LQ121S1LG42 LCD Module

Product Specification
July 2008

800 × 600 SVGA LCD Module featuring
370 nits brightness with 450:1 contrast.
Full Specifications Listing.

SHARP

DEVICE SPECIFICATION FOR

TFT-LCD Module

MODEL No.

LQ121S1LG42

These parts have corresponded with the RoHS directive.

☐ CUSTOMER'S APPROVAL

DATE _____

BY _____

PRESENTED

BY _~K. Shiono~_ _____

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SHARP CORPORATION

'08. 7. 31

RECORDS OF REVISION

LQ121S1LG42

SPEC No.	DATE	REVISED		SUMMARY	NOTE
		No.	PAGE		
LD-20712A	July. 28. 2008	-	-	-	1 st Issue

1. Application

   This specification applies to color TFT-LCD module, LQ121S1LG42

The device listed in these specification sheets was designed and manufactured for use in general electronic equipment.

In case of using the device for applications such as control and safety equipment for transportation (aircraft, trains, automobiles, etc.), rescue and security equipment and various safety related equipment which require higher reliability and safety, take into consideration that appropriate measures such as fail-safe functions and redundant system design should be taken.

Do not use the device for equipment that requires an extreme level of reliability, such as aerospace applications, telecommunication equipment (trunk lines), nuclear power control equipment and medical or other equipment for life support.

SHARP assumes no responsibility for any damage resulting from the use of the device which does not comply with the instructions and the precautions specified in these specification sheets.

Confirm "12. Handling Precautions " item when you use the device.

Contact and consult with a SHARP sales representative for any questions about this device.

2. Overview

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 ICs, control circuit and power supply circuit and a backlight unit. Graphics and texts can be displayed on a 800 × × 600 dots panel with 262,144 colors by using LVDS (Low Voltage Differential Signaling) system for interface and supplying +3.3V +5.0V DC supply voltage for TFT-LCD panel driving and supply voltage for backlight.
Backlight-driving DC/AC inverter is not built in this module.
Viewing angle is 6 o'clock direction.

3. Outline Specifications

Parameter	Specifications	Unit
Display size	31 (12.1") Diagonal	cm
Active area	246.0 (H) X 184.5 (V)	mm
Pixel format	800 (H) X 600 (V)	pixel
	(1 pixel=R+G+B dots)	
Number of colors (Number of gray scale level)	262, 144 colors (64 gray scales per color)	
Pixel pitch	0.3075 (H) X 0.3075 (V)	mm
Pixel configuration	R,G,B vertical stripe	
Display mode	Normally white	
Unit outline dimensions *1	276.0(W)×209.0(H)×Max.11.0 (D) *Outline dimensions is shown in Fig.1	mm
Mass	MAX. 660	g
Surface treatment	Anti-glare and hard-coating 3H	

[Note] excluding backlight cables.

4. Input Terminals

4-1. TFT-LCD panel driving

CN1 (LVDS signals , +3.3V / +5.0V DC power supply and Contorol signal)

Corresponding connector:FI-SE20M (JAE) or FI-S20S (JAE)

Pin No.	Symbol	Function	Remark
1	V_{CC}	+3.3V / +5.0V power supply	
2	V_{CC}	+3.3V / +5.0V power supply	
3	GND		
4	GND		
5	RXIN0-	Differential data input, CH0 (negative)	LVDS signal
6	RXIN0+	Differential data input, CH0 (positive)	LVDS signal
7	GND		
8	RXIN1-	Differential data input, CH1 (negative)	LVDS signal
9	RXIN1+	Differential data input, CH1 (positive)	LVDS signal
10	GND		
11	RXIN2-	Differential data input, CH2 (negative)	LVDS signal
12	RXIN2+	Differential data input, CH2 (positive)	LVDS signal
13	GND		
14	RXCLK IN-	Differential clock input (negative)	LVDS signal
15	RXCLK IN+	Differential clock input (positive)	LVDS signal
16	GND		
17	R/L	Horizontal display mode select signal	[Note1]
18	U/D	Vertical display mode select signal	[Note2]
19	GND		
20	GND		

[Note]   To obtain the proper relation between LVDS signals and actual digital data signals, the digital signals should be inputted into the transmitter as described in the nextsection, 4-2. The shielding case is connected with signal GND.

[Note 1],[Note 2]

