# DATA IMAGE CORPORATION

## LCD Module Specification

ITEM NO.: **GM123200SFAYBGI2**

## Table of Contents

| Customer Companies | R&D Dept. | Q.C. Dept. | Eng. Dept. | Prod. Dept. |
|---|---|---|---|---|
| | JACK | ERIC | KEN | HUANG |
| Approved by | Version: | Issued Date: | Sheet Code: | Total Pages: |
| | A | 2007/1/12 | | 22 |

## 2.　　RECORD OF REVISION

| Rev | Date | Item | Page | Comment |
|-----|------|------|------|---------|
| A | 2007/1/12 | | | New Release |

## 3. GENERAL SPECIFICATION

Display Format :                    122dots (W)  ×        32 (H)                dots

Dot Size :                               0.4 (W)  ×      0.45 (H)              mm

View Area :                             62.2 (W)  ×      17.9 (H)              mm

General Dimensions :                     84 (W)  ×        44 (H) × 14.5 (T) mm Max.

Weight :                    36 g max.

LCD Type &              ☐ STN          ☑ STN          ☐ FSTN
Background Color :        Blue Gray      Yellow Green

Polarizer mode :         ☐ Reflective    ☑ Transflective

                         ☐ Transmissive  ☐ Negative

View Angle :             ☑ 6 O'clock     ☐ 12 O'clock    ☐ Others _____

Backlight :              ☑ LED           ☐ EL            ☐ CCFL

Backlight Color :        ☑ Yellow green  ☐ Amber         ☐ Blue Green

                         ☐ White         ☐ Others

Controller / Driver :    SBN1661G-M02

Temperature Range :      ☐ Normal                 ☑ Wide Temperature
                         Operating  0 to 50°C      Operating  -20 to 70°C
                         Storage    -20 to 70°C    Storage    -30 to 80°C

Pixel Color: Blue


REMARK:

Our components and processes are compliant to ROHS standard.

# 4. ABSOLUTE MAXIMUM RATINGS

## 4.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

$V_{SS}= 0V, \quad Ta = 25°C$

| Item | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|
| Supply Voltage (Logic) | $V_{DD}-V_{SS}$ | -0.3 | 7 | V |
| Supply Voltage (LCD Driver) | $V_{DD}-V_{EE}$ | -0.3 | 13 | V |
| Input Voltage | $V_I$ | -0.3 | $V_{DD}$ +0.3 | V |
| Operating Temperature | $T_{OP}$ | -20 | 70 | °C |
| Storage Temperature | $T_{STG}$ | -30 | 80 | °C |

## 4.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

| Item | Operating | | Storage | | Comment |
|---|---|---|---|---|---|
| | (Min.) | Max.) | (Min.) | (Max.) | |
| Ambient Temp | -20 | 70 | -30 | 80 | Note (1) |
| Humidity | Note (2) | | Note(2) | | Without Condensation |
| Vibration | -- | $4.9M/S^2$ | -- | $19.6M/S^2$ | XYZ Direction |
| Shock | -- | $29.4M/S^2$ | -- | $490M/S^2$ | XYZ Direction |

Note(1)  Ta  =  0°C :  50Hr Max.

Note(2)  Ta  ≤ 40°C :  90% RH Max.

Ta  ≥ 40°C :  Absolute humidity must be lower than the humidity
of 90% RH at 40°C.

## 4．3 **Electronic Static Discharge maximum rating**

### ESD test method : IEC1000-4-2

| Item | Description | |
|---|---|---|
| Testing environment | Ambient temperature :15°C to 35 °C<br>Humidity: 30% to 60 %<br>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
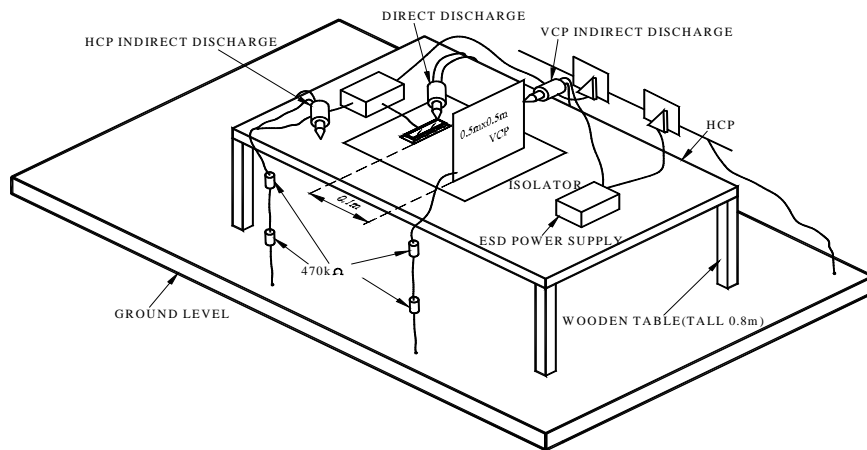


(1)

## DIRECT CONTACT DISCHARGE
### CONTACT POINT : A.B.C.D
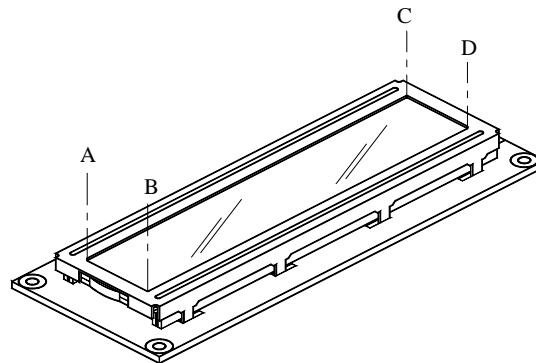


(2)

