DATA IMAGE CORPORATION

LCD Module Specification

ITEM NO.: SG243200CNCWA-T1

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2. RECORD OF REVISION

Rev	Date	Item	Page	Comment

3. GENERAL SPECIFICATION

Display Format :   240x3(R.G.B) (W) ×   320 (H)   dots

Dot Size :   0.067 (W) ×   0.211 (H)   mm

Dot Pitch :   0.076 (W) ×   0.23 (H)   mm

View Area :   57.8 (W) ×   76.58 (H)   mm

Outline Dimensions :   71.7 (W) ×   90.8 (H) × 7.4 (T) mm Max.

Weight :   g max.

LCD Type :   [V] STN Color [ ] STN Yellow [ ] FSTN [ ] TN

Polarizer mode :   [ ] Reflective   [ ] Transflective

                    [V] Transmissive [V] Negative

Display dots   [ ] Black   [ ]   [ ] Others

View Angle :   [V] 6 O'clock   [ ] 12 O'clock   [ ] Others

Backlight :   [ ] LED   [ ] EL   [V] CCFL

Backlight Color :   [ ] Yellow green [ ] Amber   [ ] Blue Green

                    [V] White   [ ] Others

Duty Ratio   1/323

Temperature Range : [V] Normal   [ ] Wide Temperature
                    Operating   0 to 50°C   Operating -20 to 70°C
                    Storage   -20 to 60°C   Storage   -30 to 80°C

4. ABSOLUTE MAXIMUM RATINGS

4.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

$V_{SS}= 0V, \ Ta = 25°C$

Item	Symbol	Min.	Max.	Unit
Supply Voltage (Logic)	$V_{DD}-V_{SS}$	0	7.0	V
Supply Voltage (LCD Driver)	$V_{EE}-V_{SS}$	0	42	V
Input Voltage	Vi	-0.3	$V_{DD}+0.3$	V
Input Current	Ii	0	1	A
Operating Temperature	T_{OP}	0	50	°C
Storage Temperature	T_{STG}	-20	60	°C

4.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

Item	Operating		Storage		Comment
	(Min.)	Max.)	(Min.)	(Max.)	
Ambient Temp	0	50	-20	60	Note(2),(3)
Humidity	Note (1)		Note(1)		Without Condensation
Vibration	--	--	--	--	Depends on housing design.
Shock	--	--	--	--	Depends on housing design.
Corrosive Gas	Not Acceptable		Not Acceptable		

Note(1) Ta $\leq$ 40°C : 85%RH Max.
  Ta $>$ 40°C : Absolute humidity must be lower than the humidity of 85%RH at
      40° C.
Note(2) Ta at -20°C for 48 hrs, at 60°C for 120 hrs.
Note(3) Background color changes slightly depending on ambient temperature.
   This phenomenon is reversible.
Note(4) When LCM will be operated less than 5° C. The life time of CFL will be reduced
    need to make sure of value of IL and characteristics of inverter, also the
    response time less than 5 ° C will be slower.

# 4.3 Electronic Static Discharge maximum rating

ESD test method : IEC1000-4-2

Item	Description	
Testing environment	Ambient temperature :15°C to 35 °C Humidity: 30% to 60 % LCM (E.U.T) : Power up	
Testing equipment	Manufacture: Noise Ken , Model No. ESD-100L	
Testing condition	See drawing 1	
Direct discharge	0 to ± 6 KV	Discharge point, see drawing 2
Indirect discharge	0 to ± 12KV	Discharge point, see drawing 1
Pass condition	No malfunction of unit. Temporary malfunction of unit which can be recovered by system reset	
Fail condition	Non. Recoverable malfunction of LCM or system	

FIG 1 ESD TESTING EQUIPMENT
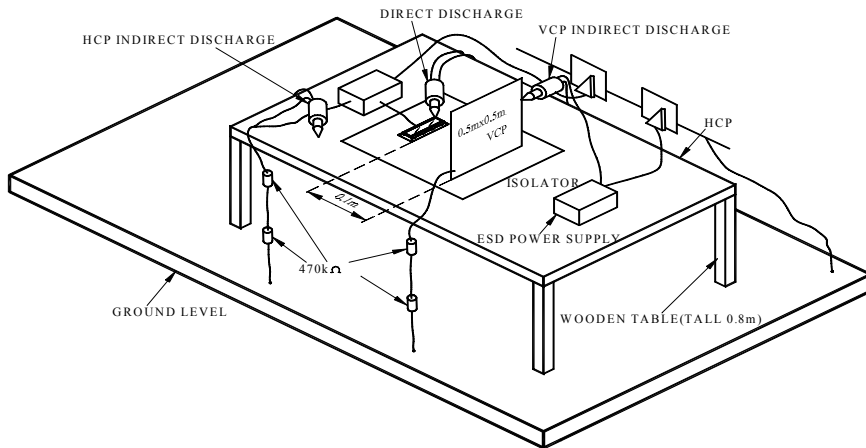
(1)

DIRECT CONTACT DISCHARGE
CONTACT POINT : A.B.C.D
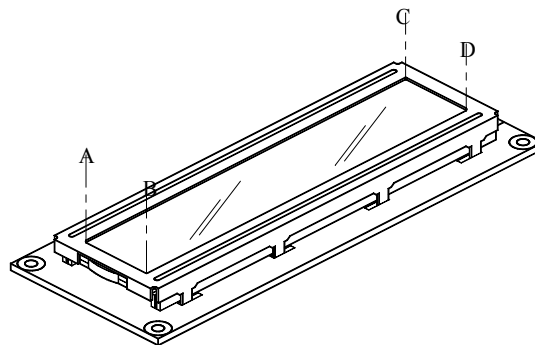
(2)

5. ELECTRICAL CHARACTERISTICS

Ta=25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage (Logic)	V_{DD}-V_{SS}		2.7	3.3	5.5	V
Contrast Adjustment Voltage (Note 1)	V_{EE}-V_{SS}	0°C	29.1	30.1	31.1	V
		25°C	27.5	28.5	29.5	
		40°C	26.8	27.8	28.8	
Input Voltage for Logic Circuits	V_{IH}		0.8V_{DD}	--	V_{DD}	V
	V_{IL}		0	--	0.2V_{DD}	
Power Supply Current(Note 2,3)	I_{DD}	V_{DD}-V_{SS}=3.3V	--	0.5	--	mA
	I_{EE}	V_{EE}-V_{SS}=28.5V	--	1.4	--	
Frame Frequency (Note 4)	fFLM	25°C	60	70	80	Hz