R/L = High, U/D = Low   R/L = Low, U/D = Low

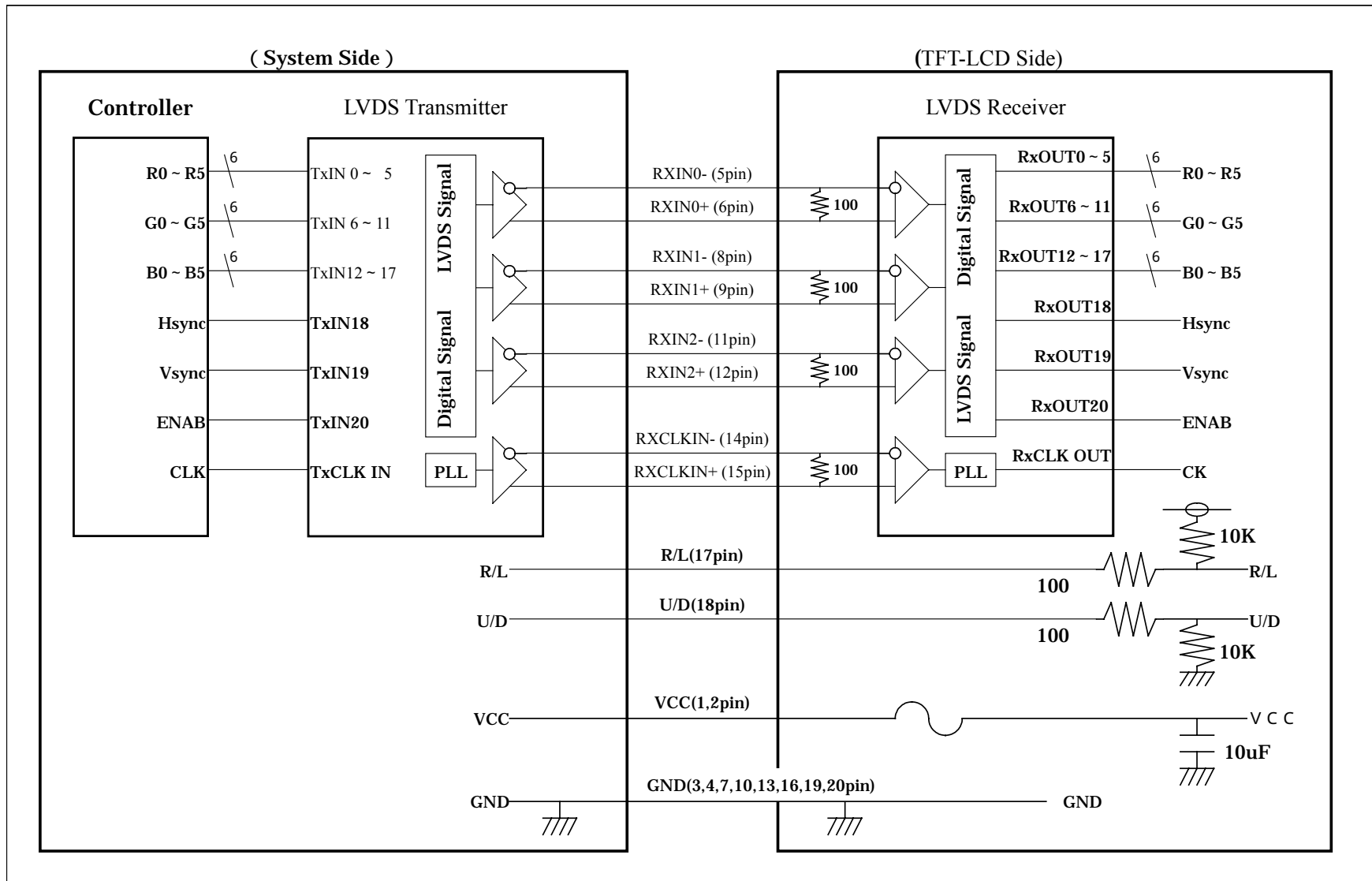R/L = High, U/D = High   R/L = Low, U/D = High
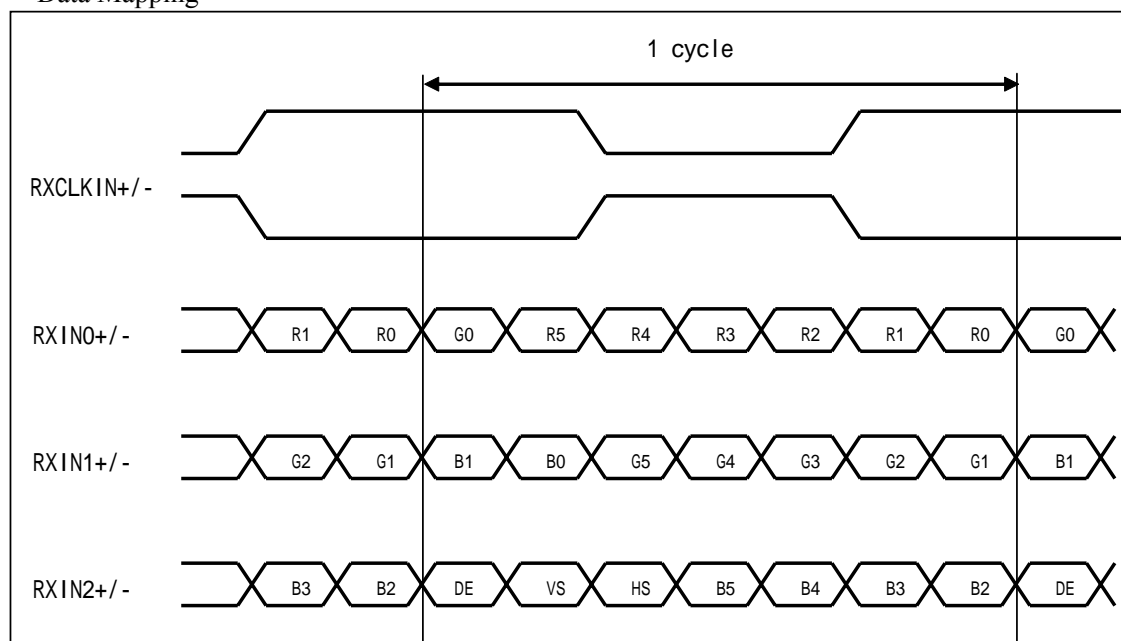
4-2 LVDS Interface block diagram

Using receiver Single LVDS interface, which equals THC63LVDF64A(THine),contained in a control IC

Corresponding Transmitter DS90C363, DS90C363A, DS90C383, DS90C383A(National semiconductor),

THC63LVDF63A,THC63LVDM63A(THine), SN75LVDS84(Ti)

System Side | **(TFT-LCD Side)**

Controller | LVDS Transmitter | LVDS Receiver

R0 R5 — TxIN 0   5
G0 G5 — TxIN 6   11
B0 B5 — TxIN12   17
Hsync — TxIN18
Vsync — TxIN19
ENAB — TxIN20
CLK — TxCLK IN — PLL

LVDS Signal / Digital Signal

RXIN0- (5pin)
RXIN0+ (6pin) 100
RXIN1- (8pin)
RXIN1+ (9pin) 100
RXIN2- (11pin)
RXIN2+ (12pin) 100
RXCLKIN- (14pin)
RXCLKIN+ (15pin) 100

Digital Signal / LVDS Signal — PLL

RxOUT0   5 — R0 R5
RxOUT6   11 — G0 G5
RxOUT12   17 — B0 B5
RxOUT18 — Hsync
RxOUT19 — Vsync
RxOUT20 — ENAB
RxCLK OUT — CK

R/L — **R/L(17pin)** — 100 — 10K — R/L
U/D — **U/D(18pin)** — 100 — U/D — 10K

VCC — **VCC(1,2pin)** — 10uF

GND — **GND(3,4,7,10,13,16,19,20pin)** — GND

Data Mapping

4-3. Backlight driving
CN2 ,CN3

Used connector : BHR-03VS-1(JST)
Corresponding connector :SM02(8.0)B-BHS(JST)

Pin no.	symbol	function	Color of FL cable	
			CN2	CN3
1	VHIGH	Power supply for lamp (High voltage side)	Pink	Blue
2	NC	This is electrically opened.		
3	VLOW	Power supply for lamp (Low voltage side)	White	Brown

5. Absolute Maximum Ratings

Parameter	Symbol	Condition	Pin name	Ratings	Unit	Remark
+3.3V / +5.0V supply voltage	Vcc	Ta=25 °C	Vcc	0 to + 6.0	V	
Input voltage	VI1	Ta=25°C	RXINi-/+(i= 0,1,2)	-0.3 to Vcc+0.3	V	VCC<3.0V
			RXCLK IN-/+	-0.3 to 3.3V	V	3.0V≦VCC
	VI2	Ta=25°C	R/L , U/D	-0.3 to Vcc+0.3	V	
Storage temperature	Tstg	-	-	-30 to +70	°C	[Note1]
Operating temperature	Topa	Ambient	-	-10 to +65	°C	[Note2]

[Note1] Humidity: 95%RH Max. at Ta=<40°C.
　　　　　　Maximum wet-bulb temperature at 39°C or less at Ta>40 °C.
　　　　　　No condensation.
[Note2] There is a possibility of causing deterioration in the irregularity and others of the screen and
　　　　the display fineness when preserving or using it from 60 to 70

6.Recommended operation condition

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply voltage		3.0	+3.3/+5.0	5.5		[Note1]
LVDS Signals	L	0		2.4		[Note2]
Input voltage		0		Vcc		[Note3]
Ambient temperature		-10		+65		[Note4]

