SHARP

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Tomtom向けLQ043T3DW01-Rome技術資料改訂の件(Ver A)

いつもお世話になり有り難うございます。
標記TFTモジュールにつき、技術資料を改訂しましたので、添付資料にて提出いたします。
本技術資料のユーザー承認取得を宜しくお願い致します。

－ 記 －

資料名	内容	枚数
LQ043T3DW01 (Rome)	LQ043T3DW01 SPECIFICATION LCY-W08252A Feb.29.2008	表紙を含め 26 枚

改訂内容
「外形寸法図」:①The bending radius of FPC change
②Dimensions of Gasket Area add

以上

SHARP

No.	LCY-W08252A
DATE	Feb. 29 2008

TECHNICAL LITERATURE

For

TFT-LCD module

MODEL No. LQ043T3DW01(Rome)

TENTATIVE

The technical literature is subject to change without notice. So, please contact Sharp or its representative before designing your product based on this literature.

SHARP CORPORATION

MOBILE LIQUID CRYSTAL DISPLAY GROUP III

RECORDS OF REVISION

MODEL No: LQ043T3DW01

SPEC No.	Date	NO.	PAGE	SUMMARY	NOTE
	Nov.5.07	-	-	-	
LCY-W08252	Feb.22 .08	-	-	Update for ES sample	
LCY-W08252A	Feb.29 .08	12-2	19	The bending radius of FPC change	K. Yamamoto
		19	24	Outline dimension change	K. Yamamoto

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- Audio visual and multimedia equipment
- Consumer electronics
- Personal navigation device

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1. Applicable Scope

This specification is applicable to TFT-LCD Module "LQ043T3DW01" only.
This LCD module is developed for PND (Personal Navigation Devices), not designed for Automotive build-in uses.

2. General Description

This module is a color active matrix LCD module incorporating amorphous silicon TFT (Thin Film Transistor). It is composed of a color TFT-LCD panel, driver IC, Input FPC, a back light unit and touch panel. Graphics and texts can be displayed on a 480 x 272 x RGB dots panel with about 1677k colors by supplying 24bit data signals (8bit x RGB), four timing signals, supply voltages (Typ. +3.3V) for TFT-LCD panel driving and supply voltage for back light.

3. Mechanical (Physical) Specifications

Item	Specifications	Unit
Screen size	10.9 (4.3" type) diagonal	cm
Active area	95.04(H)×53.856(V)	mm
Pixel format	480(H) x 272(V)	Pixel
	1Pixel =R+G+B dots	
Pixel pitch	0.066(H) x 0.198(V)	mm
Pixel configuration	R,G,B horizontal stripes	
Display mode	Normally black	
Unit outline dimensions	105.5(W) x 67.2(H) x 4.0 (D)	mm
Mass	T.B.D.	g
Surface hardness	2H	
Surface treatment	Anti glare	

*The above-mentioned table indicates module sizes without some projections and FPC.
For detailed measurements and tolerances, please refer to Fig.1.

4. Input Terminal Names and Functions

Recommendation CN : [Entery] 6702-E50N-00R

Pin No.	Symbol	Description	Note
1	GND	GND(0V)	
2	GND	GND(0V)	
3	VDDIO	+3.3V power source	
4	VCI	+3.3V power source	
5	R0	RED data signal(LSB)	
6	R1	RED data signal	
7	R2	RED data signal	
8	R3	RED data signal	
9	R4	RED data signal	
10	R5	RED data signal	
11	R6	RED data signal	
12	R7	RED data signal(MSB)	
13	G0	GREEN data signal(LSB)	
14	G1	GREEN data signal	
15	G2	GREEN data signal	
16	G3	GREEN data signal	
17	G4	GREEN data signal	
18	G5	GREEN data signal	
19	G6	GREEN data signal	
20	G7	GREEN data signal(MSB)	
21	B0	BLUE data signal(LSB)	
22	B1	BLUE data signal	
23	B2	BLUE data signal	
24	B3	BLUE data signal	
25	B4	BLUE data signal	
26	B5	BLUE data signal	
27	B6	BLUE data signal	
28	B7	BLUE data signal(MSB)	
29	GND	GND(0V)	
30	DOTCLK	Pixel clock signal	
31	SHUT	Display ON/OFF signal	
32	HSYNC	Horizontal synchronizing signal	
33	VSYNC	Vertical synchronizing signal	
34	NC	NC	
35	GND	GND(0V)	
36	NC	NC	
37	NC	NC	
38	NC	NC	
39	NC	NC	
40	GND	GND(0V)	

Pin No.	Function	Description	Note
41	X1	X right	
42	Y1	Y bottom	
43	X2	X left	
44	Y2	Y top	
45	GND	GND(0V)	
46	LED-	LED (Cathode side)	
47	NC	NC	
48	LED+	LED (Anode side)	
49	GND	GND(0V)	
50	GND	GND(0V)	

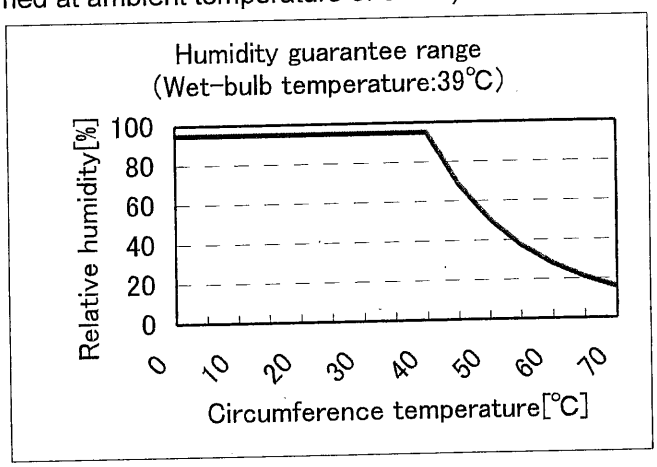
5. Absolute Maximum Ratings

Item	Symbol	Conditions	Rated value	Unit	Remarks
Input voltage	VI	Ta = 25°C	-0.3 ~ V_{DDIO} +0.3	V	Note 1
Logic I/O Power supply voltage	V_{DDIO}	Ta = 25°C	-0.3 ~ +4.0	V	
Analog Power supply voltage	V_{CI}	Ta = 25°C	AGND-0.3~+5.0	V	
Temperature for storage	Tstg	-	-30 to +70	°C	Note 2
Temperature for operation	Topr	-	-20 to +60	°C	Note 3
LED input electric current	I_{LED}	Ta = 25°C	35	mA	Note 4
LED electricity consumption	P_{LED}	Ta = 25°C	T.B.D	mW	Note 4