# 5. ELECTRICAL CHARACTERISTICS

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Supply Voltage (Logic) | $V_{DD}$-$V_{SS}$ | | 3.0 | 5.0 | 5.5 | V |
| Supply Voltage (LCD) | $V_{DD}$-$V_{EE}$ | 0°C | 6.7 | 7.1 | 7.4 | V |
| | | 25°C | 6.5 | 6.9 | 7.2 | |
| | | 50°C | 6.3 | 6.7 | 7.0 | |
| Input Voltage | $V_{IH}$ | -- | VDD-1.2 | -- | VDD | V |
| | $V_{IL}$ | | 0 | -- | 0.8 | |
| Logic Supply Current | $I_{DD}$ | $V_{DD}$-$V_{SS}$=5V | -- | 0.3 | -- | mA |

# 6. ELECTRO-OPTICAL CHARACTERISTICS

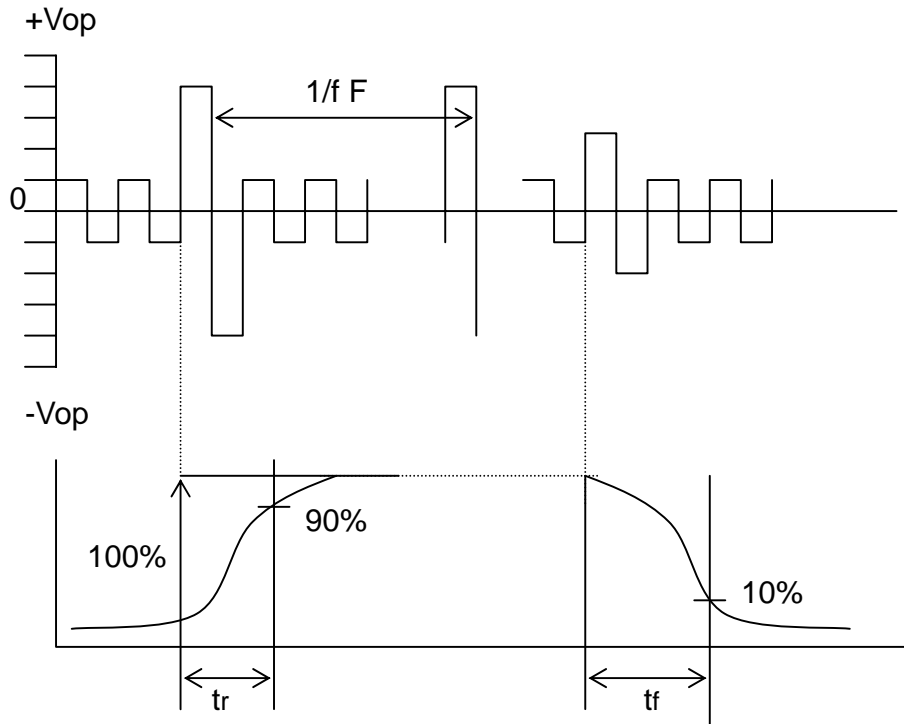| ITEM | Symbol | Condition | Min. | Typ. | Max. | Unit | Ref. |
|---|---|---|---|---|---|---|---|
| Rise Time | Tr | 0°C | -- | 500 | 800 | ms | Note (1) |
| | | 25°C | | 120 | 240 | | |
| Fall Time | Tf | 0°C | -- | 1000 | 1500 | ms | |
| | | 25°C | | 200 | 350 | | |
| Contrast | CR | 25°C | 3 | 4 | -- | | Note (3) |
| View Angle | θ1~θ2 ∅1, ∅2 | 25°C & CR≥1.5 | -- | -- | 80 | | Note (2) |
| | | | -30 | -- | 30 | | |
| Frame Frequency | Ff | 25°C | -- | 64 | -- | Hz | |

Note (1) & (2) : See next page
Note (3) : Contrast ratio is defined under the following condition:

CR= $\dfrac{\text{Brightness of non-selected condition}}{\text{Brightness of selected condition}}$

( a ).    Temperature ---------- 25°C
( b ).    Frame frequency ---- 64Hz
( c ).    Viewing angle -------- θ= 0°,   ∅ = 0°
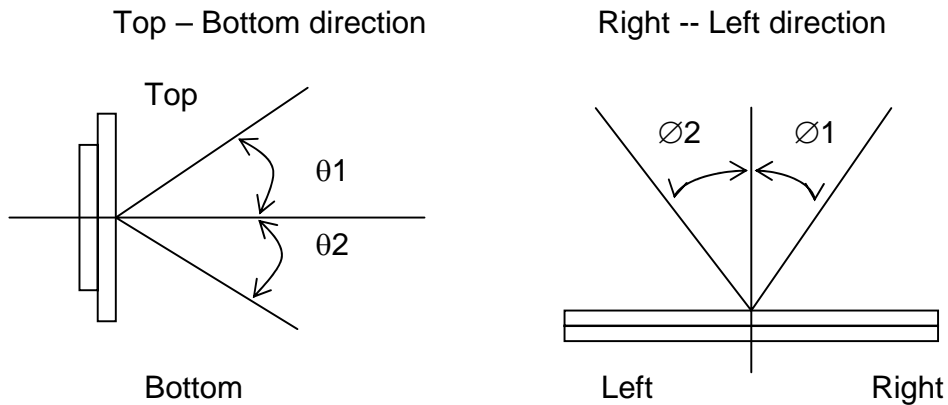( d ).    Operating voltage --- 6.9V

Note (1)    Response time is measured as the shortest period of time possible between the change in state of an LCD segment as demonstrated below:



Condition:
( a ) .    Temperature ---------------25°C
( b ) .    Frame frequency --------- 64Hz
( c ) .    View Angle ----------------- $\theta = 0°$, $\varnothing = 0°$
( d ) .    Operating voltage -------- 6.9V


Note (2)    Definition of View Angle

Top – Bottom direction

Right -- Left direction

## 6.1 LED ELECTRO-OPTICAL CHARACTERISTIC

Ta = 25°C

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Forward Voltage | $V_F$ | IF = 120mA Yellow Green | -- | 4.1 | 4.2 | V |
| Luminous Intensity | $I_V$ | IF = 120mA Yellow Green | 55 | 90 | -- | cd/m$^2$ |
| Peak Emission | $\lambda P$ | IF = 120mA Yellow Green | -- | 573 | -- | nm |
| Spectrum Radiation | $\Delta \lambda$ | IF = 120mA Yellow Green | -- | 30 | -- | nm |
| Reverse Current | IR | VR = 8V Yellow Green | -- | -- | 0.2 | mA |

Note : Measured at the bared LED backlight unit.