[Note1]On-off conditions for supply voltage

  0<t1 15ms
  0<t2 10ms
  0<t3 100ms
  0<t4 1s
200ms<t5
Vcc-dip conditions
 1) 2.5V Vcc<3.0V
    td 10ms
 2) Vcc<2.5V
    Vcc-dip conditions should also follow the On-off
    conditions for supply voltage
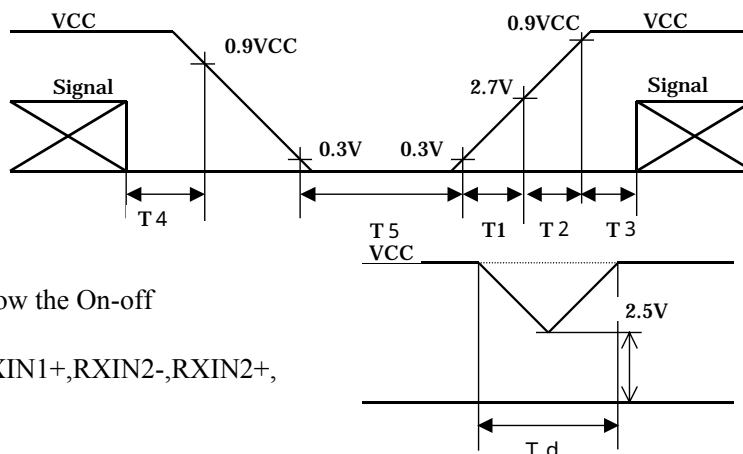[Note2]   RXIN0-, RXIN0+,RXIN1-,RXIN1+,RXIN2-,RXIN2+,
        RXCLK IN-,RXCLK IN+
[Note3] R/L, U/D
[Note4] Humidity: 95%RH Max. at Ta=<40°C.
        Maximum wet-bulb temperature at 39°C or less at Ta>40 °C.
        No condensation.

7. Electrical Characteristics

7-1.TFT-LCD panel driving   Ta=25 °C

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Current dissipation	Vcc=+3.3V	Icc	-	380	480	mA	[Note1]
	Vcc=+5.0V	Icc	-	230	280	mA	
Permissive input ripple voltage		VRP	-	-	100	mVp-p	
Input voltage range	LVDS signal	VL	0	-	2.4	V	[Note2]
Differential input threshold voltage	High	VTH	-	-	VCM+100	mV	V_{CM}=1.2V
	Low	VTL	VCM–100	-	-	mV	[Note3]
Input impedance (Differential input)		RT	-	100	-		[Note2]
Input voltage	Low	VIL	-	-	0.8	V	[Note4]
	High	VIH	2.1	-	-		[Note5]
Input current1	Low(VI=0V)	IOL1	-800	-	-		[Note4]
	High(VI=Vcc)	IOH1	-10.0	-	10.0		
Input current2	Low(VI=0V)	IOL2	-10.0	-	10.0	uA	[Note5]
	High(VI=Vcc)	IOH2	-	-	800	uA	

[Note1] Typical current situation : 16-gray-bar pattern.
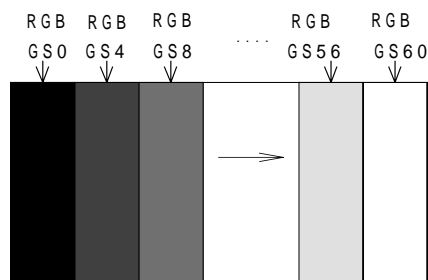   Vcc=+3.3V / +5.0V
[Note2] LVDS signals
[Note3] V_{CM} : Common mode voltage of LVDS driver.
[Note4] R/L
[Note5] U/D

7-2. Backlight driving

The backlight system is an edge-lighting type with 2 CCFT (Cold Cathode Fluorescent Tube).
The characteristics of single lamp are shown in the following table.

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark	
Lamp current range	IL	3.0	6.0	6.5	mArms	[Note1]	
Lamp power consumption	PL	-	3.5	-	W	[Note2]	
Lamp frequency	FL	40	60	80	kHz	[Note3]	
Kick-off voltage	Vs	-	-	1200	Vrms	Ta=25 °C	[Note4]
		-	-	1400		Ta=0 °C	
		-	-	1500		Ta=-10 °C	

[Note1] Lamp current is measured with current meter for high frequency as shown below.

* 3pin is V_{LOW}
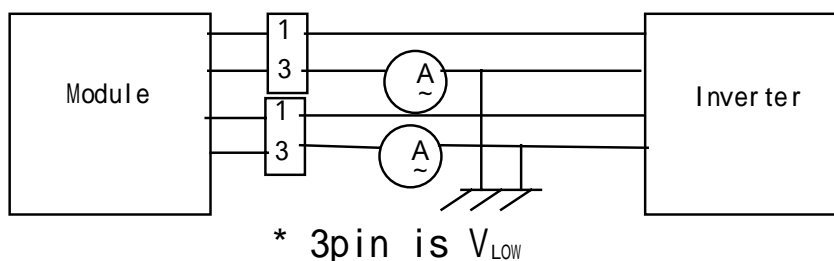
[Note2] At the condition of IL=6.0mArms
The data don't include loss at inverter. (IL=6.0mArms)

[Note3] Lamp frequency may produce interference with horizontal synchronous frequency, and this may cause beat on the display. Therefore lamp frequency shall be detached as much as possible from the horizontal synchronous frequency and from the harmonics of horizontal synchronous to avoid interference.

[Note4] The voltage above this value should be applied to the lamp for more than 1 second to startup. Otherwise the lamp may not be turned on.

[Note5] Lamp is consumables. In the following condition, the life time is 50,000 hour as the reference value and it is not guaranteed in this technical literature sheet by SHARP.
Above value is applicable when lamp is placed horizontally.
Lamp life time is defined that it applied either   or   under this condition
(Continuous turning on at Ta=25 °C, IL=6.0mArms)
Brightness becomes 50% of the original value under standard condition.
Kick-off voltage at Ta=-10 °C exceeds maximum value,1500Vrms.
(Lamp life time may vary if lamp is in portrait position due to the change of mercury density inside the lamp.) Lamp life time shortens according to the state of mounting and use.
In case of operating under lower temp environment, the lamp exhaustion is accelerated and the brightness becomes lower. (Continuous operating under for around 1 month under lower temp condition may reduce the brightness to half of the original brightness.)
In case of such usage under lower temp environment, periodical lamp exchange is recommended.

[Note6] The performance of the backlight, for example life time or brightness, is much influenced by the characteristics of the DC-AC inverter for the lamp. When you design or order the inverter, please make sure that a poor lighting caused by the mismatch of the backlight and the inverter (miss-lighting, flicker, etc.) never occur. When you confirm it, the module should be operated in the same condition as it is installed in your instrument.
Be sure to use a back light power supply with the safety protection circuit such as the detection circuit for the excess voltage, excess current and or electric discharge waveform.
Be sure to use the detect circuit by which one side of the CCFT lamps can be controlled independently. Otherwise, when one side of the CCFT is open, the excess current may possibly be applied to the other side of the lamp.
Recommended inverter is "CXA-P1212B-WJL(TDK corporation)".

[Note7] It is required to have the inverter designed so that to allow the impedance deviation of the two CCFT lamps and the capacity deviation of barast capacitor.

[Note8] Under the environment of 10 lx or less, lamp may not turn on or it may take some time to turn on.