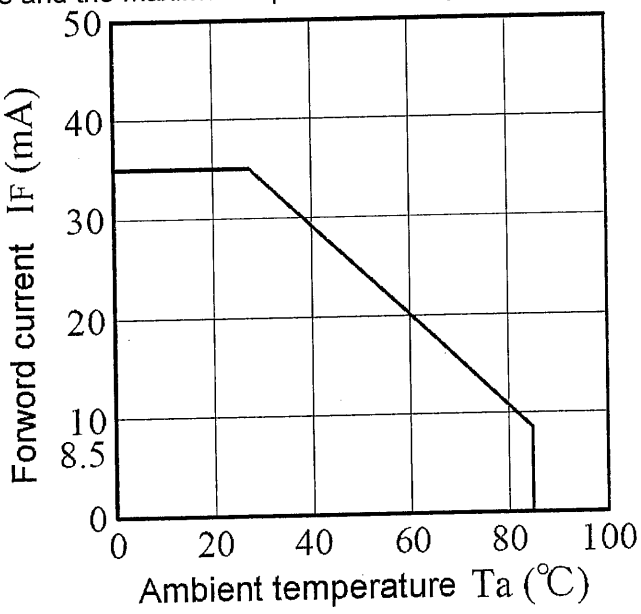
Note 1) SHUT, B7 to B0, G7 to G0, R7 to R0, VSYNC, HSYNC, DOTCLK

Note 2) Humidity: 80%RH Max. (Ta≦40°C)
Maximum bulb temperature under 39°C (Ta>40°C) See to it that no dew will be condensed.

Note 3) Panel surface temperature prescribes.
(Reliability is examined at ambient temperature of 50°C.)



Note 4) Power consumption of one LED (Ta = 25°C). (use 10 pieces LED)
Ambient temperature and the maximum input are fulfilling the following operating conditions.



Ambient temperature and the maximum input

6. Electrical Characteristics

6-1. TFT LCD Panel Driving

Ta = 25°C

Item		Symbol	Min.	Typ.	Max.	Unit	Remarks
Logic I/O Power supply	DC voltage	V_{DDIO}	+1.6.	+3.3	3.6	V	
	DC current	I_{VDDIO}	-	T.B.D.	T.B.D.	mA	Note 1
Analog Power supply	DC voltage	V_{CI}	+2.5	+3.3	+3.6	V	
	DC current	I_{VCI}	-	T.B.D.	T.B.D.	mA	Note 1
Permissive input Ripple voltage		$V_{RFVDDIO}$	-	-	(100)	mVp-p	Note 2
		V_{RFVCI}	-	-	(100)	mVp-p	Note 2
Logic Input Voltage	High	V_{IH}	0.8*V_{DDIO}	-	V_{DDIO}	V	Note 3
	Low	V_{IL}	0	-	0.2*V_{DDIO}	V	Note 3
Logic input Current		I_{IH} / I_{IL}	-1	-	+1	μA	Note 3

Note 1) $V_{DDIO}=V_{CI}$ = +3.3V

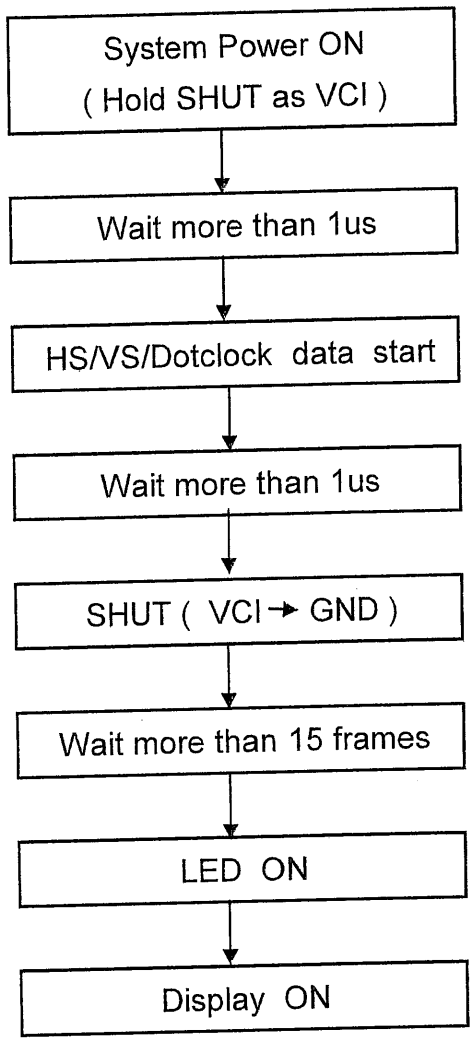
Current situation for I_{VDDIO}: Black & White checker flag pattern

