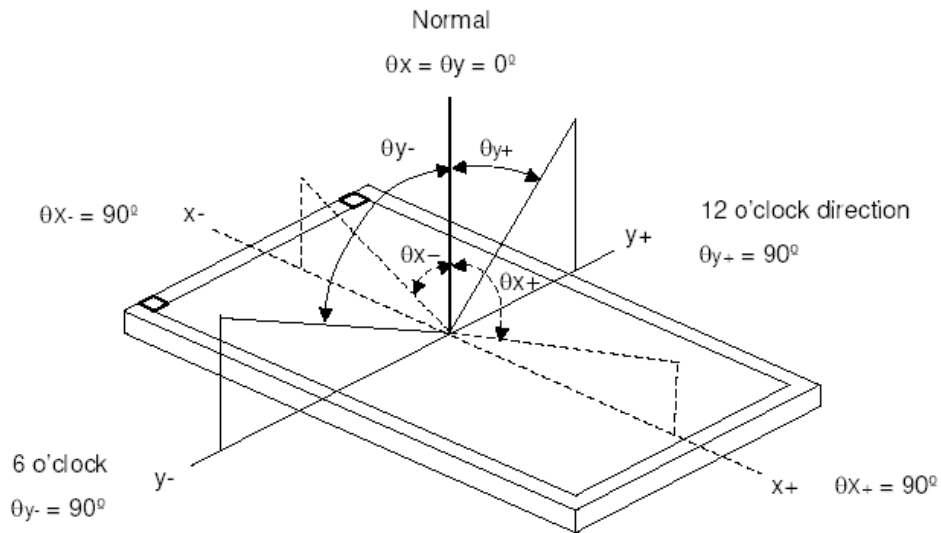
(1) Definition of Luminance Uniformity :

Measured Maximum luminance[L(MAX)] and Minimum luminance[L(MIN)] on the 5 points

Luminance Uniformity is calculated with the following formula :

$$\Delta L = [L(MIN) / L(MAX)] \times 100\%$$

(2) Definition of Viewing Angle



$$\Phi = (\Theta_{x+}) + (\Theta_{x-}) \quad \Theta = (\Theta_{y+}) + (\Theta_{y-})$$

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8. TOUCH PANEL ELECTRICAL SPECIFICATION

Parameter	Condition	Standard Value
Terminal Resistance	X Axis	180 ~ 670 Ω
	Y Axis	140 ~ 560 Ω
Insulating Resistance	DC 25 V	More than 20MΩ
Linearity	--	≤ 1.5 %
Notes life by Pen	Note a	100,000 times(min)
Input life by finger	Note b	1,000,000 times (min)

Note A .

Notes area for pen notes life test is 10 x 9 mm.

Size of word is 7.5 x 6.75

Shape of pen end : R0.8mm

Load : 250 g

Note B

By Silicon rubber tapping at same point

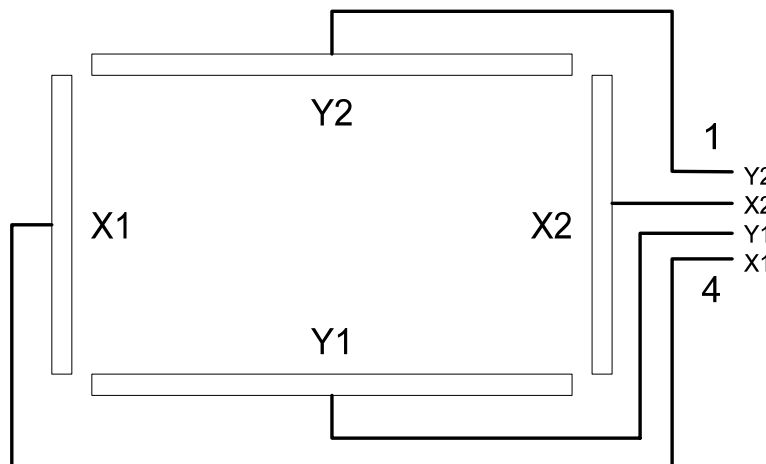
Shape of rubber end : R8mm

Load : 250gf

Frequency : 5 Hz

Interface

No.	Symbol	Function
1	Y2	Touch Panel Top Signal in Y Axis
2	X2	Touch Panel Right Signal in X Axis
3	Y1	Touch Panel Bottom Signal in Y Axis
4	X1	Touch Panel Left Signal in X Axis