## 6.2 LED MAXIMUM OPERATING RANGE

| Item | Symbol | Yellow Green | Unit |
|---|---|---|---|
| Power Dissipation | $P_{AD}$ | 0.76 | W |
| Forward Current | $I_{AF}$ | 180 | mA |
| Reverse Voltage | VR | 8 | V |

## 6.2.1 LED ARRAY BLOCK DIAGRAM
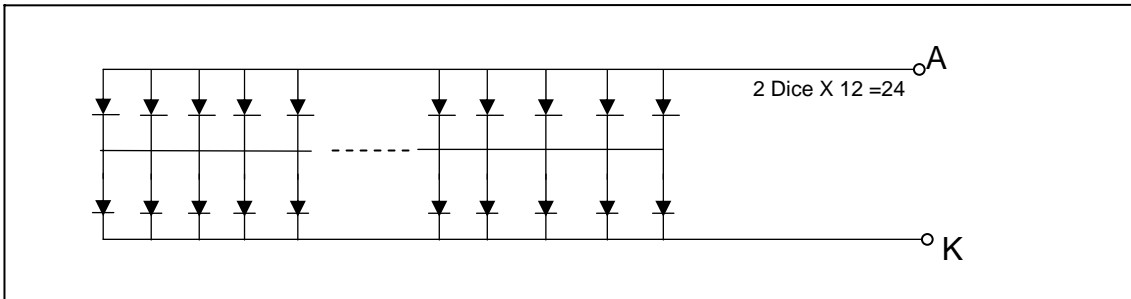


## 6.2.2 LED POWER SOURCE

| | Power source | Jumper setting | Mark |
|---|---|---|---|
| LED | VDD/VSS | J1,J3,R9 | |
| | 19A/20K | J2,J4,J5 | V |
| | A/K | NONE | |
| | 19K/20A | J2,J6,J7 | |
| GND | BZL GND | J8 | |
| | FRM GND | J9 | |

# 7. TIMING CHARACTERISTICS

AC Timing for interface with an 80-type microcontroller.
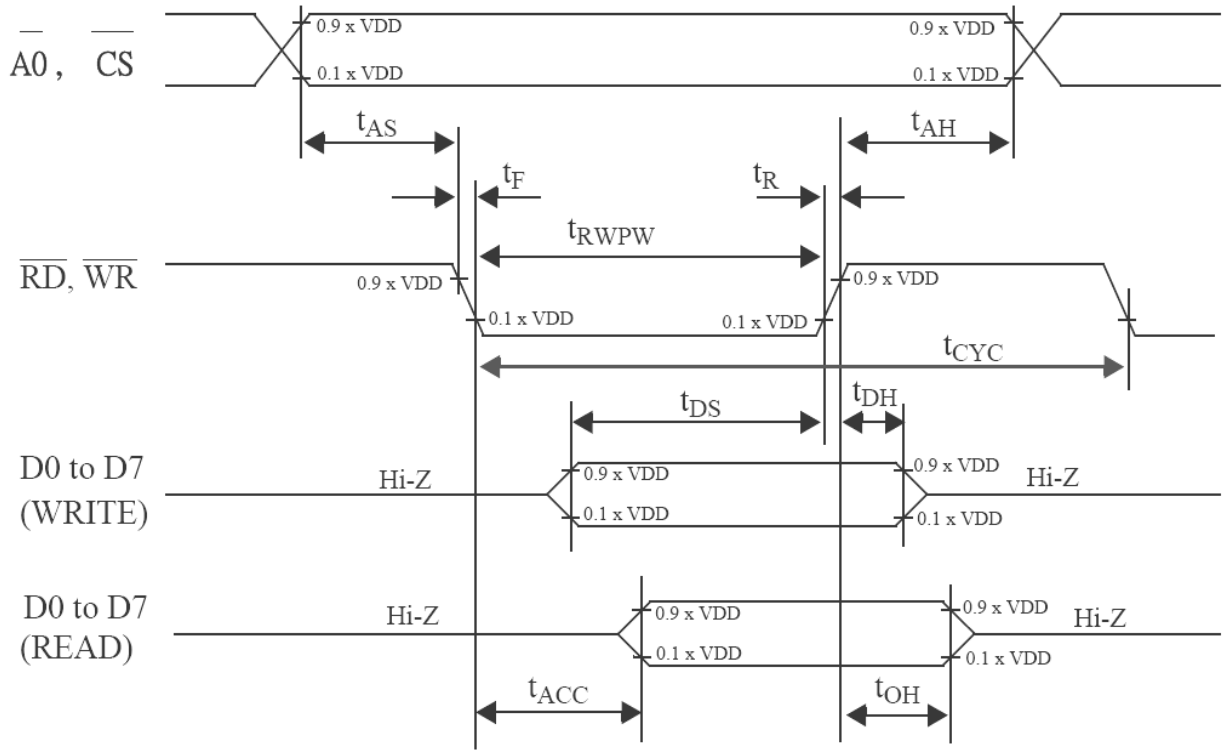


VDD=5V ± 10%：VSS=0V;Ta=-20 to 75° C.