Note 1: fFLM =70Hz,Ta=25°C, Display pattern :Checker pattern.
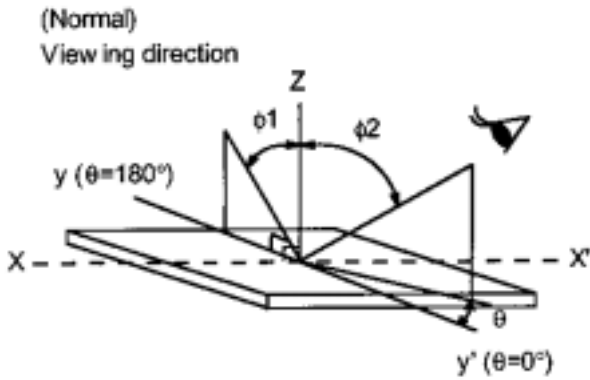Note 2: Rush Current of power ON:200mA(PK)x100µs.
Note 3: Need to make sure of flickering and rippling of display when setting the
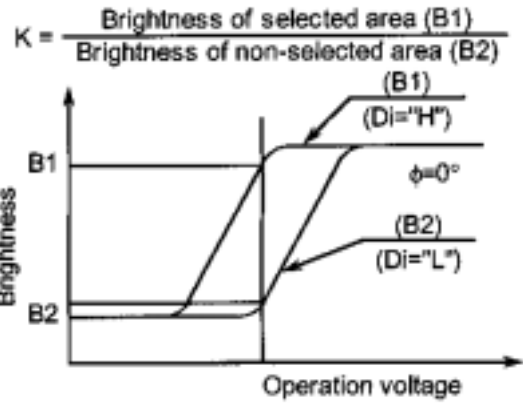   Frame frequency and msignal frequency in your set.

6. ELECTRO-OPTICAL CHARACTERISTICS

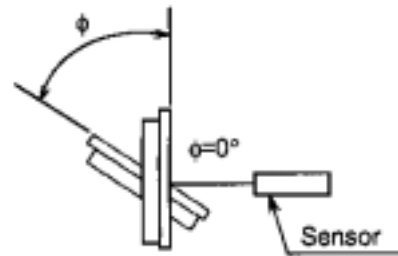| ITEM		Symbol	Condition	Min.	Typ.	Max.	Unit	Ref.
View Angle		$\varnothing2$-$\varnothing1$	θ = 0°, K≥2.0	--	40	--	deg	Note (1), Note (2)
Contrast ratio		K	θ = 0°, $\varnothing$=0°	30	45	--		Note(3), Note(5), Note(6)
Response time (rise + fall)		tr	θ = 0°, $\varnothing$=0°	--	250	--	ms	Note (4)
		tf		--	150	--	ms	
Color tone (Primary Color)	Red	X	θ = 0°, $\varnothing$=0°	0.48	0.53	0.58		Note(7)
		Y		0.26	0.31	0.36		
	Green	X		0.25	0.30	0.35		
		Y		0.50	0.55	0.60		
	Blue	X		0.11	0.16	0.21		
		Y		0.12	0.17	0.22		
	White	X		0.25	0.30	0.35		
		Y		0.30	0.35	0.40		

Note 1. Definition of θ and φ

(Normal)
Viewing direction

Note 2. Definition of viewing angle φ1 and φ2
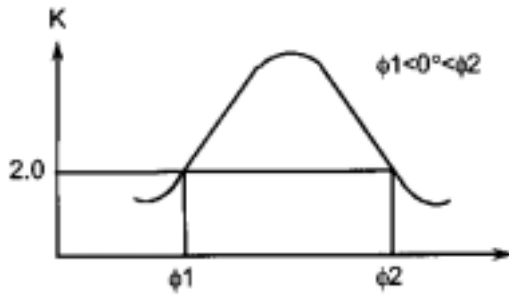
Contrast ratio K vs viewing angle φ

Note 3. Definition of contrast "k"

$$K = \frac{\text{Brightness of selected area (B1)}}{\text{Brightness of non-selected area (B2)}}$$

Sensor: BM–7
Aperture : 1°
Distance : 0.4m

Note4.Definition of optical response time
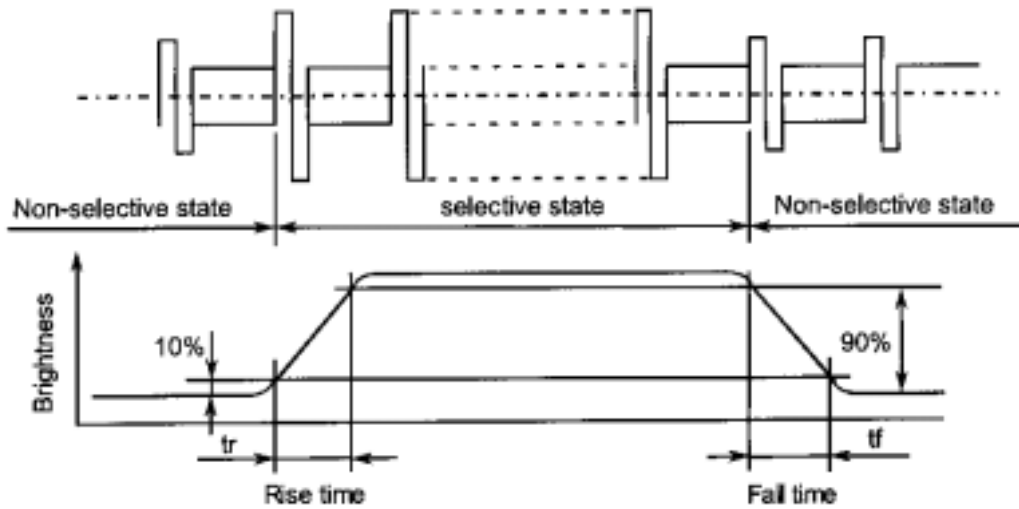
6.1 OPTICAL CHARACTERISTICS OF CCFL BACKIGHT

Ta=25°C

ITEM	Symbol	Min.	Typ.	Max.	Unit
Lamp Voltage	VL	250	280	310	Vrms
Frequency	fL	50	--	--	KHz
Lamp Current (1Lamp)(Note 7)	IL	0.5 (Note 9)	1.25	2.0	mA
Starting discharge Voltage	VS (Note 2)	595	--	--	Vrms

Note 1:Please design your lamp driving circuit (inverter) according to the above specifications.