Current situation for I_{CI}: All white pattern

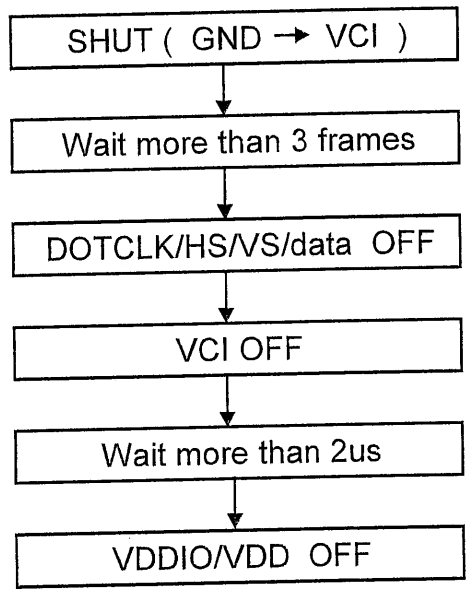
Note 2) $V_{DDIO}=V_{CI}$ = +3.3V

Note 3) SHUT, CSB, SDI, CSK, B7 to B0, G7 to G0, R7 to R0, VSYNC, HSYNC, DOTCLK

6-2. start up sequence



6-3 power down sequence



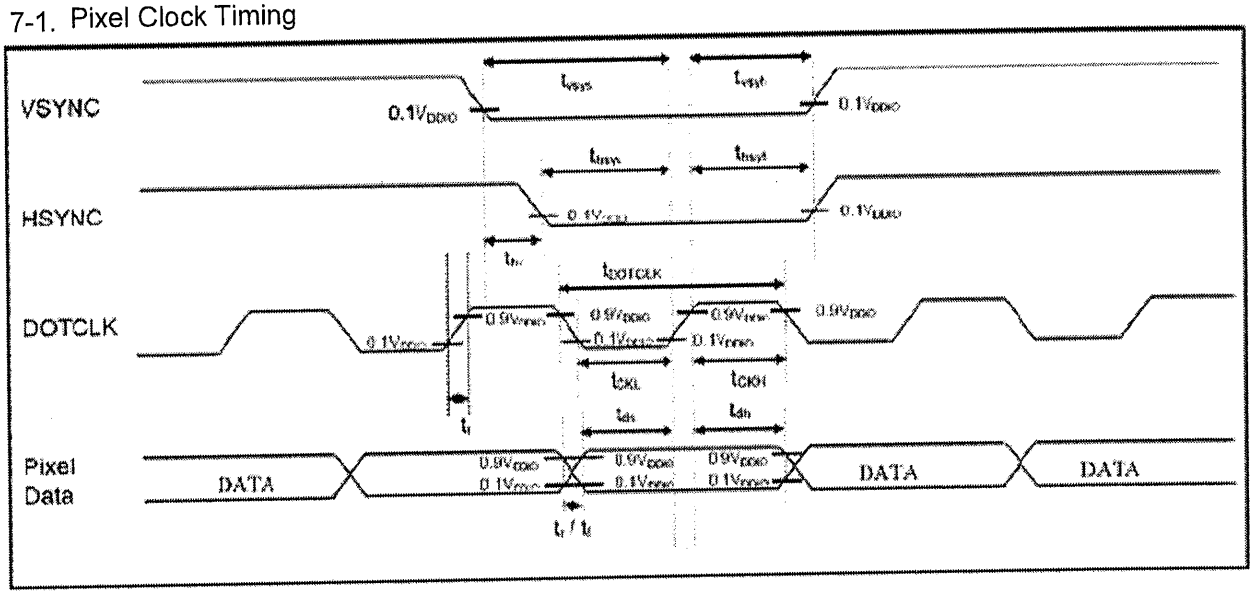
6-4 Back light driving

The back light system has 10 pieces LED

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Rated Voltage	V_{BL}	-	(33.2)		V	
Rated Current	I_L	-	20	-	mA	Ta=25°C
Power consumption	W_L	-	664	-	mW	

7. Timing characteristics of input signals

7-1. Pixel Clock Timing



Characteristics	Symbol	Target Min	Target Typ	Target Max	Units
DOTCLK Frequency	f_{DOTCLK}	-	-	8.69	MHz
DOTCLK Period	t_{DOTCLK}	115	-	-	nSec
Pixel Clock Period	t_{PIXCLK}	-	1	-	t_{DOTCLK}
Pixel Clock Frequency	f_{PIXCLK}	-	-	8.69	MHz
Vertical Sync Setup Time	t_{vsys}	5	-	-	nSec
Vertical Sync Hold Time	t_{vsyh}	5	-	-	nSec
Horizontal Sync Setup Time	t_{hsys}	5	-	-	nSec
Horizontal Sync Hold Time	t_{hsyh}	5	-	-	nSec
Phase difference of Sync Signal Falling Edge	t_{hv}	0	-	480	t_{DOTCLK}
DOTCLK Low Period	t_{CKL}	18	-	-	nSec
DOTCLK High Period	t_{CKH}	18	-	-	nSec
Data Setup Time	t_{ds}	10	-	-	nSec
Data Hold Time	t_{dh}	15	-	-	nSec
Reset Pulse Width	t_{RES}	10	-	-	uSec
Rise / Fall Time	t_r / t_f	5	-	25	nSec