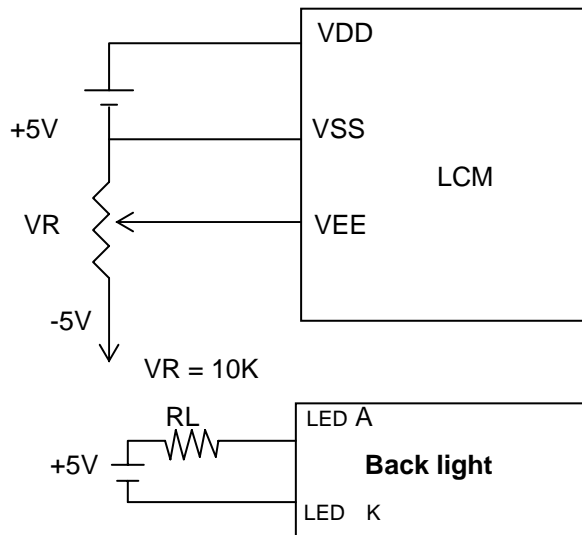| symbol | parameter | min. | max. | test conditons | unit |
|---|---|---|---|---|---|
| $t_{AS}$ | Address set-up time | 20 | | | ns |
| $t_{AH}$ | Address hold time | 10 | | | ns |
| $t_F$, $t_R$ | Read/Write pulse falling/rising time | | 15 | | ns |
| $t_{RWPW}$ | Read/Write pulse width | 200 | | | ns |
| $t_{CYC}$ | System cycle time | 1000 | | | ns |
| $t_{DS}$ | Data setup time | 80 | | | ns |
| $t_{DH}$ | Data hold time | 10 | | | ns |
| $t_{ACC}$ | Data READ access time | | 90 | CL= 100 pF. | ns |
| $t_{OH}$ | Data READ output hold time | 10 | 60 | Refer to Fig. 23. | ns |

AC timing for interface a 68-type microcontroller.
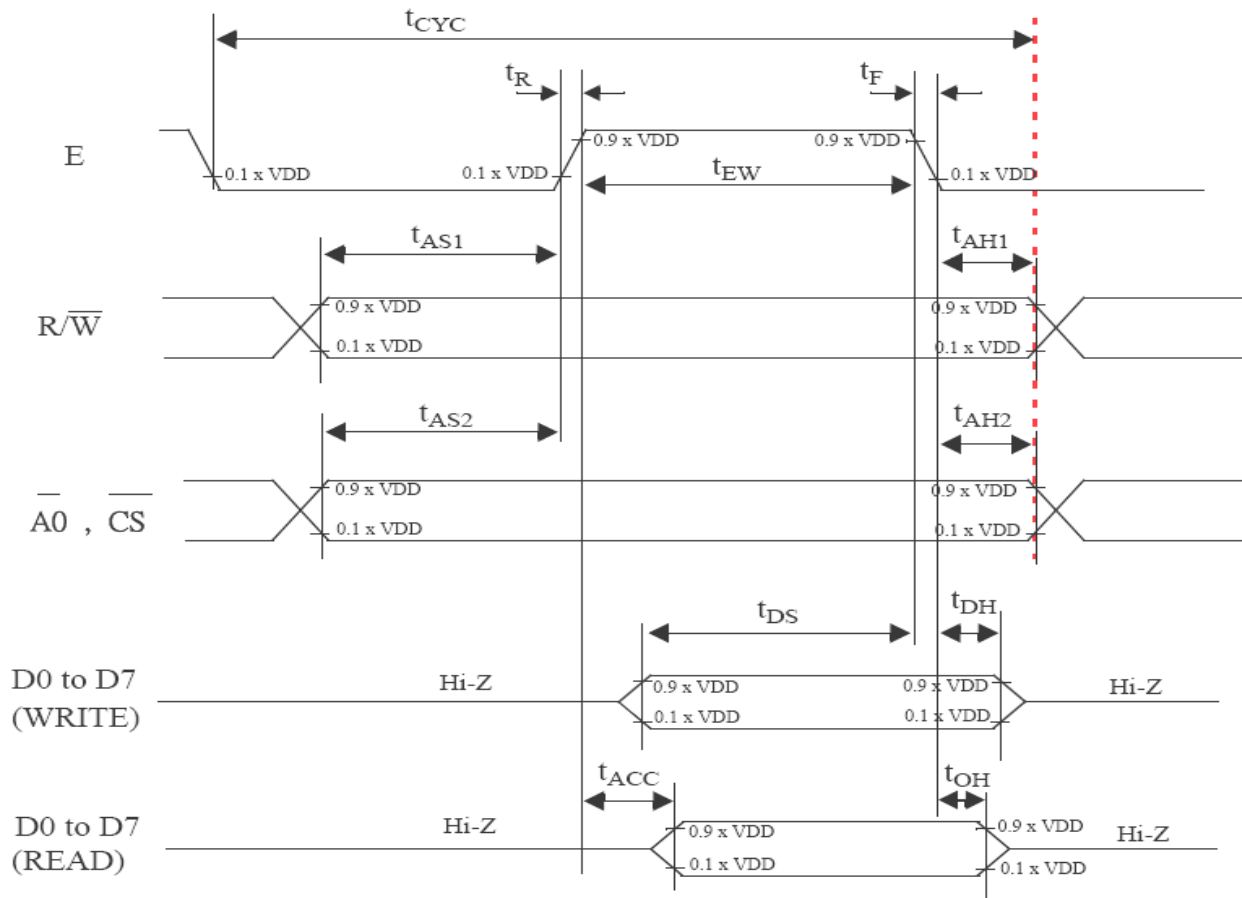


VDD = 5V ± 10% ; VSS=0V;Ta = -20 to 75° C.