8. Timing characteristics of input signals

8-1. Timing characteristics

(These are specified at the digital inputs/outputs of LVDS transmitter/receiver.)
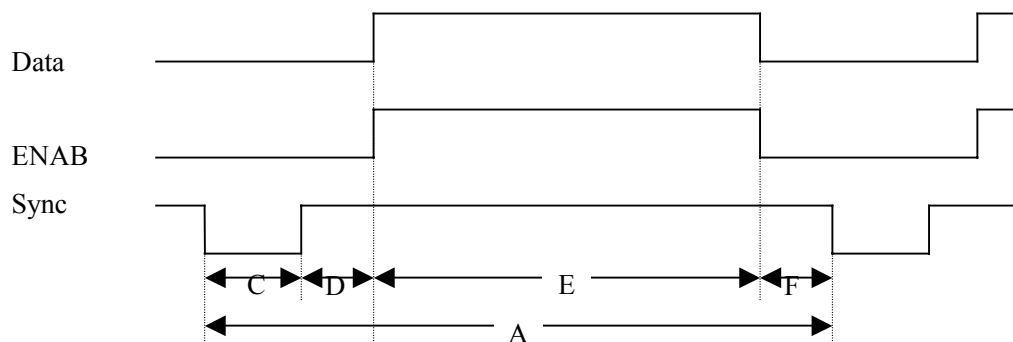
(Vertical timing)

Item(symbol)	Min.	Typ.	Max.	Unit	
Vsync cycle (T_{VA})	-	17.6	-	ms	Negative
	628	666	798	line	
Vsync pulse width (T_{VC})	2	4	6	line	
Back porch (T_{VD})	23	23	23	line	
Vsync pulse width+Back porch (T_{VC}+T_{VD})	25	27	29	line	
Active display area (T_{VE})	600	600	600	line	
Front porch (T_{VF})	3	39	-	line	

(Horizontal timing)

Item(symbol)	Min.	Typ.	Max.	Unit	Remark
Hsync cycle (T_{HA})	20.8	26.4	39.9	us	Negative
	832	1056	1395	clock	
Hsync pulse width (T_{HC})	2	128	200	clock	
Back porch (T_{HD})	O	-	-	clock	When ENAB signal is input.
	88	88	88	clock	When ENAB signal is fixed to low level.
Active display area (T_{HE})	800	800	800	clock	
Front porch (T_{HF})	0	40	-	clock	

(Clock signal)

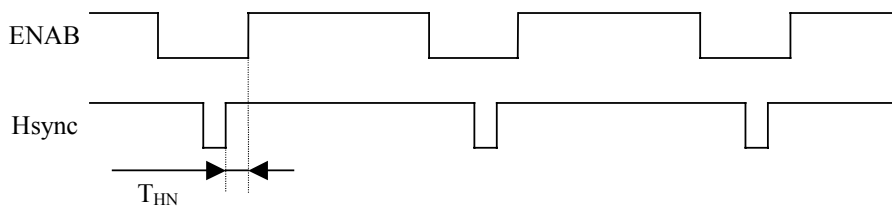| Item	Min.	Typ.	Max.	Unit	Remark
Frequency	35	40	42	MHz	[Note1]

[Note1] In case of lower frequency, the deterioration of display quality, flicker etc., may be occurred.

(Hsync-Vsync Phase difference)
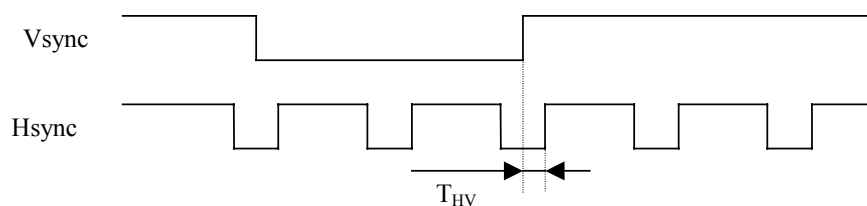
Item(symbol)	Min.	Typ.	Max.	Unit	Remark
Hsync-Vsync Phase difference (T_{HV})	1	-	T_{HA}-T_{HC}	clock	

(Hsync-ENAB Phase difference)

Item	Min.	Typ.	Max.	Unit	Remark
Hsync-ENAB Phase difference (T_{HN})	0	-	T_{HA}-T_{HC} -800	clock	

8-2   Display position

Item	Standards	Beginning	Ending	Unit	Remark
Horizontal	rising edge of ENAB	0	800	clock	
	rising edge of Hsync	88	888	clock	[Note1]
Vertical	rising edge of Vsync	23	623	line	

[Note1]   In case that ENAB signal is fixed to low level. Do not keep ENAB signal high during operation.

8-3. Input Data Signals and Display Position on the screen

Display position of input data

(H , V
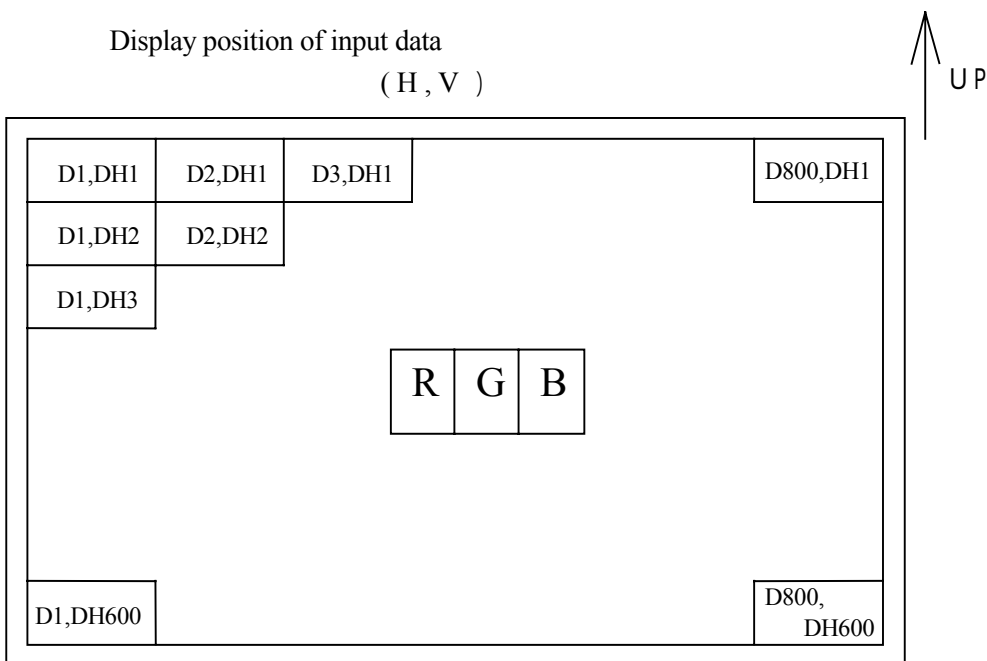
9. Input Signals, Basic Display Colors and Gray Scale of Each Color

Colors & Gray scale		Gray Scale	R0	R1	R2	R3	R4	R5	G0	G1	G2	G3	G4	G5	B0	B1	B2	B3	B4	B5
Basic Color	Black	-	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	1	1	1	1	1	1
	Green	-	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Cyan	-	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Red	-	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	-	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	-	1	1	1	1	1	1	1	1	1	1	1	1	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
Gray Scale of Red	Black	GS0	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
	Darker	GS2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	↓			↓						↓						↓			
	⇩	↓			↓						↓						↓			
	Brighter	GS61	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	⇩	GS62	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red	GS63	1	1	1	1	1	1	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
	⇧	GS1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	⇧	↓			↓						↓						↓			
	⇩	↓			↓						↓						↓			
	Brighter	GS61	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0
	⇩	GS62	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0
	Green	GS63	0	0	0	0	0	0	1	1	1	1	1	1	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
	⇧	GS1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	⇧	↓			↓						↓						↓			
	⇩	↓			↓						↓						↓			
	Brighter	GS61	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
	⇩	GS62	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
	Blue	GS63	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

0 : Low level voltage, 1 : High level voltage

Each basic color can be displayed in 64 gray scales from 6 bit data signals. According to the combination of total 18 bit data signals, the 262,144-color display can be achieved on the screen.