7-2 24-bit RGB Interface

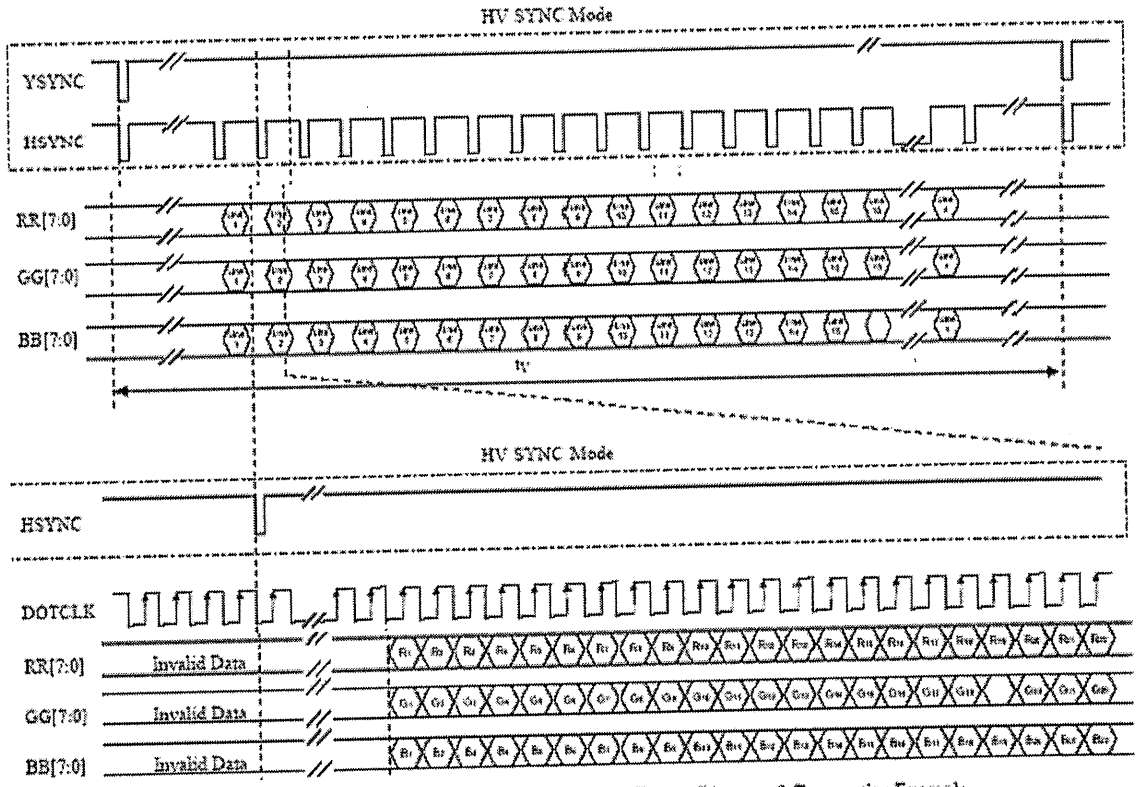


Figure 14-10 – 24-bit Serial Interface Timing Diagram & Transaction Example

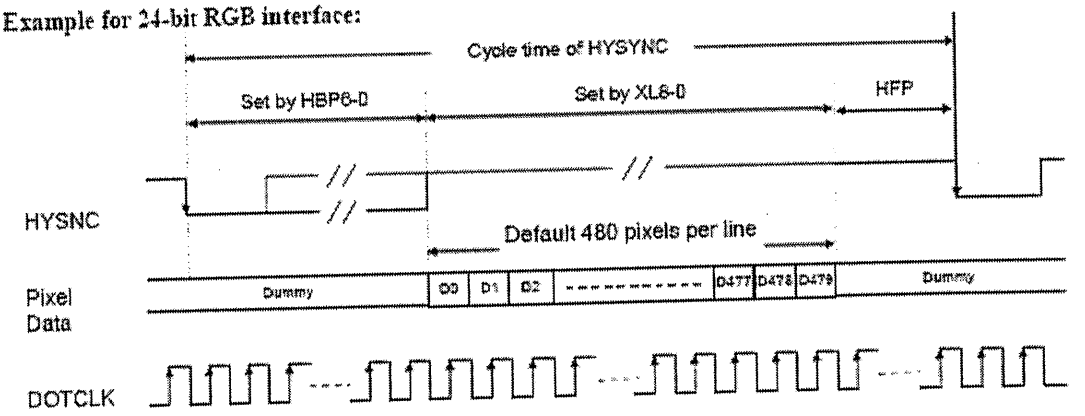
Characteristics		Symbol	HV SYNC Mode	Units
Serial Clock Frequency		$1/t_{DOTCLK}$	8.54	MHz
Horizontal	One Line Period	t_H	512	t_{DOTCLK}
	Active Data Period	t_{HDP}	480	t_{DOTCLK}
	Horizontal Back Porch	t_{HBP}	16	t_{DOTCLK}
	Horizontal Front Porch	t_{HFP}	16	t_{DOTCLK}
Vertical	One Field Period	t_V	278	t_H
	Active Line period	t_{VD}	272	t_H
	Vertical Back Porch	t_{VBP}	4	t_H
	Vertical Front Porch	t_{VFP}	2	t_H

***When use HV sync mode.**

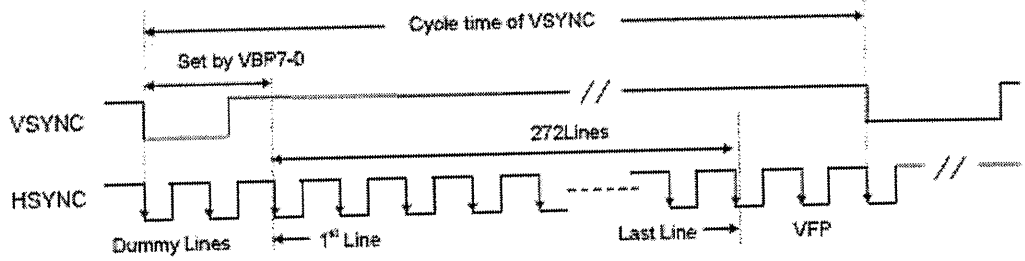
HBP : 16 Dotclock ***This setting is fixed value**

VHP : 3 Line ***This setting is fixed value**

Example for 24-bit RGB interface:

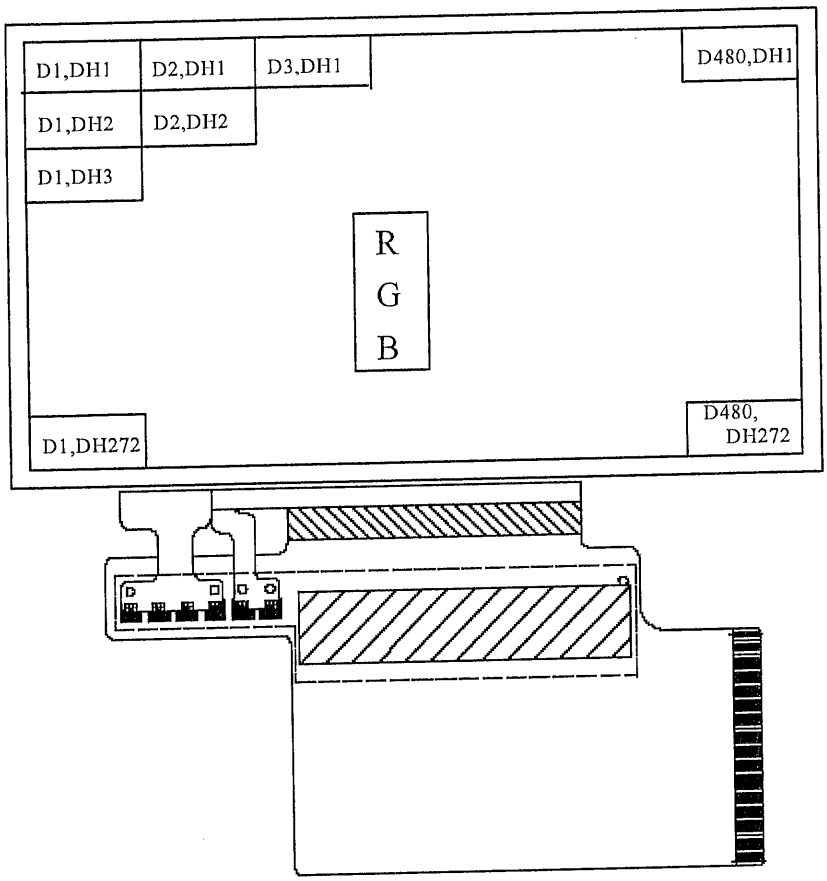


Example for 24-bit RGB interface:



***When decide the value of FP/HP/DEN and DOTCLK, set frame rate between 55 and 60Hz**

7-3 Input Data Signals and Display Position on the screen



Display position of input data (H, V)

8. Input Signals, Basic Display Colors and Gray Scale of Each Color

	Colors & Gray Scale	Gray Scale	Date signal																									
			R0	R1	R2	R3	R4	R5	R6	R7	G0	G1	G2	G3	G4	G5	G6	G7	B0	B1	B2	B3	B4	B5	B6	B7
			LSB							MSB	LSB							MSB	LSB							MSB
Basic Color	Black	–	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	–	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	–	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Cyan	–	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Red	–	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magent	–	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	–	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	–	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale of Red	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	↓					↓								↓								↓			
	⇩	↓					↓								↓								↓			
	Brighter	GS253	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇩	GS254	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	GS255	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	↓					↓								↓								↓			
	⇩	↓					↓								↓								↓			
	Brighter	GS253	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	⇩	GS254	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Green	GS255	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale of Blue	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	⇧	↓					↓								↓								↓			
	⇩	↓					↓								↓								↓			
	Brighter	GS253	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1
	⇩	GS254	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
	Blue	GS255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

0: Low level voltage, 1: High level voltage

Each basic color can be displayed in 256 gray scales from 8 bit data signals. According to the combination of 24 bit data signals, the 16-million-color display can be achieved on the screen.