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9. RELIABILITY

Test Item	Test Conditions	Note
High Temperature Operation	70±3°C , t=96 hrs	
Low Temperature Operation	-20±3°C , t=96 hrs	
High Temperature Storage	80±3°C , t=96 hrs	1,2
Low Temperature Storage	-30±3°C , t=96 hrs	1,2
Thermal Shock Test	-20°C ~ 25°C ~ 70°C 30 m in. 5 min. 30 min. (1 cycle) Total 5 cycle	1,2
Humidity Test	40 °C, Humidity 90%, 96 hrs	1,2
Vibration Test (Packing)	Sweep frequency : 10 ~ 55 ~ 10 Hz/1min Amplitude : 0.75mm Test direction : X.Y.Z/3 axis Duration : 30min/each axis	2

Note 1 : Condensation of water is not permitted on the module.

Note 2 : The module should be inspected after 1 hour storage in normal conditions (15-35°C , 45-65%RH).

Definitions of life end point :

- Current drain should be smaller than the specific value.
- Function of the module should be maintained.
- Appearance and display quality should not have degraded noticeably.
- Contrast ratio should be greater than 50% of the initial value.

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10. USE PRECAUTIONS

10-1 Handling precautions

- (1) The polarizing plate may break easily so be careful when handling it. Do not touch, press or rub it with a hard-material tool like tweezers.
- (2) Do not touch the polarizing plate surface with bare hands so as not to make it dirty. If the surface or other related part of the polarizing plate is dirty, soak a soft cotton cloth or chamois leather in benzine and wipe off with it. Do not use chemical liquids such as acetone, toluene and isopropyl alcohol. Failure to do so may bring chemical reaction phenomena and deteriorations.
- (3) Remove any spit or water immediately. If it is left for hours, the suffered part may deform or decolorize.
- (1) If the LCD element breaks and any LC stuff leaks, do not suck or lick it. Also if LC stuff is stuck on your skin or clothing, wash thoroughly with soap and water immediately.

10-2 Installing precautions

- (1) The PCB has many ICs that may be damaged easily by static electricity. To prevent breaking by static electricity from the human body and clothing, earth the human body properly using the high resistance and discharge static electricity during the operation. In this case, however, the resistance value should be approx. $1M\Omega$ and the resistance should be placed near the human body rather than the ground surface. When the indoor space is dry, static electricity may occur easily so be careful. We recommend the indoor space should be kept with humidity of 60% or more. When a soldering iron or other similar tool is used for assembly, be sure to earth it.
- (2) When installing the module and ICs, do not bend or twist them. Failure to do so may crack LC element and cause circuit failure.
- (3) To protect LC element, especially polarizing plate, use a transparent protective plate (e.g., acrylic plate, glass etc) for the product case.
- (4) Do not use an adhesive like a both-side adhesive tape to make LCD surface (polarizing plate) and product case stick together. Failure to do so may cause the polarizing plate to peel off

10-3 Storage precautions

- (1) Avoid a high temperature and humidity area. Keep the temperature between 0°C and 35°C and also the humidity under 60%.
- (2) Choose the dark spaces where the product is not exposed to direct sunlight or fluorescent light.
- (3) Store the products as they are put in the boxes provided from us or in the same conditions as we recommend.

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10-4 Operating precautions

- (1) Do not boost the applied drive voltage abnormally. Failure to do so may break ICs. When applying power voltage, check the electrical features beforehand and be careful. Always turn off the power to the LC module controller before removing or inserting the LC module input connector. If the input connector is removed or inserted while the power is turned on, the LC module internal circuit may break.
- (2) The display response may be late if the operating temperature is under the normal standard, and the display may be out of order if it is above the normal standard. But this is not a failure; this will be restored if it is within the normal standard.
- (3) The LCD contrast varies depending on the visual angle, ambient temperature, power voltage etc. Obtain the optimum contrast by adjusting the LC drive voltage.
- (4) When carrying out the test, do not take the module out of the low-temperature space suddenly. Failure to do so will cause the module condensing, leading to malfunctions.
- (5) Make certain that each signal noise level is within the standard (L level: $0.2V_{dd}$ or less and H level: $0.8V_{dd}$ or more) even if the module has functioned properly. If it is beyond the standard, the module may often malfunction. In addition, always connect the module when making noise level measurements.
- (6) The CMOS ICs are incorporated in the module and the pull-up and pull-down function is not adopted for the input so avoid putting the input signal open while the power is ON.
- (7) The characteristic of the semiconductor element changes when it is exposed to light emissions, therefore ICs on the LCD may malfunction if they receive light emissions. To prevent these malfunctions, design and assemble ICs so that they are shielded from light emissions.
- (8) Crosstalk occurs because of characteristics of the LCD. In general, crosstalk occurs when the regularized display is maintained. Also, crosstalk is affected by the LC drive voltage. Design the contents of the display, considering crosstalk.