10. Optical Characteristics

Ta=25°C, Vcc=+3.3V / +5.0V

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle range	Horizontal	21, 22	CR>10	60	70	-	Deg.	[Note1]
	Vertical	11		40	50	-	Deg.	[Note4]
		12		50	60	-	Deg.	
Contrast ratio		CRn	=0°	150	-	-	-	[Note2]
		CRo	Optimum viewing angle	-	450	-	-	[Note4]
Response time	Rise	r	=0°	-	15	-	ms	[Note3]
	Decay	d		-	30	-	ms	[Note4]
Chromaticity of white	x			0.263	0.313	0.363	-	[Note4]
	y			0.279	0.329	0.379	-	
Chromaticity of red	x			0.546	0.596	0.646	-	
	y			0.279	0.329	0.379	-	
Chromaticity of green	x			0.260	0.310	0.360	-	
	y			0.502	0.552	0.602	-	
Chromaticity of blue	x			0.098	0.148	0.198	-	
	y			0.075	0.125	0.175	-	
Luminance of white		Y_{L1}		300	370	-	cd/m²	IL=6.0mArms fL=60kHz
White Uniformity		δW		-	-	1.25	-	[Note5]
Viewing angle range within defined brightness		21, 22	50% of the maximum brightness	-	35	-	Deg.	[Note1]
		11		-	25	-	Deg.	
		12		-	30	-	Deg.	

[Note]
 The measurement shall be executed 30 minutes after lighting at rating.
 The optical characteristics shall be measured in a dark room or equivalent state with the method shown in Fig.3 below.

Photodetector
Viewing angle/Response time : BM-5A (TOPCON)
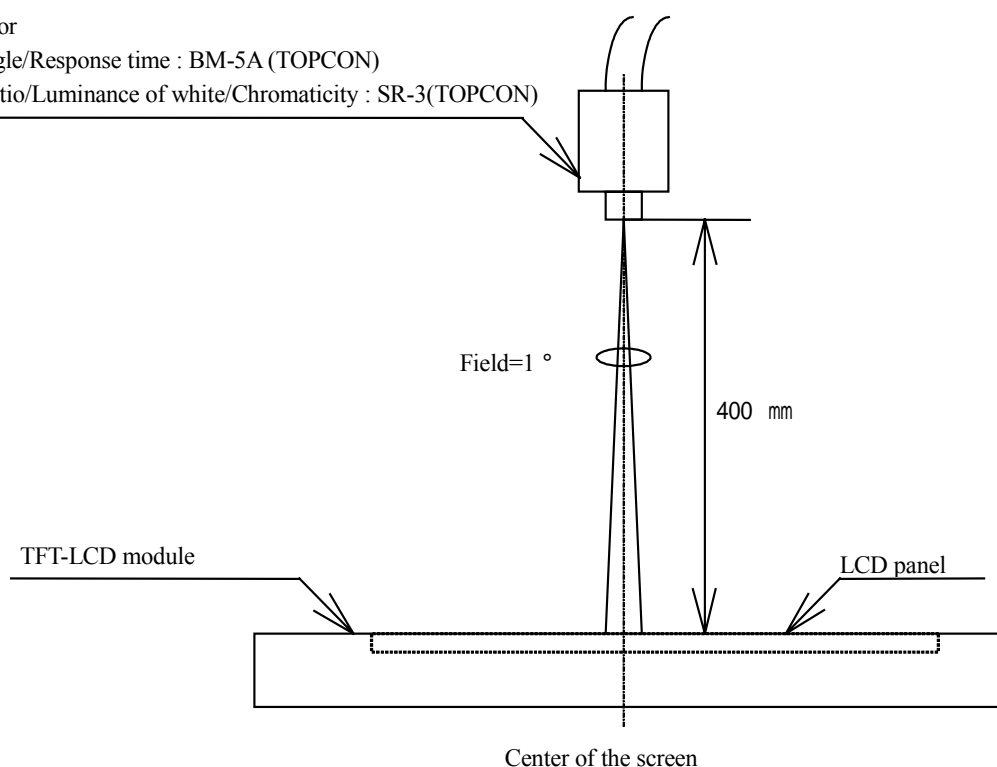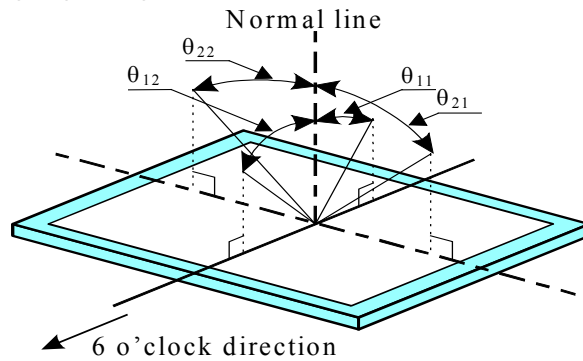Contrast ratio/Luminance of white/Chromaticity : SR-3(TOPCON)

Field=1°

400 mm

TFT-LCD module

LCD panel

Center of the screen

Fig.3 Optical characteristics measurement method

[Note1]Definitions of viewing angle range:

Normal line

θ_{22}
θ_{12}
θ_{11}
θ_{21}

6 o'clock direction

[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" .

white   black   white

Photodetector output (relative Value)

100%
90%

10%
0%

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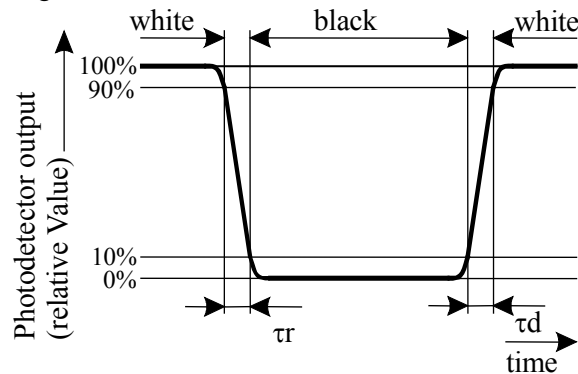
[Note4]This shall be measured at center of the screen.

[Note5]Definition of white uniformity:

White uniformity is defined as the following with five measurements (A~E).