Note 2:Starting discharge voltage is increased when LCM is operating at lower temperature.
Please check the characteristics of your inverter before applying to your set.
Note 3:Average life time of CFL will be decreased when LCM is operating at lower temperature.
Note 4:Under lower driving frequency of an inverter, a certain backlight system(CFL & CFL
reflection sheet) may generate a sound noise. Before designing the inverter, please
consider the driving frequency and the noise.
Note 5: When IL is over 3.0mA, it may cause uneven contrast near CFL location, due to heat
dispersion from CFL.
Note 6:Absolute maximum ratinge voltage of CFL cable for this module is as follows.
VCF side:2Kv
VSS side:300V
This inverter design shall not exceed the rated voltage.
Note 7: We suggest that the lamp current can not be lower than the standard of CAS
set, or it will cause low brightness.
Note 8:The brightness of the CFL in this LCM may deteriorate after the long-hour use under
ICFL=1.25mA. However, it will recover when the CFL is lighted at ICFL=2.0mA min.
5 minutes or more.
Note 9:Except at starting up.
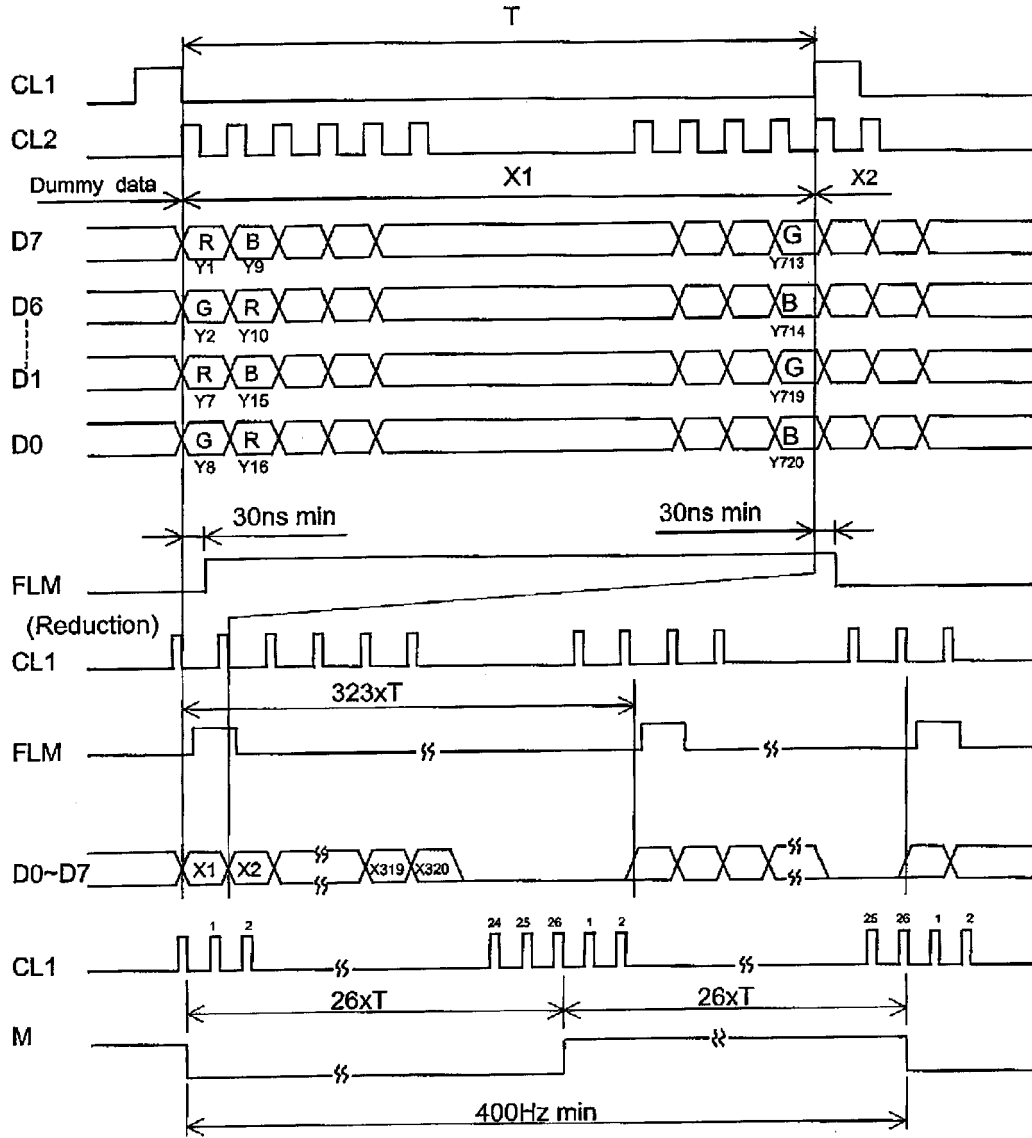
6.2 Recommend CCFL inverter:

TDK L10L   operation voltage +12V , 300mA

TDK L10A   operation voltage +5V , 600mA

7. TIMING CHARACTERISTIC

(1) INTERFACE TIMING DIAGRAM

Note 1. M signal should be kept 400Hz min. and 50% duty.

(2) INTERFACE TIMING DIAGRAM

(VSS=0V,VDD=2.7-5.5V, ta=0 to 50°C)