| symbol | parameter | min. | max. | test conditons | unit |
|---|---|---|---|---|---|
| $t_{AS1}$ | Address set-up time with respect to R/$\overline{W}$ | 20 | | | ns |
| $t_{AS2}$ | Address set-up time with respect to $\overline{A0}$ , $\overline{CS}$ | 20 | | | ns |
| $t_{AH1}$ | Address hold time with respect to R/$\overline{W}$ | 10 | | | ns |
| $t_{AH2}$ | Address hold time respect with to $\overline{A0}$ , $\overline{CS}$ | 10 | | | ns |
| $t_F$, $t_R$ | Enable (E) pulse falling/rising time | | 15 | | ns |
| $t_{CYC}$ | System cycle time | 1000 | | Note 1 | ns |
| $t_{EWR}$ | Enable pulse width for READ | 100 | | | ns |
| $t_{EWW}$ | Enable pulse width for WRITE | 80 | | | ns |
| $t_{DS}$ | Data setup time | 80 | | | ns |
| $t_{DH}$ | Data hold time | 10 | | | ns |
| $t_{ACC}$ | Data access time | | 90 | CL= 100 pF. | ns |
| $t_{OH}$ | Data output hold time | 10 | 60 | Refer to Fig. 23. | ns |

# 8. PIN CONNECTIONS

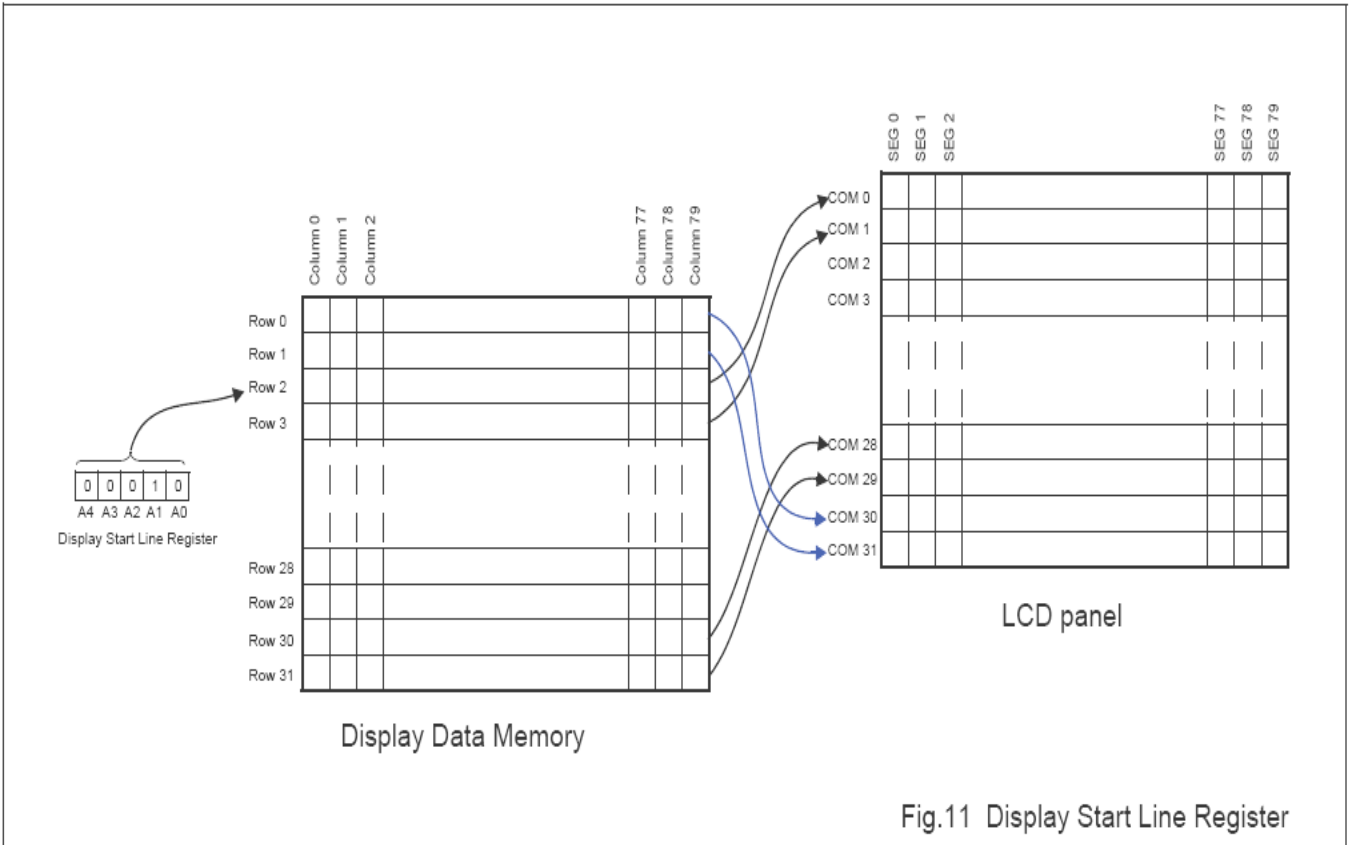| No. | Symbol | Function |
|-----|--------|----------|
| 1 | VSS | Ground (0V) |
| 2 | VDD | +5V |
| 3 | VEE | Power Supply For LCD Drive |
| 4 | A0 | L→ Instructions    H→ Data |
| 5 | /CS1 | Chip Enable Active "L" |
| 6 | /CS2 | Chip Enable Active "L" |
| 7 | CL | External Clock Input (2K Hz) |
| 8 | /RD (E) | /RD for 80 series, E for 68 series |
| 9 | /WR (R/W) | /WR for 80 series, R/W for 68 series |
| 10 | DB0 | |
| 11 | DB1 | |
| 12 | DB2 | |
| 13 | DB3 | Data Bus Line |
| 14 | DB4 | |
| 15 | DB5 | |
| 16 | DB6 | |
| 17 | DB7 | |
| 18 | RES | Reset Signal, H→80 series, L→68 series |
| 19 | LED A | LED Anode. Power Supply + |
| 20 | LED K | LED Cathode. Power Supply - |