9. Optical Characteristics

Module characteristics

Ta = 25°C , V_{DDIO}=3.3V,V_{CI} = +3.3V

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle range (Without Wide View)	Horizontal	θ21	CR>10	-	(80)	-	deg.	[Note1,4]
		θ22		-	(80)	-	deg.	
	Vertical	θ11		-	(80)	-	deg.	
		θ12		-	(80)	-	deg.	
Contrast ratio		CR	Optimum viewing angle	(400)	(700)	-		[Note2,4]
Response Time	Rise	Tr	θ=0°	-	T.B.D.	-	ms	[Note3,4]
	Decay	Td		-	T.B.D.	-	ms	
Chromaticity of White		x		-	T.B.D.	-		
		y		-	T.B.D.	-		
Chromaticity of Red		x		-	T.B.D.	-		
		y		-	T.B.D.	-		
Chromaticity of Green		x		-	T.B.D.	-		
		y		-	T.B.D.	-		
Chromaticity of Blue		x		-	T.B.D.	-		[Note4]
		y		-	T.B.D.	-		
Luminance of white		X_{L1}		(175)	(250)	-	cd/m²	I_{LED}=20mA [Note6]
Uniformity		U		(70)	(80)		%	[Note5]

* The optical characteristics measurements are operated under a stable luminescence (I_{LED} = 20mA) and a dark condition. (Refer to Fig.3)

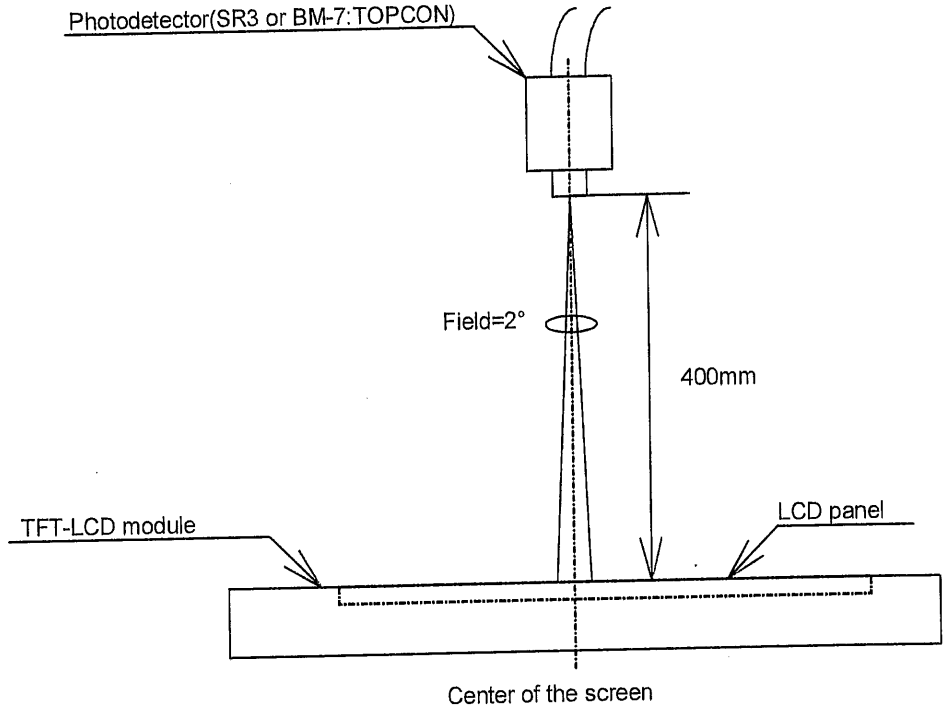
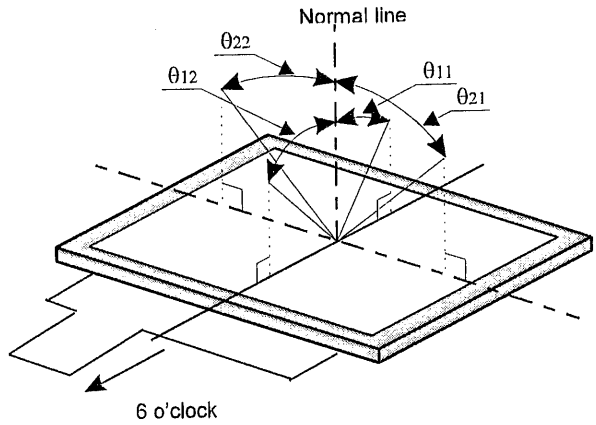


Fig.3 Optical characteristics measurement method

[Note1] Definitions of viewing angle range



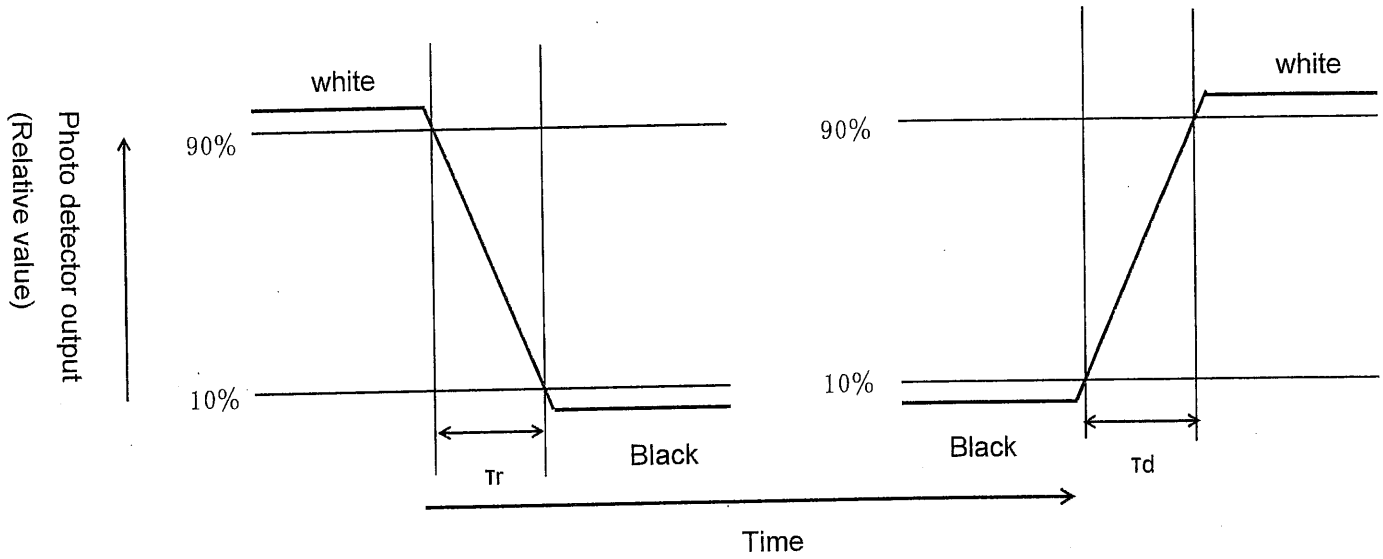
[Note2] Definition of contrast ratio

The contrast ratio is defined as the following:

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance (brightness) with all pixels white}}{\text{Luminance (brightness) with all pixels black}}$$

[Note3] Definition of response time

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white"

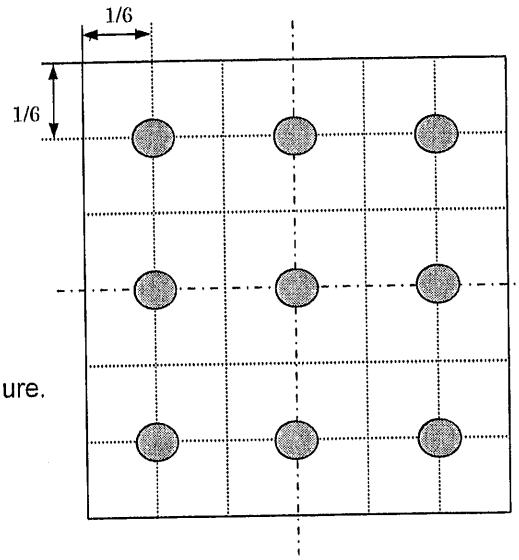


[Note4] This shall be measured at center of the screen.