Item	Symbol	Min.	Typ.	Max.	Units
CL1 pulse width **H**	tWHCL1	50	--	--	ns
CL1 pulse width **L**	tWHCL1	370	--	--	ns
Clock cycle time	tCYC	100	--	--	ns
CL2 pulse width	tWCL2	37	--	--	ns
Clock set up time	tSCL1	100	--	--	ns
Clock hold time	tHCL1	100	--	--	ns
Clock rise fall time	tr,tf	--	--	30	ns
Data set up time	tDSU	35	--	--	ns
Data hold time	tDH	35	--	--	ns
FLM set up time	tFS	100	--	--	ns
FLM hold time	tFH	30	--	--	ns
M delay time	tM	--	--	300	ns
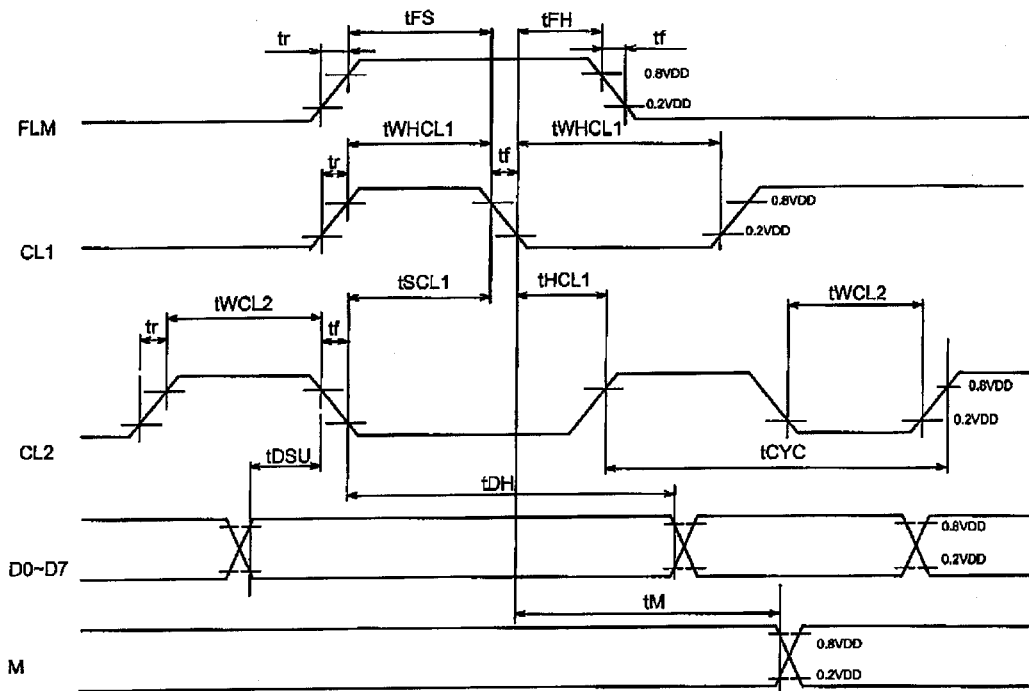
(3) POWER ON/OFF SEQUENCE
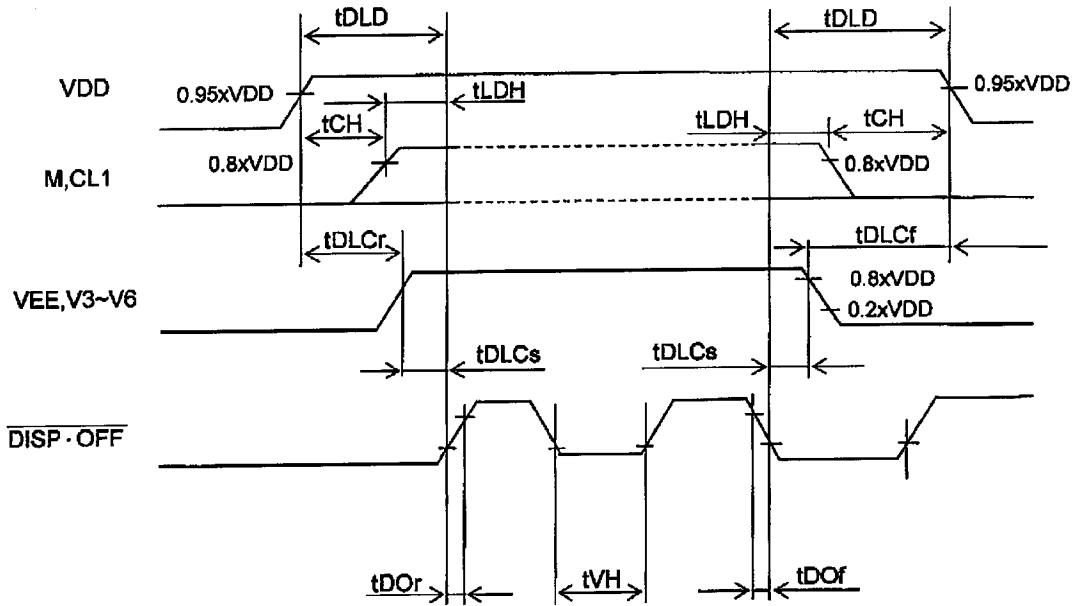
Symbol	Min.	Max.	Units	Comment
tDLD	200	--	ms	(Note 1)
tCH	0	--	ms	
tLDH	0	--	ms	
tDOr	--	100	ms	
tDOf	--	100	ms	
tDLCr	20	--	ms	(Note 2)
tDLCf	0	--	ms	
tDLCs	20	--	ms	
tVH	200	--	ms	

(Note 1)Please keep the specified sequence because wrong sequence may cause
Permanent damage to the LCD panel .

(Note 2) We recommends you to use $\overline{\text{DISP•OFF}}$ function.

Display quality may deteriorate if you don't use $\overline{\text{DISP•OFF}}$ function.

(4) INPUT DATA ALLOCATION TABLE

Data Signal	D7	D6	D5	D4	D3	D2	D1	D0	D7	D6	D5	D4	---------------	D4	D3	D2	D1	D0
X \ Y	1	2	3	4	5	6	7	8	9	10	11	12	--------------	716	717	718	719	720
1	R	G	B	R	G	B	R	G	B	R	G	B	------------	G	B	R	G	B
2	R	G	B	R	G	B	R	G	B	R	G	B	------------	G	B	R	G	B
3	R	G	B	R	G	B	R	G	B	R	G	B	------------	G	B	R	G	B
4	R	G	B	R	G	B	R	G	B	R	G	B	------------	G	B	R	G	B
5	R	G	B	R	G	B	R	G	B	R	G	B	------------	G	B	R	G	B
6	R	G	B	R	G	B	R	G	B	R	G	B	------------	G	B	R	G	B
7	R	G	B	R	G	B	R	G	B	R	G	B	------------	G	B	R	G	B
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	----------	⋮	⋮	⋮	⋮	⋮
314	R	G	B	R	G	B	R	G	B	R	G	B	------------	G	B	R	G	B
315	R	G	B	R	G	B	R	G	B	R	G	B	------------	G	B	R	G	B
316	R	G	B	R	G	B	R	G	B	R	G	B	------------	G	B	R	G	B
317	R	G	B	R	G	B	R	G	B	R	G	B	------------	G	B	R	G	B
318	R	G	B	R	G	B	R	G	B	R	G	B	------------	G	B	R	G	B
319	R	G	B	R	G	B	R	G	B	R	G	B	------------	G	B	R	G	B
320	R	G	B	R	G	B	R	G	B	R	G	B	------------	G	B	R	G	B

R:RED
G:GREEN
B:BLUE

8. PIN CONNECTIONS

No.	Symbol	Function
1	VSS	Power Supply (OV, Ground)
2~9	DB0~DB7	Display data
10	VDD	Power Supply for logic
11	VEE	Power Supply for LCD
12	V6	Bias Voltage for non-select (common driver)
13	V3	Bias Voltage for non-select (segment driver)
14	V4	Bias Voltage for non-select (segment driver)
15	V5	Bias Voltage for non-select (common driver)
16	/DISP_OFF	H: Display ON L: Display OFF
17	CL2(CP)	Data Shift Clock
18	M	AC Signal input for LCD drive wave form
19	CL1(LP)	Data latch Clock
20	FLM	First Line Marker