200   400   600 pixel

A   D   150

C   300

B   E   450
pixel
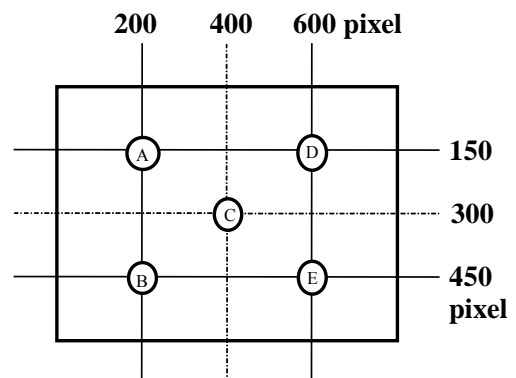
$$w \quad \frac{\text{Maximum Luminance of five points (brightness)}}{\text{Minimum Luminance of five points (brightness)}}$$

11. Display Quality

The display quality of the color TFT-LCD module shall be in compliance with the Incoming Inspection Standard.

12.Handling Precautions
  a) Be sure to turn off the power supply when inserting or disconnecting the cable.
  b) Be sure to design the cabinet so that the module can be installed without any extra stress such as
     warp or twist.
  c) Since the front polarizer is easily damaged, pay attention not to scratch it.
     Blow away dust on the polarizer with antistatic $_2$ blow. It is undesirable to wipe off because a polarizer is
     sensitive. It is recommended to peel off softly using the adhesive tape when soil or finger oil is stuck to
     the polarizer. When unavoidable, wipe off carefully with a cloth for wiping lenses.
  d) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
  e) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
  f) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface.
     Handle with care.
  g) Since CMOS LSI is used in this module, take care of static electricity and injure the human earth
     when handling.Observe all other precautionary requirements in handling components.
  h) Since there is a circuit board in the module back, stress is not added at the time of a design assembly.
     Please make it like. If stress is added, there is a possibility that circuit parts may be damaged.
  i) Protection film is attached to the module surface to prevent it from being scratched .
     Peel the film off slowly , just before the use, with strict attention to electrostatic charges.
     Blow off 'dust' on the polarizer by using an ionized nitrogen.
  j) The polarizer surface on the panel is treated with Anti-Glare for low reflection. In case of attaching
     protective board over the LCD, be careful about the optical interface fringe etc. which degrades display
     quality.
  k) Do not expose the LCD panel to direct sunlight. Lightproof shade etc. should be attached when LCD
     panel is used under such environment.
  l) Connect GND to 4 place of mounting holes to stabilize against EMI and external noise.
  m) There are high voltage portions on the backlight and very dangerous. Careless touch may lead to
     electrical shock. When exchange lamps or service, turn off the power without fail.
  n) When handling LCD modules and assembling them into cabinets, please avoid that long-term storage in
     the environment of oxidization or deoxidization gas and the use of such materials as reagent,solvent,
     adhesive, resin, etc. which generate these gasses, may cause corrosion and discoloration of the LCD modules.
  o) Cold cathode fluorescent lamp in LCD panel contains a small amount of mercury, please follow local
     ordinances or regulations for disposal.
  p) Be careful of a back light lead not to pull by force at the time of the wiring to an inverter, or line processing.
  q) When install LCD modules in the cabinet, please tighten with "torque=0.294± 0.02N m(3.0± 0.2kgf cm)".
     Be sure to confirm it in the same condition as it is installed in your instrument.
  r) Liquid crystal contained in the panel may leak if the LCD is broken. Rinse it as soon as possible if itgets
     inside your eye or mouth by mistake.
  s) Notice : Never dismantle the module , because it will cause failure. Please don't remove the fixed tape,
     insulateing tape etc that was pasted on the original module. (except for protection film of the panel and
     the crepe tape(yellow tape) of fixing lamp cable temporarily.)
  t) Be careful when using it for long time with fixed pattern display as it may cause afterimage.
     (Please use a screen saver etc., in order to avoid an afterimage.)
  u) Adjusting volume have been set optimally before shipment, so do not change any adjusted value.
     If adjusted value is changed, the specification may not be satisfied.
  v) If a minute particle enters in the module and adheres to an optical material, it may cause display
     non-uniformity issue, etc. Therefore, fine-pitch filters have to be installed to cooling and inhalation hole
     if you intend to install a fan.
  w) The lamp used for this product is very sensitive to the temperature.
     Luminance decreases rapidly when it is used for a long time or repeatedly under the environment of the
     low temperature or the module is being cooled. Please avoid the continuous or repeating use of it under
     such an environment. It may decrease up to 50% of the initial luminance in about one month under the low
     temperature environment. Please consult our company when it is used under the environment like the
     above mentioned.

13. Packing form

Product country	JAPAN	CHINA
Piling number of cartons	MAX. 5	
Package quantity in one carton	10pcs	
Carton size	395(W)×275(H)×350(D) mm	
Total mass of one carton filled with full modules	8000g	
Packing form is shown	Fig.2	

14.Reliability test items

No.	Test item	Conditions	Remark
1	High temperature storage test	Ta=70 ℃ 240h	
2	Low temperature storage test	Ta= -30 ℃ 240h	
3	High temperature & high humidity operation test	Ta=40 ℃ ; 95%RH 240h (No condensation)	
4	High temperature operation test	Ta=65 ℃ 240h	
5	Low temperature operation test	Ta= -10 ℃ 240h	
6	Vibration test (non- operating)	Frequency: 10～57Hz/Vibration width (one side):0.076mm : 57～500Hz/Gravity:9.8m/s^2 Sweep time : 11 minutes Test period : 3 hours (1 hour for each direction of X,Y,Z)	
7	Shock test (non- operating)	Max. gravity : 490m/s^2 Pulse width : 11ms, half sine wave Direction : ± X,± Y,± Z once for each direction.	
8	ESD test	Contact discharge (150pF 330Ω) non-operating = ± 10kV, operating = ± 8kV Atmospheric discharge (150pF 330Ω) non-operating = ± 20kV, operating = ± 15kV	
9	EMI	Measurement in 10m site Display position on the screen = "H" (full-screen), GND to 4 place = un-connect, Vcc / Vsignal = typ.	VCCI (Class B)

[Result Evaluation Criteria]
Under the display quality test conditions with normal operation state, these shall be no change which may affect practical display function. (normal operation state Temperature:15～35℃, Humidity:45～75％, Atmospheric pressure:86～106kpa)
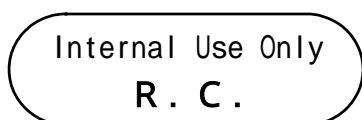
15.Others
1) Lot number Label:
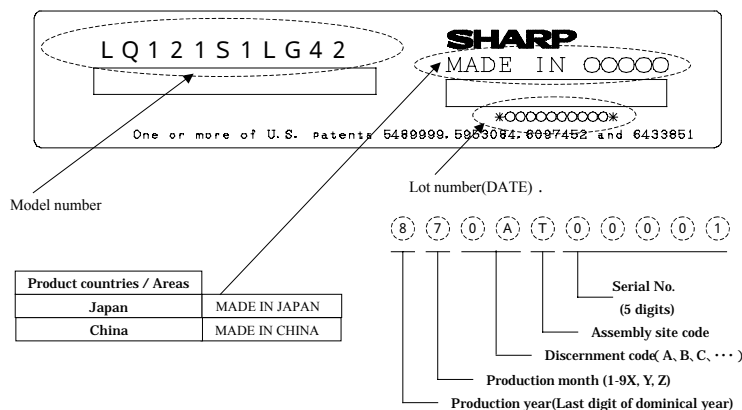
15-2 Packing box Label:

R.C.   RoHS Compliance   means these parts have corresponded with the RoHS directive.