[Note5] Definition of Uniformity

$$Uniformity = \frac{\text{Minimum Brightness}}{\text{Maximum Brightness}} \times 100\,(\%)$$

The brightness should be measured on the 9-point as shown in the right figure.



[Note6] This shall be measured on the 9-point as shown in the right figure.

$$\text{Luminance of white} = \frac{\text{Summation of the 9-point Brightness}}{9}$$

10. Touch panel characteristics

Parameter	Min.	Typ.	Max.	Unit	Remark
Input voltage	-	T.B.D.	T.B.D.	V	
Resistor between terminals(XL-XR)	T.B.D.	T.B.D.	T.B.D.	Ω	Provisional specification
Resistor between terminals(YU-YD)	T.B.D.	T.B.D.	T.B.D.	Ω	
Line linearity(X direction)	-	-	T.B.D.	%	
Line linearity(Y direction)	-	-	T.B.D.	%	
Insulation resistance	T.B.D.	-	-	MΩ	at DC25V
Minimum tension for detecting	-	-	T.B.D.	N	

Note) For use of finger input

11. Mechanical characteristics

11-1) FPC (for LCD panel) characteristics

(1) Specific connector: TBD

(2) Bending endurance of the bending slits portion

No line of the FPC is broken for the bending test (Bending radius=0.6mm and angle=90°) in 30 cycles.

11-2) Design guidance for touch panel (T/P)

11-2-1) Example of housing design

(1) If a consumer will put a palm on housing in normal usage, care should be taken as follows.

(2) Keep the gap, for example 0.3 to 0.7mm, between bezel edge and T/P surface.
The reason is to avoid the bezel edge from contacting T/P surface that may cause a "short" with bottom layer (See Fig.)

(3) Insertion a cushion material is recommended.

(4) The cushion material should be limited just on the busbar insulation paste area.
If it is over the transparent insulation paste area, a "short" may be occurred.

(5) There is one where a resistance film is left in the T/P part of the end of the pole.
Design to keep insulation from the perimeter to prevent from mis-operation and so on.

11-2-2) Mounting on display and housing bezel

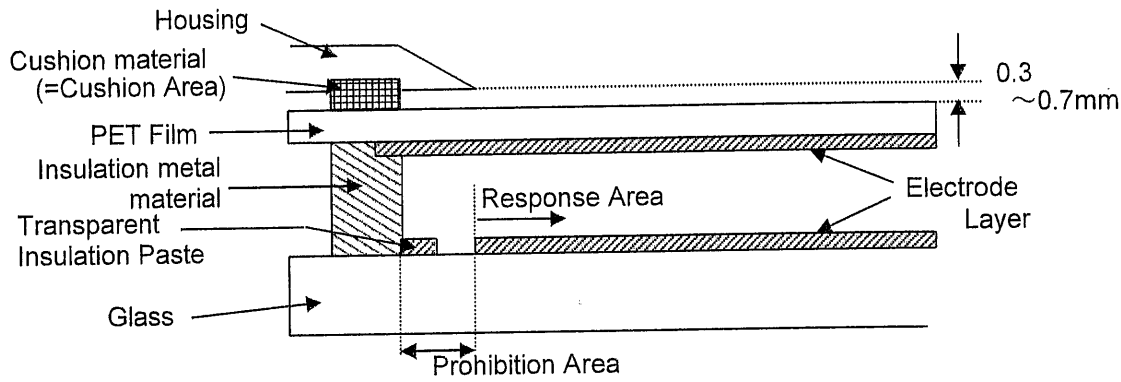
(1) In all cases, the T/P should be supported from the backside of the Plastic.

(2) Do not to use an adhesive-tape to bond it on the front of T/P and hang it to the housing bezel.

(3) Never expand the T/P top layer (PET-film) like a balloon by internal air pressure.
The life of the T/P will be extremely short.

(4) Top layer, PET, dimension is changing with environmental temperature and humidity.
Avoid a stress from housing bezel to top layer, because it may cause "waving".

(5) The input to the Touch panel sometimes distorts touch panel itself.



12. Handling of modules

12-1. Inserting the FPC into its connector and pulling it out.

1) Be sure to turn off the power supply and the signals when inserting or disconnecting the cable.
2) Please insert for too much stress not to join FPC in the case of insertion of FPC.

12-2. About handling of FPC

1) The bending radius of the FPC should be more than 0.6mm, and it should be bent evenly.
2) Do not dangle the LCD module by holding the FPC, or do not give any stress to it.

12-3. Mounting of the module

1) The module should be held on to the plain surface. Do not give any warping or twisting stress to the module.
2) Please consider that GND can ground a modular metal portion etc. so that static electricity is not charged to a module.
3) Design guidance for touch panel (T/P)

12-4. Cautions in assembly / Handling pre cautions.

As the polarizer can be easily scratched, be most careful in handling it.

1) Work environments in assembly.
   Working under the following environments is desirable:
   a) Implement more than 1MΩ conductive treatment (by placing a conductive mat or applying conductive paint) on the floor or tiles.
   b) No dusts come in to the working room. Place an adhesive, anti-dust mat at the entrance of the room.
   c) Humidity of 50 to 70% and temperature of 15 to 27°C are desirable.
   d) All workers wear conductive shoes, conductive clothes, conductive fingerstalls and grounding belts without fail.
   e) Use a blower for electrostatic removal. Set it in a direction slightly tilt downward so that each Module can be well subjected to its wind. Set the blower at an optimum distance between the blower and the module.
2) How the remove dust on the polarizer
   a) Blow out dust by the use of an N2 blower with antistatic measures taken. Use of an ionized air Gun is recommendable.
   b) When the panel surface is soiled, wipe it with soft cloth.
3) In the case of the module's metal part (shield case) is stained, wipe it with a piece of dry, soft cloth. If rather difficult, give a breath on the metal part to clean better.
4) If water dropped, etc. remains stuck on the polarizer for a long time, it is apt to get discolored or cause stains. Wipe it immediately.
5) As a glass substrate is used for the TFT-LCD panel, if it is dropped on the floor or hit by something hard, it may be broken or chipped off.