CCFL CN2 JST :housing :BHSR-02VS-1(Suitable Connector :JST SMO2(4.0)B-BHSS-1)
Contact pin : SBH-001T-P0.5

No.	Symbol	Function
1	VSS	GND for CCFL
2	VCFL	Power Supply for CCFL

CN3 Touch Screen Flat Cable(1.0mm pitch)

No.	Symbol	Function
1	X2	
2	Y2	Signal for touch panel
3	X1	
4	Y1	

9. POWER SUPPLY
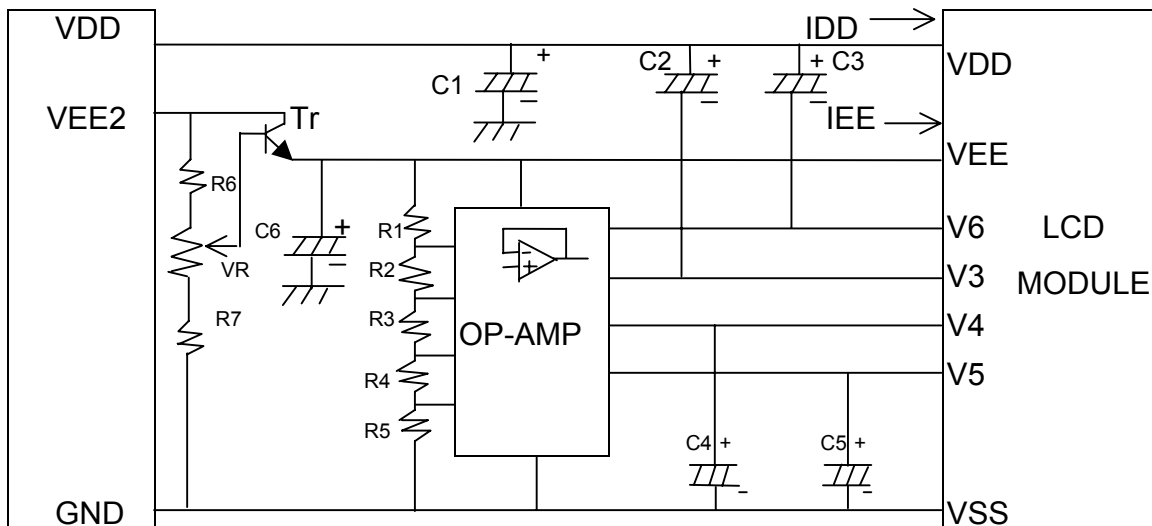
Tr: 2SD1368   R1=R2=R4=R5=20KΩ;R3=300KΩ ;R6=10KΩ;R7=200KΩ;VR=50KΩ
 C1= C2=C3=C4=C5=C6=3.3uF~4.7Uf ;VEE2=32V

10. BLOCK DIAGRAM

```
V3,V4        ──────────────────▶┌─────────────────────┐
DB0~DB7      ──────────────────▶│                     │
CL2          ──────────────────▶│                     │
CL1, M       ──────●───────────▶│                     │
VDD,VSS      ──●────────────────▶│    SEG Driver x 3   │
VEE          │    │              │                     │
             │    │              │                     │
/DISP_ OFF   │    │    ●────────▶│                     │
V5,V6        │    │    │         └──────────┬──────────┘
FLM          │    │    │                    │
             ▼    ▼▼   ▼              720    │
          ┌──────────────┐               ┌──┼──
          │              │               ▼
          │              │         ┌─────────────────────┐
          │              │   320   │                     │
          │ COM Driver   │──┌──▶   │                     │
          │    x 2       │         │                     │
          │              │         │ LCD 240 x (R.G.B)   │
          │              │         │      x 320 DOTS     │
          └──────────────┘         └─────────────────────┘
```
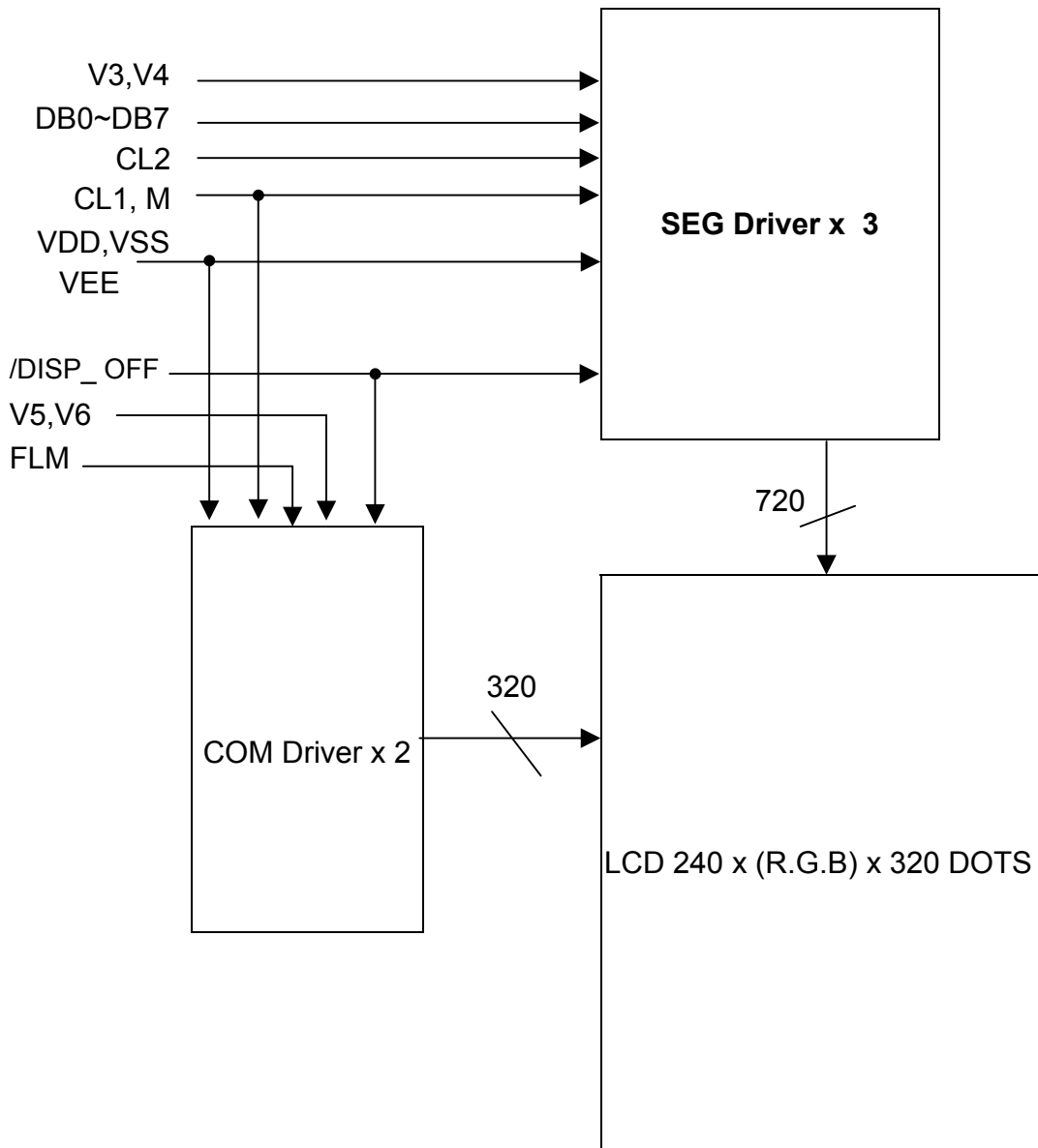
11.   TOUCH PANEL CHARACTERISTICS