15-3   If any problem occurs in relation to the description of this specification , it shall be resolved
through discussion with spirit of cooperation.

16. Storage conditions
<Environmental condition range of storage temperature and humidity>
Temperature   0 to 40 degrees Celsius
Relative humidity   95% and below
   Note   Please refer below as a mean value of the environmental conditions.
                  Summer time   temperature   20 to 35 degrees Celsius
                                         humidity   85% and below
                  Winter time   temperature   5 to 15 degrees Celsius
                                         humidity   85% and below
         Please maintain within 240 hours of accumulated length of storage time, with conditions of
         40 degrees Celsius and room humidity of 95%.
Direct sun light
      Please keep the product in a dark room or cover the product to protect from direct sun light.
Atmospheric condition
      Please refrain from keeping the product with possible corrosive gas or volatile flux.
Prevention of dew
        * Please store the product carton either on a wooden pallet or a stand / rack to prevent dew.
          Do not place directly on the floor. In addition, to obtain moderate ventilation in between the
                            pallet's
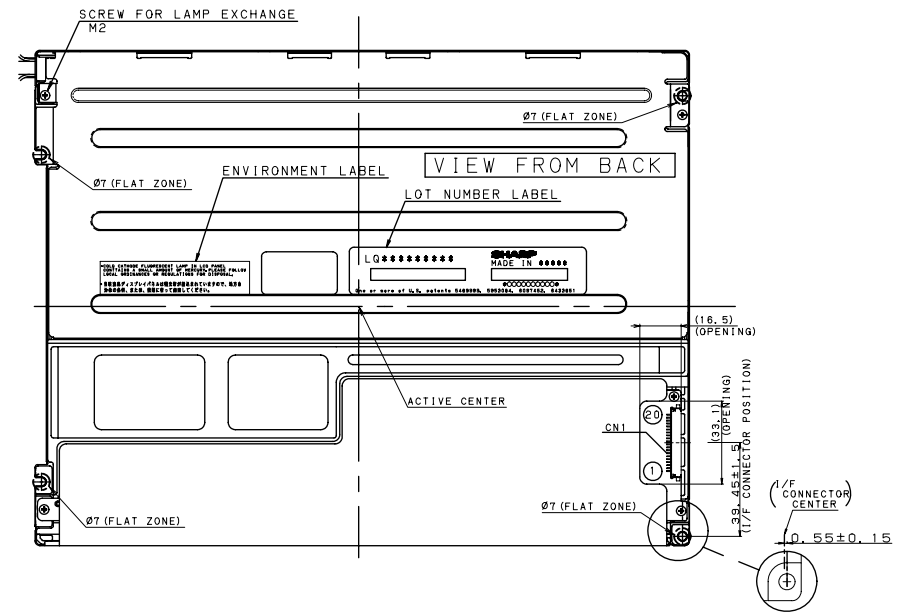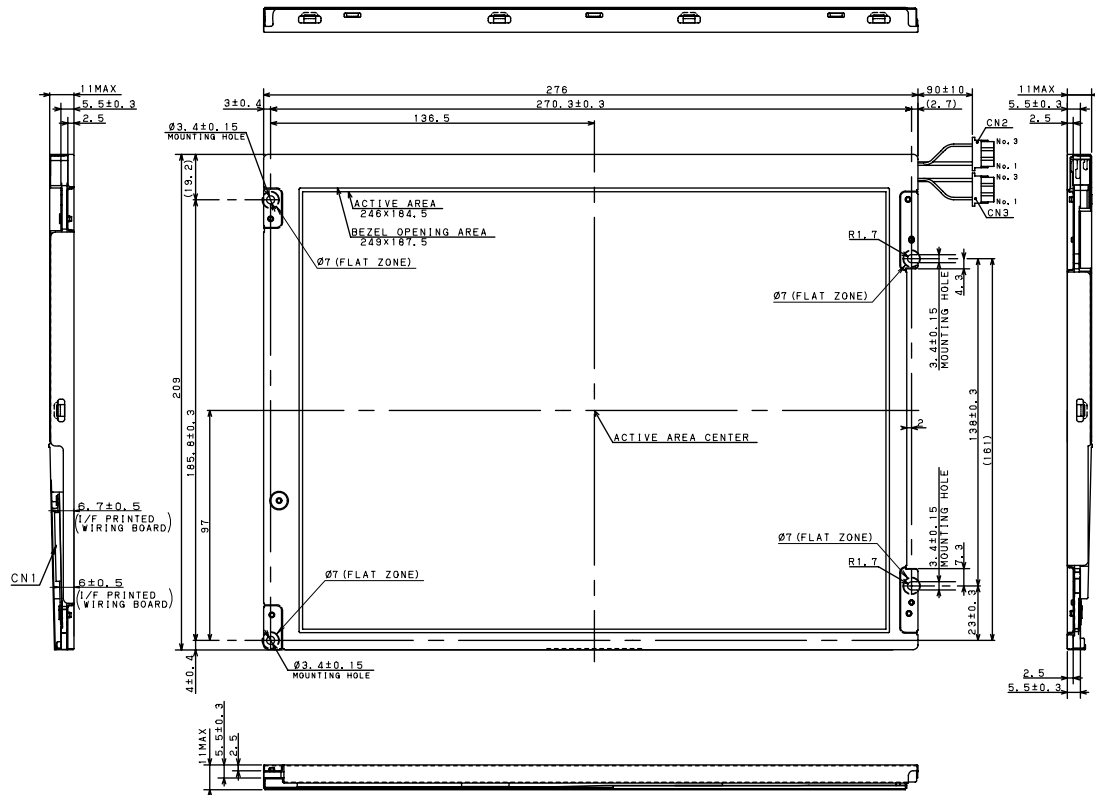   top and bottom surfaces, pile the cartons up in a single direction and in order.
        * Please place the product cartons away from the storage wall.
        * Please maintain the storage area with an appropriate ventilation. It is recommendable   to furnish
           the storage area with equipments such as ventilation systems.
        * Please maintain the ambient temperature within the range of natural environmental fluctuation.
 Storage period
      Within above mentioned conditions, maximum storage period should be one year.
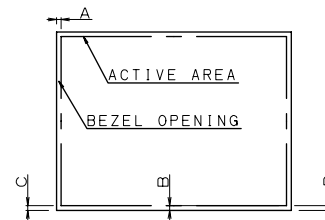
SCREW FOR LAMP EXCHANGE
M2

VIEW FROM BACK

ENVIRONMENT LABEL

LOT NUMBER LABEL

Ø7 (FLAT ZONE)

Ø7 (FLAT ZONE)

ACTIVE CENTER

CN1

Ø7 (FLAT ZONE)