6) Since CMOS LSI is used in this module, take care of static electricity and take the human earth into consideration when handling.

12-5. Others

1) Regarding storage of LCD modules, avoid storing them at direct sunlight-situation.

You are requested to store under the following conditions:

(Environmental conditions of temperature/humidity for storage)

a) Temperature: 0 to 40°C

b) Relative humidity : 95% or less

- As average values of environments (temperature and humidity) for storing, use the following control guidelines:

Summer season: 20 to 35°C, 85% or less Winter season: 5 to 15°C, 85% or less

- If stored under the conditions of 40°C and 95% RH, cumulative time of storage must be less than 240 hours.

2) If stored at temperatures below the rated values, the inner liquid crystal may freeze, causing cell destruction. At temperatures exceeding the rated values for storage, the liquid crystal may become isotropic liquid, making it no longer possible to come back to its original state in some cases.

3) If the LCD is broken, do not drink liquid crystal in the mouth. If the liquid crystal adheres to a hand or foot or to clothes, immediately cleanse it with soap.

4) If a water drop or dust adheres to the polarizer, it is apt to cause deterioration. Wipe it immediately.

5) Be sure to observe other caution items for ordinary electronic parts and components.

6) If local pressure joins T/P surface for a long time, it will become the cause of generating of Newton's ring.

13. Reliability test items

No.	Test item	Conditions
1	High temperature storage test	Ta = +70°C 240h
2	Low temperature storage test	Ta = -30°C 240h
3	High temperature & high humidity operation test	Ta = +40°C ; 95%RH 240h (No condensation)
4	High temperature operation test	Ta = +60°C 240h (The panel temp. must be less than 50°C)
5	Low temperature operation test	Ta = -20°C 240h
6	Vibration test (non- operating)	Frequency : 10 to 55Hz/Vibration width (one side) : 1.5mm Sweep time : 1minutes Test period : (2 hours for each direction of X,Y,Z)
7	Shock test	Direction: ±X, ±Y, ±Z, Time: Third for each direction. Impact value : 100G Action time 6ms
8	Thermal shock test	Ta=-25°C～70°C /10 cycles (30 min) (30min)
9	Electro static discharge test	±200V·200pF(0Ω) to Terminals(Contact) (1 time for each terminals) ±4kV・150pF(330Ω) to Housing bezel or T/P(Contact) ±8kV・150pF(330Ω) to Housing bezel or T/P(in Air)
10	FPC Bending Test	Bending 30 times by bending radius R0.6mm and angle=90°(LCD FPC)

*Note Ta = Ambient temperature, Tp = Panel temperature

【Check items】

(a)Test No.1～9

In the standard condition, there shall be no practical problems that may affect the display function.

【Result Evaluation Criteria】

Under the display quality test conditions with normal operation state, these shall be no change which may affect practical display function.

14. Display Grade

The standard regarding the grade of color LCD displaying modules should be based on the delivery inspection standard.

15. Delivery Form

15-1. Carton storage conditions

1) Carton piling-up: Max 8 rows

2) Environments

Temperature: 0~40°C

Humidity: 65% RH or less (at 40°C)

There should be no dew condensation even at a low temperature and high humidity.

3) Packing form: As shown in Figure 4.

*Cartons are weak against damp, and they are apt to be smashed easily due to the compressive pressure applied when piled up. The above environmental conditions of temperature and humidity are set in consideration of reasonable pile-up for storage.

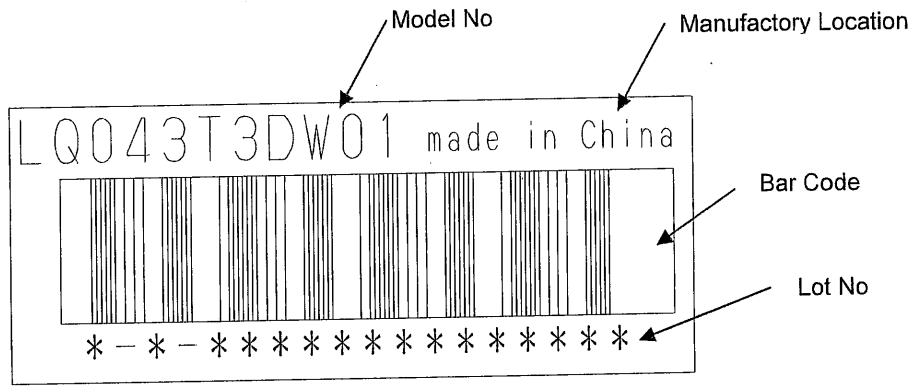
15-2. Packing composition

Name	quantity	Note
Carton size	1	575×360×225 (mm)
Tray	8	Material: Electrification prevention polypropylene
(The number of Module)		8 unit/tray: 80 unit/carton
Electrification prevention bag	2	Material: Electrification prevention polyethylene 680mm(length)×500mm(depth)×50μm(thin)

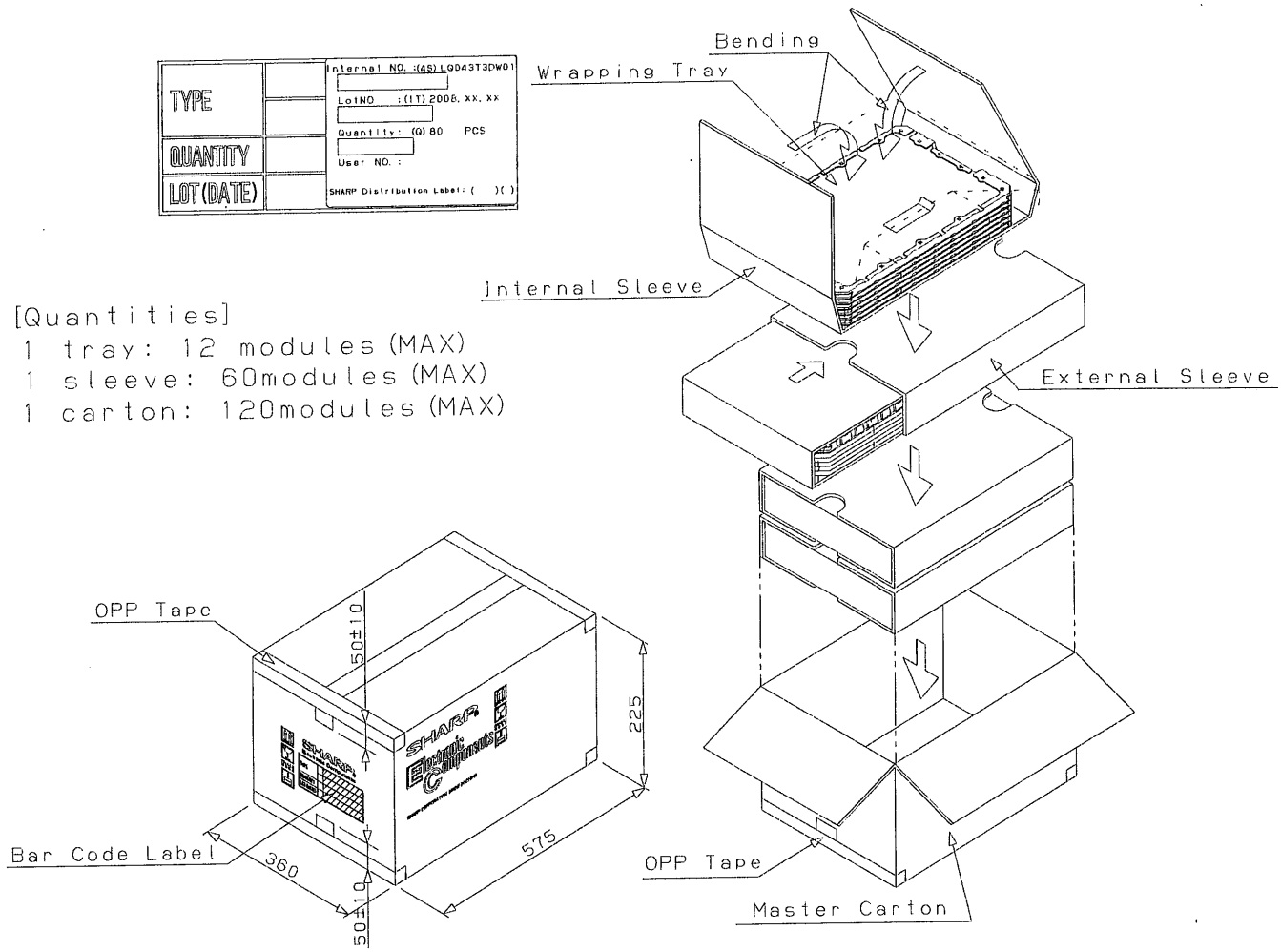
Carton weight (80 modules): Approx. T.B.D kg