1.Scope

This specification is applied to DATA IMAGE Display Devices Product/ SG243200

2. Features

Type : Analog Resistive Type Touch Panel

Input Mode : Pen or Finger

Structure: PET-------------Non Glare ITO Film, 175μm

Clear ITO Film, 175μm

Glass------------ITO Glass, 0.7mm/1.1mm/1.8mm

Tape Gasket----60μm

Dot pitch-------1.0 mm(Optional)

Connector : FPC

3. General Specification

Item	Specification	Unit
ITO Glass	1.1±0.1(T)	mm
FPC (ITO Film)	175±15(ITO Film)	μm
Connector	FPC,4-pin connector (L23.3*W5.5),Pitch=1.0	mm
Total Thickness	87.3±0.3(W)*69.3±0.3(H)*0.95±0.15(T)	mm

4. RATING

4.1 The maximum voltage: DC 7Volts

4.2 Usable Temperature Range From: −20°C to 60 °C(20~90%)

4.3 Storage Temperature Range From: −40°C to 80 °C(20~90%)

5. Electrical Specification

5.1 Resistance between leads: FILM(X axis) GLASS (Y axis):200~900Ω

5.2 Linearity : X axis ±1.5%↓,Y axis ±1.5%↓

5.3 Insulation resistance: 20MΩ↑   @DC 25V

5.4 Chattering Time : 10msec @100KΩ↓ Pull -UP

6. Mechanical Specification

6.1 Input Method pen or Finger

6.2 Operating Force: 80g↓ With R8.0 HS40° Silicon Rubber

80g↓ With R0.8 Polyacetal pen

6.3 Surface Hardness: 2H (Pencil Test) ,Hard Coated PET

6.4 Light Transmission: 75%↑ (Non Glare Type),80%↑ (Clear Type)

(@550nm, Spectro Photometer Hitachi U3300)

7. Durability

7.1 Durability against Writing Characters

After writing 200,000 characters in the same area (20mm*20mm),

Force : 250g , Speed: 1,000 characters/hour

- Resistance Between Leads : FILM (X axis) GLASS (Y axis)
- Linearity : X axis ±1.0%↓, Y axis ±1.0%↓
- Insulation Resistance: 20 M Ω↑   @DC 25V

7.2 Punching Life

After Punching 1,200,000 Times with the R8.0 silicon rubber

Force : 250g, Speed:2/sec

- Resistance Between Leads : FILM (X axis) GLASS (Y axis)
- Linearity : X axis ±1.0%↓, Y axis ±1.0%↓

- Insulation Resistance: 20 M Ω↑ @DC 25V

7.3 Impact Resistance:
No damage when ϕ9mm steel ball is dropped on the surface from 30cm height
at 1 time.

7.4 Flexible Pattern Heat Seal Peeling Strength :1.5N/cm (peeling upward by
90deg. Speed:50mm/min)

7.5 Flexible Pattern Bending Resistance Bending: 3 times or more by bending
radius R1.0mm.

7.6 Flexible Pattern insert/pull out Resistance 5 times at least.
The requirements in 5.1 shall be satisfied.

7.7 Vibration Resistance (In operation)
No faulty operation when sweep vibration of 0.2G 10~55Hz
(1min.) is given for 30min. each in the directions of X,Y,Z.
(Not in operation)
The requirements in 6.2 and 5.1~5.4 shall be satisfied after
sweep vibration of 2g 10~55Hz (1min.) is given for 30min.
each in the directions of X,Y,Z.

7.8 Package Drop
No damage to the product.(1 corner edge, 2 ridges, 4 surfaces, drop from 50
cm height:65cm for the bottom)

8. Reliability

8.1 High Temperature Test
After putting Panels at 80°C for 120 hours, then leaving for 24 hours at room temperature.
- Resistance Between Leads : FILM (X axis)   GLASS(Y axis)
- Linearity : X axis ±1.5%↓, Y axis ±1.5%↓
- Insulation Resistance: 20 M Ω↑ @DC 25V
- Operating Fore : 80g↓ With R8.0 HS40° Silicon Rubber
  80g↓ With R0.8 Polyacetal pen

8.2 Low Temperature Test
- After putting panels at-40°C for 120 hours, then leaving for 24 hours at room temperature.
- Resistance Between Leads : FILM (X axis)   GLASS(Y axis)
- Linearity : X axis ±1.5%↓, Y axis ±1.5%↓
- Insulation Resistance: 20 M Ω↑ @DC 25V
- Operating Fore : 80g↓ With R8.0 HS40° Silicon Rubber
  80g↓ With R0.8 Polyacetal pen

8.3 Temperature and Humidity Test: After putting panels at 60°C, 90%RH for 120 hours,
then leaving for 24 hours at room temperature
- Resistance Between Leads : FILM (X axis)   GLASS(Y axis)
- Linearity : X axis ±1.5%↓, Y axis ±1.5%↓
- Insulation Resistance: 20 M Ω↑ @DC 25V
- Operating Fore: 80g↓ With R8.0 HS40° Silicon Rubber
  80g↓ With R0.8 Polyacetal pen