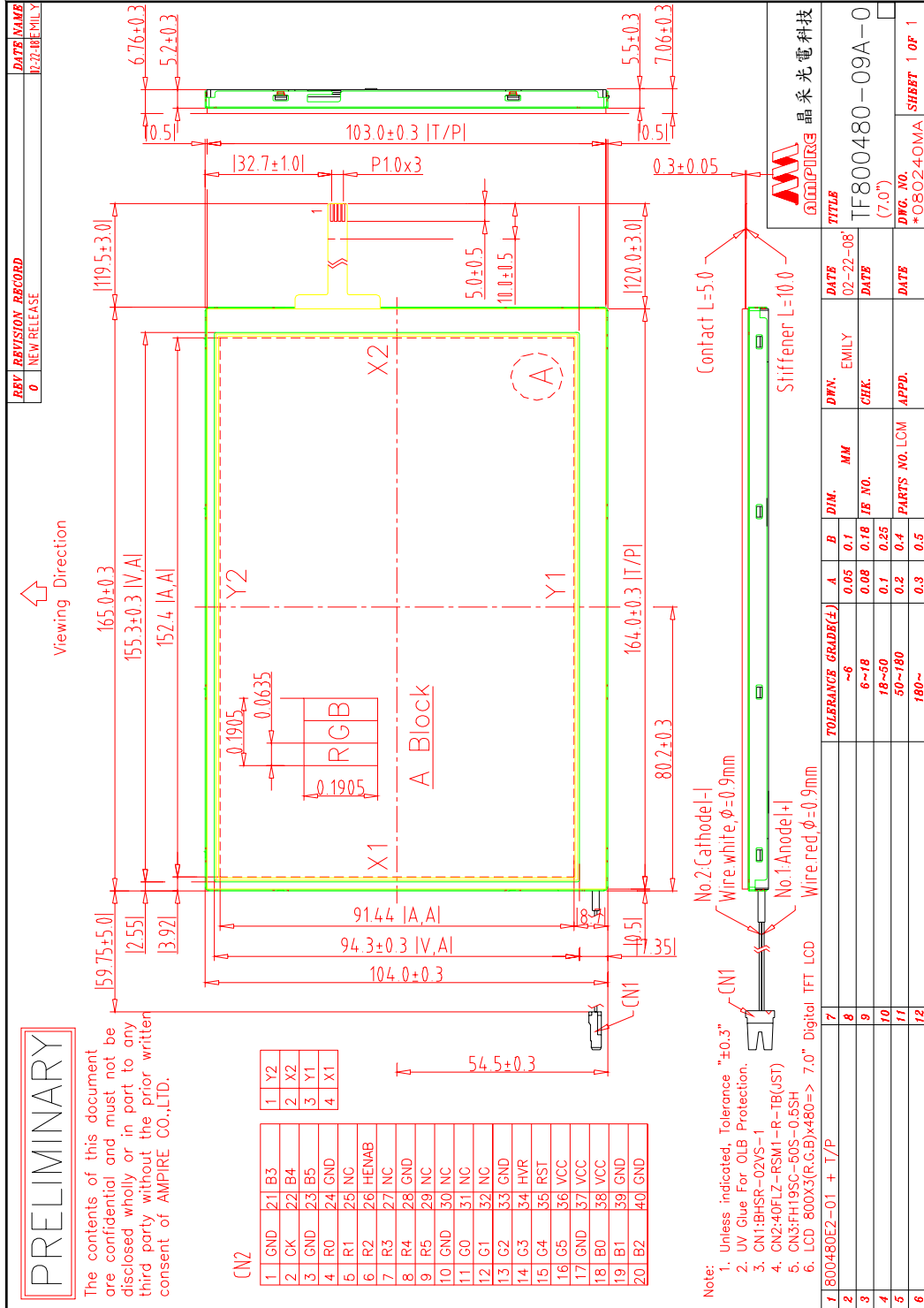
10-5 Other

- (1) Do not disassemble or take the LC module into pieces. The LC modules once disassembled or taken into pieces are not the guarantee articles.
- (2) The residual image may exist if the same display pattern is shown for hours. This residual image, however, disappears when another display pattern is shown or the drive is interrupted and left for a while. But this is not a problem on reliability.

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11. OUTLINE DIMENSION



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