# 9. POWER SUPPLY



VR = 10K

# 10. BLOCK DIAGRAM

```
VSS ──────────►┌─────────────┐  61Seg        ( SEG 0 – 60 )
VDD ──────────►│             │──────────/────────────┐
VEE ──────────►│ SBN1661G-   │                        │
               │   M02       │                        ▼
A0  ──────────►│             │  16Com      ┌──────────────────────────┐
/CS1 ─────────►│             │──────/─────►│                          │
RES ──────────►│             │             │                          │
/WR(R/W) ─────►│             │             │                          │
CL  ──────────►├─────────────┤             │      LCD    PANEL        │
/RD(E) ───────►│             │             │     122×32 DOTS          │
/CS2 ─────────►│             │  16Com      │                          │
               │ SBN1661G-   │──────/─────►│                          │
               │   M02       │             │                          │
DB0 ──────────►│             │             │                          │
               │             │             └──────────────────────────┘
DB7 ──────────►│             │  61Seg      ( SEG 0 – 60 )            ▲
               └─────────────┘──────────/──────────────────────────────┘
```
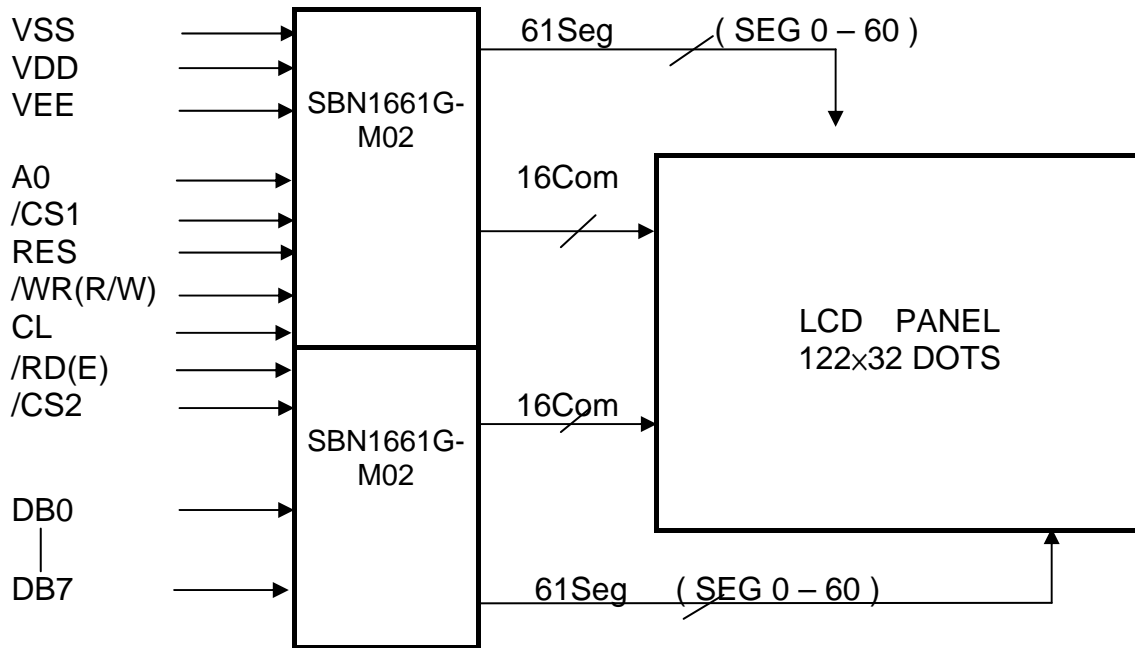
Fig.11 Display Start Line Register

**Display Data RAM Addressing**

# COMMANDS

## Summary

| Command | A0 | RD | WR | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | Function |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Code | | | | | Function |
| Display ON/OFF | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0/1 | Turns display on or off. 1 : ON, 0 : OFF |
| Display start line | 0 | 1 | 0 | 1 | 1 | 0 | Display start address (0 to 31) | | | | | Specifies RAM line corresponding to top line of display. |
| Set page address | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | Page (0 to 3) | | Sets display RAM page in page address register. |
| Set column (segment) address | 0 | 1 | 0 | 0 | Column address (0 to 72) | | | | | | | Sets display RAM column address in column address register. |
| Read status | 0 | 0 | 1 | Busy | ADC | ON/OFF | Reset | 0 | 0 | 0 | 0 | Reads the following status: BUSY 1 : Busy / 0 : Ready; ADC 1 : CW output / 0 : CCW output; ON/OFF 1 : Display off / 0 : Display on; RESET 1 : Being reset / 0 : Normal |
| Write display data | 1 | 1 | 0 | Write data | | | | | | | | Writes data from data bus into display RAM. |
| Read display data | 1 | 0 | 1 | Read data | | | | | | | | Reads data from display RAM onto data bus. |
| Select ADC | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0/1 | 0 : CW output / 1 : CCW output |
| Static drive ON/OFF | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0/1 | Selets static driving operation. 1 : Static drive / 0 : Normal driving |
| Select duty | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0/1 | Selets LCD duty cycle 1 : 1/32 / 0 : 1/16 |
| Read – Modify - Write | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | Read – modify – write ON |
| End | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | Read – modify – write OFF |
| Reset | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | Software reset |