8.4 Repetition of High and Low Temperature
After putting panels at the condition of -40°C for 30minutes,and then 80°C for 30 minutes and
this process is repeated by 10 cycles, then leaving for 24 hours at room temperature.
- Resistance Between Leads : FILM (X axis)   GLASS(Y axis)
- Linearity : X axis ±1.5%↓, Y axis ±1.5%↓
- Insulation Resistance: 20 M Ω↑ @DC 25V
- Operating Fore : 80g↓ With R8.0 HS40° Silicon Rubber
  80g↓ With R0.8 Polyacetal pen

12. QUALITY ASSURANCE

12.1 Test Condition

12.1 .1 Temperature and Humidity(Ambient Temperature)
Temperature : 25 ±5°C
Humidity : 60 ± 5%

12.1.2 Operation
Unless specified otherwise, test will be conducted under function state.

12.1.3 Container
Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

12.1.4 Test Frequency
In case of related to deterioration such as shock test. It will be conducted only once.

12.1.5 Test Method

No.	Parameter	Conditions	Regulations
1	High Temperature Operating	50 ± 2 °C	Note 3
2	Low Temperature Operating	0 ± 2 °C	Note 3
3	High Temperature Storage	60 ± 2 °C	Note 3
4	Low Temperature Storage	-20 ± 2 °C	Note 3
5	Vibration Test (Non-operation state)	Total fixed amplitude : 1.5mm Vibration Frequency : 10 ~ 55Hz One cycle 60 seconds to 3 directions of X.Y.Z. for each 15 minutes	Note 3
6	Damp Proof Test (Non-operation state)	40°C ± 2°C, 90~95%RH, 96h	Note 1,2
7	Shock Test (Non-operation state)	To be measured after dropping from 60cm high once concrete surface in packing state	Note 3

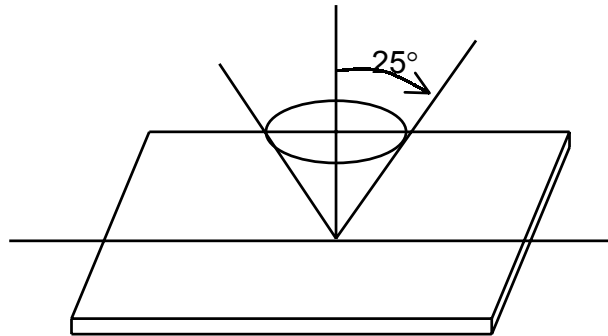Note 1: Returned under normal temperature and humidity for 4 hrs.
Note 2: No dew condensation to be observed.
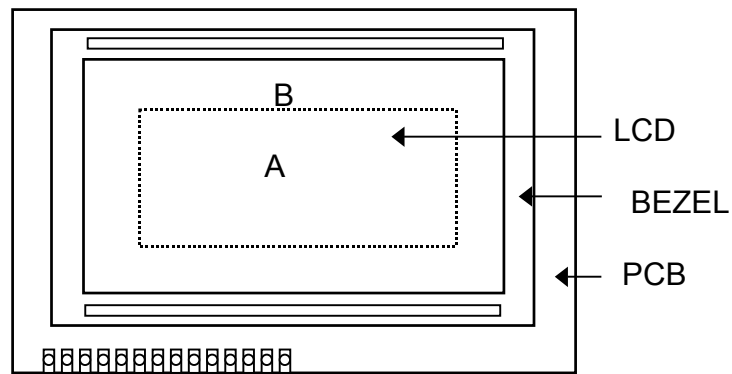Note 3: No change on display and in operation under the test condition

12.2 Inspection condition

12.2.1 Inspection conditions

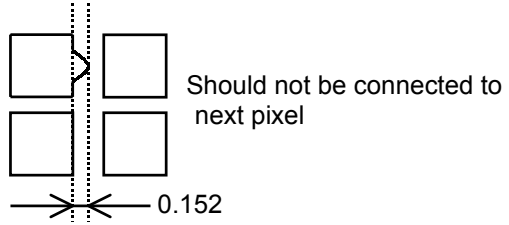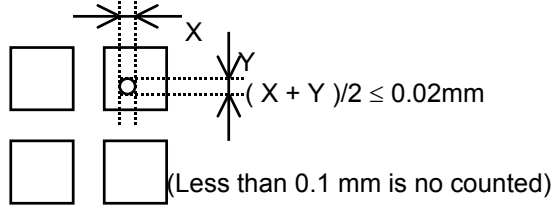The LCD shall be inspected under 40W white fluorescent light.

25°

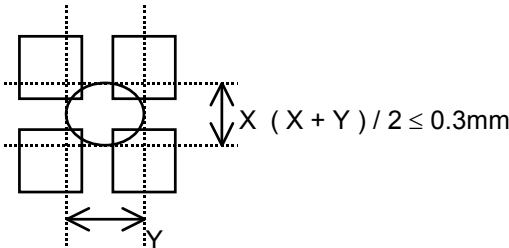### 12.2.2 Definition of applicable Zones

B

A

LCD

BEZEL

PCB

A : Display Area
B : Non-Display Area

12.2.3 Inspection Parameters

No.	Parameter	Criteria
1	Black or White spots	<table><tr><td>Zone / Dimension</td><td>Acceptable number A</td><td>Class Of Defects</td><td>AQL Level</td></tr><tr><td>D < 0.2</td><td>∗</td><td rowspan="4">Minor</td><td rowspan="4">2.5</td></tr><tr><td>0.2≦D<0.3</td><td>10</td></tr><tr><td>0.3≦D <0.4</td><td>5</td></tr><tr><td>0.4≦D</td><td>0</td></tr></table> D = (Long + Short) / 2 ∗ : Disregard
2	Scratch, Substances	<table><tr><td colspan="2">Zone / L (mm) W(mm)</td><td>Acceptable number A</td><td>Class Of Defects</td><td>AQL Level</td></tr><tr><td>L ≤ 2.0</td><td>W≦0.03</td><td>∗</td><td rowspan="3">Minor</td><td rowspan="3">2.5</td></tr><tr><td>L ≤ 3.0</td><td>0.03<W≦0.05</td><td>6</td></tr><tr><td>L ≤ 2.5</td><td>0.05<W≦0.1</td><td>1</td></tr></table> L : Length W : Width ∗ : Disregard
3	Air Bubbles (between glass & polarizer)	<table><tr><td>Zone / Dimension</td><td>Acceptable number A</td><td>Class of Defects</td><td>AQL Level</td></tr><tr><td>D ≤ 0.2</td><td>∗</td><td rowspan="4">Minor</td><td rowspan="4">2.5</td></tr><tr><td>0.2 < D ≤ 0.3</td><td>12</td></tr><tr><td>0.3 < D ≤ 0.5</td><td>3</td></tr><tr><td>0.5 < D</td><td>0</td></tr></table> ∗ : Disregard
4	Uniformity of Pixel	(1) Pixel shape (with Dent) → ← 0.152

| 4 | Uniformity of Pixel | (2) Pixel shape (with Projection)

Should not be connected to next pixel

0.152

(3) Pin hole

X
Y
$(X + Y)/2 \leq 0.02mm$

(Less than 0.1 mm is no counted)

(4) Deformation

X $(X + Y) / 2 \leq 0.3mm$
Y

Total acceptable number : 1/pixel, 5/cell |

Class of defects	Major	AQL 0.65%	**Definition**
			It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function.
		AQL 1.00%	It is a defect that is likely to assembly size and not result in functioning problem.
	Minor	AQL 2.5%	It is a defect that will not result in functioning problem with deviation classified.