16. Lot No. marking

The lot No. will be indicated on individual labels. The location is as shown

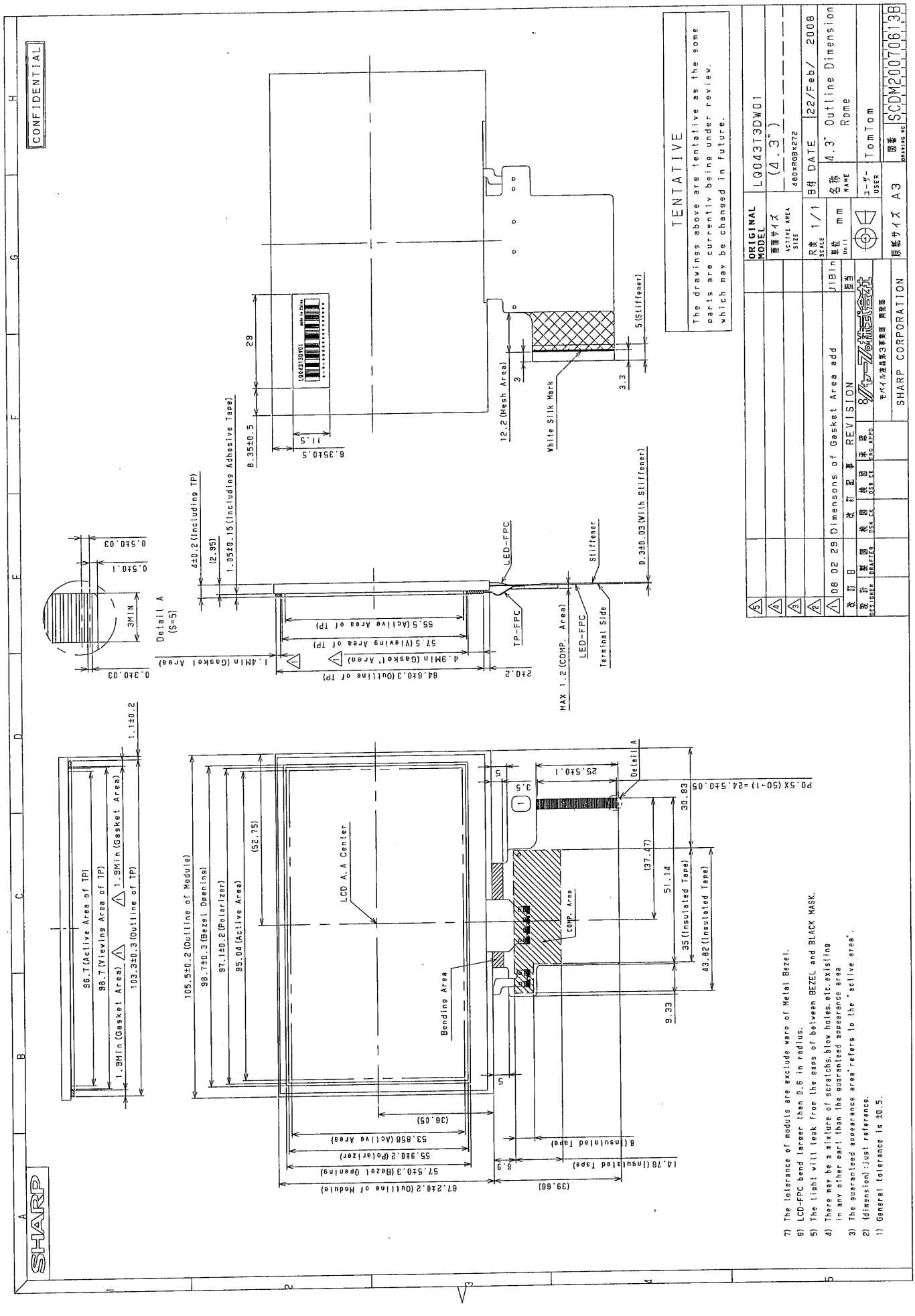


17. LCD module packing carton



18.. Others

1) Disassembling the module can cause permanent damage and you should be strictly avoided.
2) Please be careful that you don't keep the screen displayed fixed pattern image for a long time, since retention may occur.
3) If you pressed down a liquid crystal display screen with your finger and so on, the alignment disorder of liquid crystal will occur. And then It will become display fault.
   Therefore, be careful not to touch the screen directly, and to consider not stressing to it.
4) If any problem arises regarding the items mentioned in this specification sheet or otherwise, it should be discussed and settled mutually in a good faith for remedy and/or improvement.



7) The tolerance of module are exclude warp of Metal Bezel.
6) LCD-FPC bend larger than 0.6 in radius.
5) The light will leak from the gaps of between BEZEL and BLACK MASK.
4) There may be a mixture of scratchs, blow holes, etc. existing in any other part than the guaranteed appearance area.
3) The guaranteed appearance area refers to the "active area".
2) (dimension) : Just reference.
1) General tolerance is ±0.5.