# 11. QUALITY ASSURANCE

## 11.1 Test Condition

### 11.1.1 Temperature and Humidity(Ambient Temperature)
Temperature : $20 \pm 5°C$
Humidity : $65 \pm 5\%$

### 11.1.2 Operation
Unless specified otherwise, test will be conducted with LCM in operation.

### 11.1.3 Container
Unless specified otherwise, vibration test will be conducted on module only.

### 11.1.4 Test Frequency
Single cycle.

### 11.1.5 Test Method

| No. | Parameter | Conditions | Regulations |
|---|---|---|---|
| 1 | High Temperature Operating | $70 \pm 2 °C$ | Note 3 |
| 2 | Low Temperature Operating | $-20 \pm 2 °C$ | Note 3 |
| 3 | High Temperature Storage | $80 \pm 2 °C$ | Note 3 |
| 4 | Low Temperature Storage | $-30 \pm 2 °C$ | 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) | $40°C \pm 2°C$, 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.
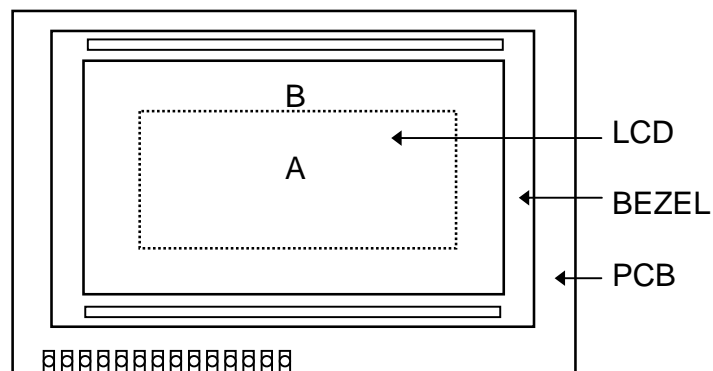Note 3: No change on display and in operation under the test condition

## 11.2    Inspection condition

### 11.2.1   Inspection conditions

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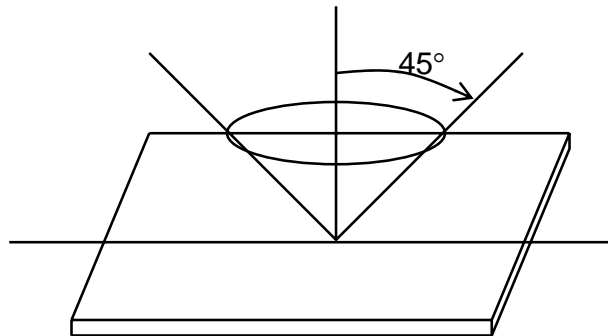


### 11.2.2   Definition of applicable Zones



A : Display Area
B : Non-Display Area

## 11.2.3  Inspection Parameters

| No. | Parameter | Criteria |
|---|---|---|
| 1 | Black or White spots | (see table below) |

| | Zone | Acceptable number | | Class Of Defects | AQL Level |
|---|---|---|---|---|---|
| Dimension | | A | B | | |
| D < 0.15 | | * | * | Minor | 2.5 |
| 0.15 ≤ D < 0.2 | | 4 | 4 | | |
| 0.2 ≤ D ≤ 0.25 | | 2 | 2 | | |
| D ≤ 0.3 | | 0 | 1 | | |

D = (Long + Short) / 2     * : Disregard

| No. | Parameter | Criteria |
|---|---|---|
| 2 | Scratch,   Substances | (see table below) |

| | Zone | Acceptable number | | Class Of Defects | AQL Level |
|---|---|---|---|---|---|
| X (mm) | Y(mm) | A | B | | |
| * | 0.04 ≥ W | * | * | Minor | 2.5 |
| 3.0 ≥ L | 0.06 ≥ W | 4 | 4 | | |
| 2.0 ≥ L | 0.08 ≥ W | 2 | 3 | | |
| — | 0.1 < W | 0 | 1 | | |

X : Length     Y : Width     * : Disregard
Total defects should not exceed 4/module

| No. | Parameter | Criteria |
|---|---|---|
| 3 | Air Bubbles (between glass & polarizer) | (see table below) |

| | Zone | Acceptable number | | Class of Defects | AQL Level |
|---|---|---|---|---|---|
| Dimension | | A | B | | |
| D ≤ 0.15 | | * | * | Minor | 2.5 |
| 0.15 < D ≤ 0.25 | | 2 | * | | |
| 0.25 < D | | 0 | 1 | | |

* : Disregard
Total defects shall not excess 3/module.

| No. | Parameter | Criteria |
|---|---|---|
| 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 $( X + Y )/2 \leq 0.2mm$ (Less than 0.1 mm is no counted) (4) Deformation  $X \quad ( X + Y ) / 2 \leq 0.3mm$ 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. |