Ø7 (FLAT ZONE)

(16.5) (OPENING)

(I/F CONNECTOR POSITION)

(I/F CONNECTOR CENTER)

0.55±0.15

Left dimension drawing

11MAX
5.5±0.3
2.5
3±0.4
276
270.3±0.3
136.5
90±10
(2.7)
CN2
No.3
No.3
No.1
No.1
CN3
11MAX
5.5±0.3
2.5

Ø3.4±0.15
MOUNTING HOLE

ACTIVE AREA
246X184.5

BEZEL OPENING AREA
249X187.5

Ø7 (FLAT ZONE)

R1.7

Ø7 (FLAT ZONE)

ACTIVE AREA CENTER

Ø7 (FLAT ZONE)

R1.7

Ø7 (FLAT ZONE)

Ø3.4±0.15
MOUNTING HOLE

(19.2)

209

185.8±0.3

97

6.7±0.5
(I/F PRINTED WIRING BOARD)

6±0.5
(I/F PRINTED WIRING BOARD)

CN1

3.4±0.15
MOUNTING HOLE
4.3

138±0.3

(161)

3.4±0.15
MOUNTING HOLE
7.3

23±0.3

4±0.4

2.5
5.5±0.3

11MAX
5.5±0.3
2.5

2

(33.1)
(OPENING)

39.45±1.5
(OPENING)

BEZEL/DISPLAY POSITION

A

ACTIVE AREA

BEZEL OPENING

C

B

D

1) TOLERANCE X-DIRECTION A:1.5±0.8
2) TOLERANCE Y-DIRECTION B:1.5±0.8
3) OBLIQUITY OF DISPLAY AREA |C-D|<0.8

CCFT CONNECTOR

CN2,CN3:BHR-03VS-1(JST)
PIN LAYOUT

1	High
2	NC
3	GND

INTERFACE CONNECTOR
PIN LAYOUT

pin	1	2	3	4	5	6	7
	VCC	VCC	GND	GND	RXIN0-	RXIN0+	GND
8	9	10	11	12	13	14	15
RXIN1-	RXIN1+	GND	RXIN2-	RXIN2+	GND	RCLKIN-	RCLKIN+
16	17	18	19	20			
GND	R/L	U/D	GND	GND			

CORRESPONDING CONNECTOR:FI-SE20M, FI-S20S

NOTES
1. UNSPECIFIED TOLERANCE TO BE ±0.5
2. WARP AND FLATING FOR PCB AND CHASSIS ARE EXCLUDED FROM THICKNESS AND DIMENSION OF THE UNIT.
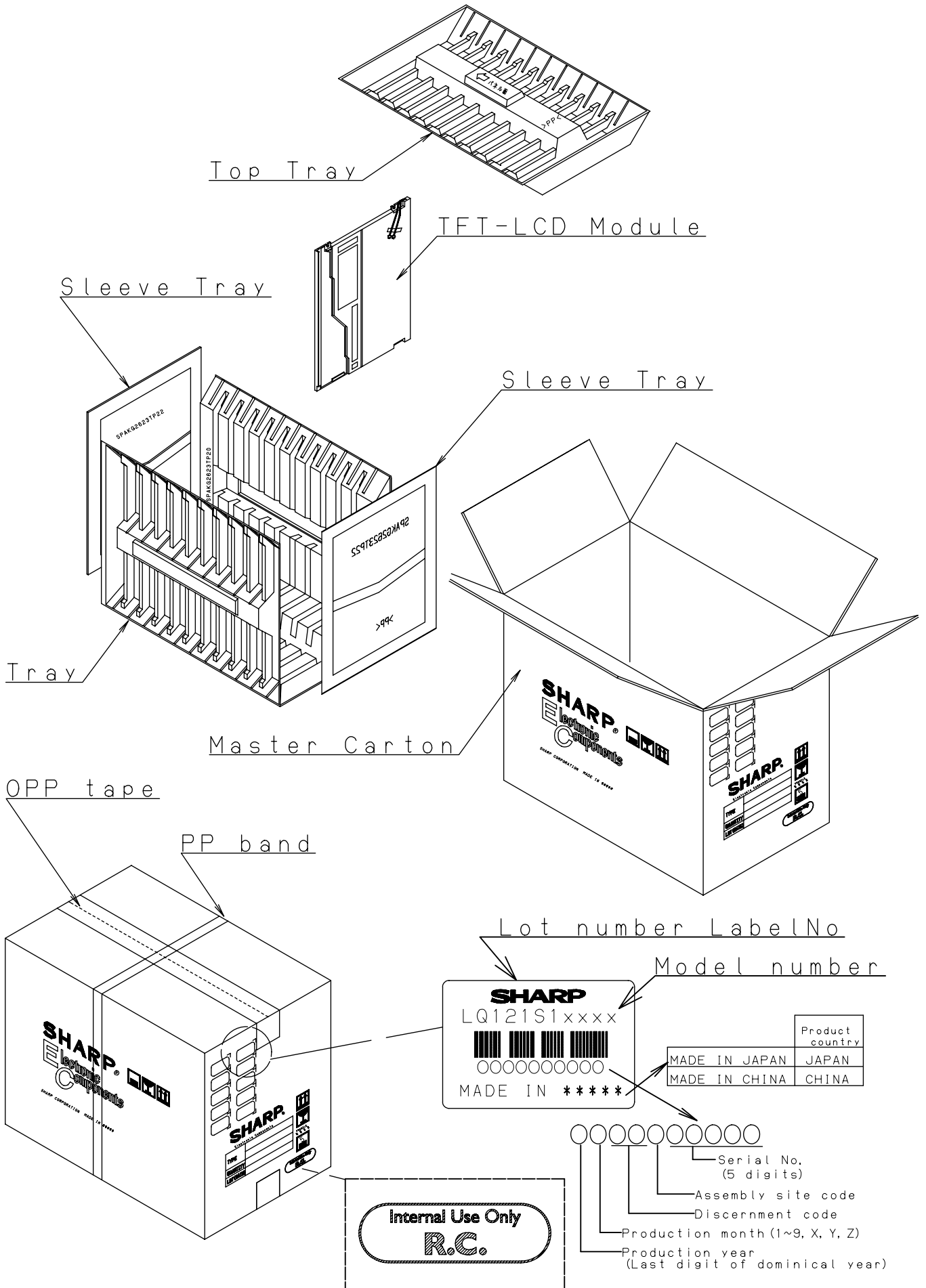
Fig1. OUTLINE DIMENSIONS
(LQ121S1LG42)

LD20712A-17

Top Tray

TFT-LCD Module

Sleeve Tray

Sleeve Tray

Tray

Master Carton

OPP tape

PP band

Lot number LabelNo

Model number

SHARP
LQ121S1xxxx

‖‖‖‖‖‖‖‖‖

○○○○○○○○○○

MADE IN *****.

	Product country
MADE IN JAPAN	JAPAN
MADE IN CHINA	CHINA

○○○○○○○○○

Serial No.
(5 digits)
Assembly site code
Discernment code
Production month(1~9, X, Y, Z)
Production year
(Last digit of dominical year)

Internal Use Only
R.C.

Fig2. Packing Form

LCD Group

SHARP®

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