12.3 Sampling Condition

Unless otherwise agree in written, the sampling inspection shall be applied to the incoming inspection of customer.
Lot size: Quantity of shipment lot per model.
Sampling type: normal inspection, single sampling
Inspection level: Level II
Sampling table: MIL-STD-105E

13. LOT NUMBERING SYSTEM

| 9 | 7 | 4 | 2 |

Production week number

Production year

14. LCM NUMBERING SYSTEM

SG 243200 C N C W A - 01

VERSION :01

View direction & Temp. Range
A–Bottom view 6H & Normal temp.
B–Bottom view 6H & Wide temp.
C–Top View & Normal temp
D–Top View & Wide temp.

Backlight Color
W –White Y – Yellow Green
G - green

Backlight
A–Array LED B/L
C–CCFL B/L

LCD Polarize type
N–Negative R – Reflective
M–transmissive F– transflective

LCD type
C –CSTN Color STN

Series code
243200–,240(X) x 320 (Y) dots type

Model type
SG–Standard Color Graphic Module
SX–Custom Color Graphic Module

15. PRECAUTION FOR USING LCM

1.   LIQUID CRYSTAL DISPLAY (LCD)
LCD is made up of glass, organic sealant, organic fluid, and polymer based polarizers. The following precautions should be taken when handing,
(1). Keep the temperature within range of use and storage. Excessive temperature and humidity could cause polarization degredation, polarizer peel off or bubble.
(2). Do not contact the exposed polarizers with anything harder than an HB pencil lead. To clean dust off the display surface, wipe gently with cotton, chamois or other soft material soaked in petroleum benzin.
(3). Wipe off saliva or water drops immediately. Contact with water over a long period of time may cause polarizer deformation or color fading, while an active LCD with water condensation on its surface will cause corrosion of ITO electrodes.
(4). Glass can be easily chipped or cracked from rough handling, especially at corners and edges.
(5). Do not drive LCD with DC voltage.

2.   Liquid Crystal Display Modules
2.1 Mechanical Considerations
LCM are assembled and adjusted with a high degree of precision. Avoid excessive shocks and do not make any alterations or modifications. The following should be noted.
(1). Do not tamper in any way with the tabs on the metal frame.
(2). Do not modify the PCB by drilling extra holes, changing its outline, moving its components or modifying its pattern.
(3). Do not touch the elastomer connector, especially insert an backlight panel (for example, EL).
(4). When mounting a LCM make sure that the PCB is not under any stress such as bending or twisting . Elastomer contacts are very delicate and missing pixels could result from slight dislocation of any of the elements.
(5). Avoid pressing on the metal bezel, otherwise the elastomer connector could be deformed and lose contact, resulting in missing pixels.

2.2.   Static Electricity
LCM contains CMOS LSI's and the same precaution for such devices should apply, namely
(1). The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads, the copper leads on the PCB and the interface terminals with any parts of the human body.
(2). The modules should be kept in antistatic bags or other containers resistant to static for storage.
(3). Only properly grounded soldering irons should be used.
(4). If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.

(5) The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended.
(6). Since dry air is inductive to statics, a relative humidity of 50-60% is recommended.

2.3 Soldering
(1). Solder only to the I/O terminals.
(2). Use only soldering irons with proper grounding and no leakage.
(3). Soldering temperature : 280°C ± 10°C
(4). Soldering time: 3 to 4 sec.
(5). Use eutectic solder with resin flux fill.
(6). If flux is used, the LCD surface should be covered to avoid flux spatters. Flux residue should be removed after wards.

2.4 Operation
(1). The viewing angle can be adjusted by varying the LCD driving voltage V0.
(2). Driving voltage should be kept within specified range; excess voltage shortens display life.
(3). Response time increases with decrease in temperature.
(4). Display may turn black or dark blue at temperatures above its operational range; this is (however not pressing on the viewing area) may cause the segments to appear "fractured".
(5). Mechanical disturbance during operation (such as pressing on the viewing area) may cause the segments to appear "fractured".

2.5 Storage
If any fluid leaks out of a damaged glass cell, wash off any human part that comes into contact with soap and water. Never swallow the fluid. The toxicity is extremely low but caution should be exercised at all the time.

2.6 Limited Warranty
Unless otherwise agreed between DATA IMAGE and customer, DATA IMAGE will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with DATA IMAGE acceptance standards, for a period on one year from date of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of DATA IMAGE is limited to repair and/or replacement on the terms set forth above. DATA IMAGE will not responsible for any subsequent or consequential events.

16.OUTLINE DRAWING

UNITS MM

T/P layout

Detail B
scale:2/1

Detail A
scale:2/1

Viewing Direction

Matching connector:
Molex 52746-2090

white   pink
(GND)   (H.V.)

BHR-02VS-1   Matching connector:
JST : SM02(4.0)B-BHS-1-TB

Contact side

Contact side

CONTACT SIDE

CN1 PIN FUNCTIONS

1. VSS	11. VEE
2. DB0	12. V6
3. DB1	13. V3
4. DB2	14. V4
5. DB3	15. V5
6. DB4	16. /DISP_OFF
7. DB5	17. CL2
8. DB6	18. M
9. DB7	19. CL1
10. VDD	20. FLM

NOTE:
1. Tolerance is ±0.3 unless otherwise noted.
2. Touch-Panel matching connector : Molex 71220-0400

			ISSUE DATE:	08/14/02'	DATA IMAGE Corporation			
			DRAWN:	Roger	TITLE: LCM OUTLINE DIMENSION			
			CHECK:		A4	DWG. NO. Q020815		
AUTH	DESCRIPTION	DATE	APPROVED			PART. NO. SG243200	REV.	1
	REVISIONS			APPROVE:		SCALE : 5/6	SHEET 1 OF 1	

17 . PACKAGE INFORMATION

Anti-static bag

LCM

Carton