## 11.3 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
Sampling table: MIL-STD-105E
Inspection level: Level II

# 12. LOT NUMBERING SYSTEM

| 9 | 7 | 4 | 2 |

**Production week number**

**Production year**

# 13. LCM NUMBERING SYSTEM

**GM 123200 S F A Y B G I2**

VERSION:I2

**RoHS**

**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**
B –Blue
A –Amber
Y - yellow

**Backlight**
S –edge light LED B/L
E –EL
A –Array LED B/L

**MODE**
M – transmissive       R – Reflective
F – transflective       N - Negative

**LCD type**
G –STN Gray
S – STN Yellow
N – TN

**Series code**
1232**00** –122 Dots X 32Dot, **0** LCD type,**0** PCB type

**Model type**
CM – Character Module
**GM – Graphic Module**
CX – Custom Character Module
GX – Custom Graphic Module

# 14. 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".
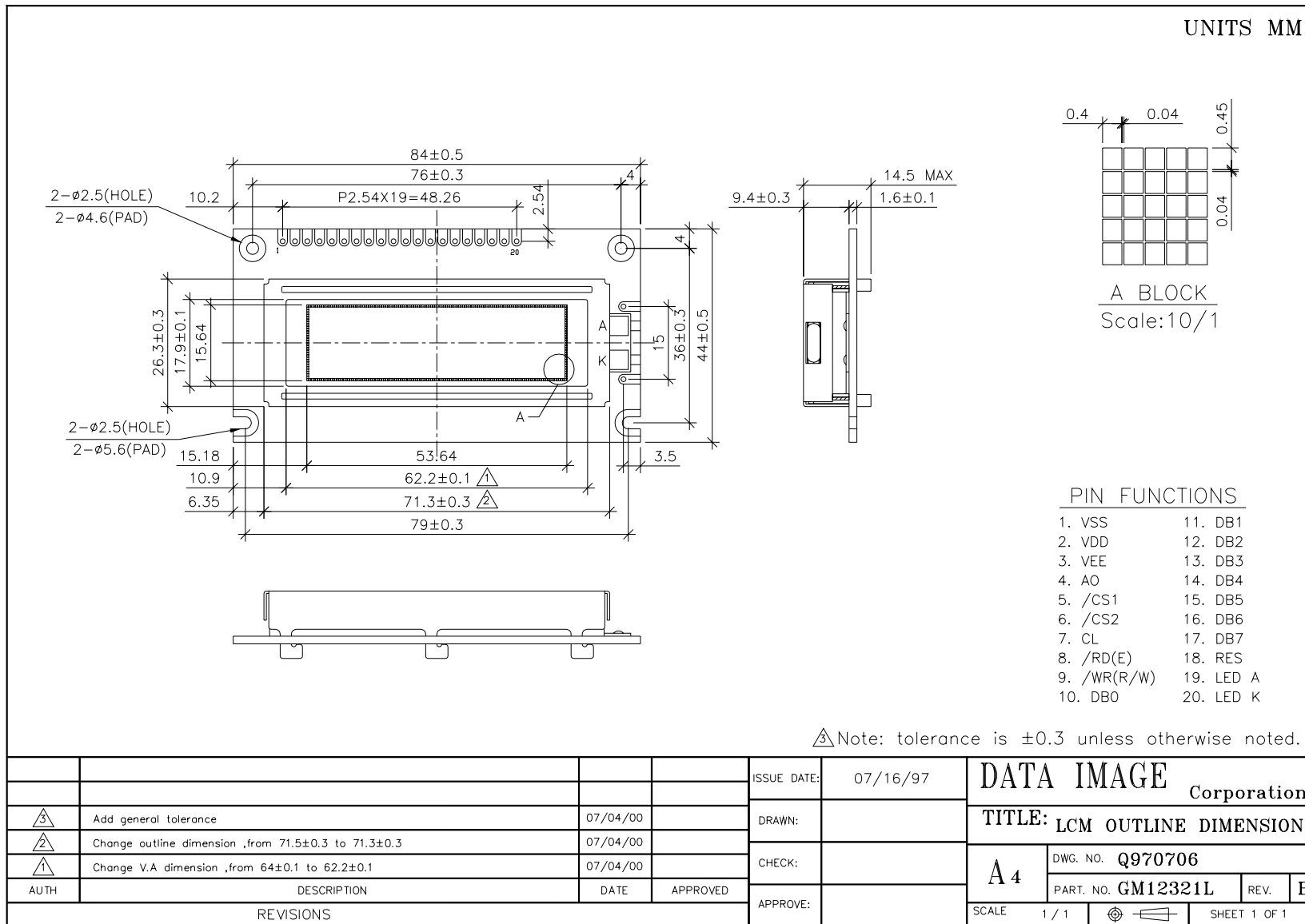
2.5 Storage
If any fluid leaks out of a damaged glass cell, wash off any human part that comes into contact with soap and water. Never swallow the fluid. The toxicity is extremely low but caution should be exercised at all the time.

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.

# 15. OUTLINE DRAWING

UNITS MM

84±0.5
76±0.3
P2.54X19=48.26
10.2
2.54
4

2-∅2.5(HOLE)
2-∅4.6(PAD)

1
20

26.3±0.3
17.9±0.1
15.64
15.64

A
K
15
36±0.3
44±0.5
4

A

2-∅2.5(HOLE)
2-∅5.6(PAD)

15.18
10.9
6.35

53.64
62.2±0.1 /1\
71.3±0.3 /2\
79±0.3

3.5

14.5 MAX
9.4±0.3
1.6±0.1

0.4    0.04    0.45
0.04

A BLOCK
Scale:10/1

## PIN FUNCTIONS

| | |
|---|---|
| 1. VSS | 11. DB1 |
| 2. VDD | 12. DB2 |
| 3. VEE | 13. DB3 |
| 4. AO | 14. DB4 |
| 5. /CS1 | 15. DB5 |
| 6. /CS2 | 16. DB6 |
| 7. CL | 17. DB7 |
| 8. /RD(E) | 18. RES |
| 9. /WR(R/W) | 19. LED A |
| 10. DB0 | 20. LED K |

/3\ Note: tolerance is ±0.3 unless otherwise noted.

| AUTH | DESCRIPTION | DATE | APPROVED |
|---|---|---|---|
| /3\ | Add general tolerance | 07/04/00 | |
| /2\ | Change outline dimension ,from 71.5±0.3 to 71.3±0.3 | 07/04/00 | |
| /1\ | Change V.A dimension ,from 64±0.1 to 62.2±0.1 | 07/04/00 | |

REVISIONS

ISSUE DATE: 07/16/97

DRAWN:

CHECK:

APPROVE:

DATA IMAGE Corporation

TITLE: LCM OUTLINE DIMENSION

A4

DWG. NO. Q970706
PART. NO. GM12321L    REV. B

SCALE  1/1    SHEET 1 OF 1

# 16. PACKAGE INFORMATION

Anti-static bag

LCM

(2)

Carton

(1)

| Item | Size(L*W*H) | | Quantity | Note |
|---|---|---|---|---|
| 1.Master Carton | 482*282*279 | | 1 | |
| 2.Inner Carton | 267*224*115 | | 4 | |
| Quantity Per Inner Carton | 48 | Quantity Per Master Carton | 192 | |
| N . W | 6.91 (kg) | G . W | 7.91 (kg) | |