

# HITACHI

## CUSTOMER'S ACCEPTANCE SPECIFICATIONS

### SX19V007-Z2A

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Accepted by: \_\_\_\_\_

Proposed by: *N. Koyama*

|                         |         |                                |      |       |
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| Displays, Hitachi, Ltd. | Sh. No. | 3284PS 2701 - SX19V007-Z2A - 3 | Page | 1-1/1 |
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#### RECORD OF REVISION

| Date          | Sheet No.                                     | Summary                                                                                                                                                                                                                                                                             |
|---------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Apr. 17, 2000 | 3284PS 2705-<br>SX19V007-Z2A-2<br>Page 5-1/3  | 5.1 ELECTRICAL CHARACTERISTICS OF LCD<br>(1) Changed Contrast Adjustment Voltage<br>TYP TYP<br>Ta= 5°C: T.B.D → 1.65<br>Ta=40°C: T.B.D → 1.95<br>(2) Revised Frame Frequency in (Note 6)<br>fFLM=70Hz → 100Hz                                                                       |
|               | 3283PS 2709-<br>SX19V007-Z2A-2<br>Page 9-2/2  | 9.2 BACK SIDE<br>Changed Rev. and Lot No.<br>0031TN00001 REV.A → 0042TN00001 REV.B                                                                                                                                                                                                  |
|               | 3284PS 2710-<br>SX19V007-Z2A-2<br>Page 10-1/4 | 10.2 DEFINITION OF ZONE<br>Revised definition<br>A zone: The effective display area -----<br>↓<br>The dots area -----<br>B zone: Area between the window of bezel line and the effective display area -----<br>↓<br>Area between the effective display area and the dots area ----- |
| Aug. 4, 2000  | 3284PS 2712-<br>SX19V007-Z2A-2<br>Page 12-2/2 | 12.2 REVISION<br>Added REV No. B                                                                                                                                                                                                                                                    |
|               | 3284PS 2705-<br>SX19V007-Z2A-3<br>Page 5-2/3  | 5.2.4 OPTICAL CHARACTERISTICS<br>Changed Transparency Specification<br>80% min → 79% min                                                                                                                                                                                            |
|               | 3284PS 2706-<br>SX19V007-Z2A-3<br>Page 6-1/3  | 6.1 OPTICAL CHARACTERISTICS<br>Added MIN Contrast ratio (20) at fFLM=70Hz                                                                                                                                                                                                           |
|               | 3284PS 2709-<br>SX19V007-Z2A-3<br>Page 9-1/2  | 9.1 DIMENSIONAL OUTLINE<br>(1) Fixed touch panel size and position<br>Size A → 173.2, Size B → 111.65<br>(2) Changed table of "Size A & B depend on type of TP"<br>(3) Changed size of effective area of touch panel<br>154.2x116.2 → Size A(154.2 or 153.2) x116.2                 |
|               | 3284PS 2710-<br>SX19V007-Z2A-3<br>Page 10-4/4 | (3) TOUCH PANEL APPEARANCE<br>(1) Changed Criteria of "Glass chipping"<br>a≤5, b≤3, C≤1.1 → a≤5, b≤2, C≤1.1<br>(2) Added Items<br>"Waviness of Top Sheet Surface"<br>"Newton Ring"                                                                                                  |
|               | 3284PS 2712-<br>SX19V007-Z2A-3<br>Page 12-2/2 | 12.2 REVISION<br>Added Rev. C and D                                                                                                                                                                                                                                                 |

|                         |      |              |         |                                |      |       |
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| Displays, Hitachi, Ltd. | Date | Aug. 4, 2000 | Sh. No. | 3284PS 2702 - SX19V007-Z2A - 3 | Page | 2-1/1 |
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### 3. MECHANICAL DATA

- |                           |                                                             |
|---------------------------|-------------------------------------------------------------|
| (1) Part Name             | SX19V007-Z2A                                                |
| (2) Module Size           | 197.0(W) mm x 145.0(H) mm x 9.8 max (D) mm                  |
| (3) Display Size          | 151.657(W) mm x 113.737(H) mm<br>Diagonal size 190mm (7.5") |
| (4) Dot Pitch             | 0.079(W) mm x 0.237(H) mm                                   |
| (5) Number of Dots        | 640 x 3 (R,G,B)(W) x 480 (H) dots                           |
| (6) Duty                  | 1/497 (Recommendation)                                      |
| (7) LCD                   | Negative type                                               |
| (8) Viewing Direction     | 6 O'clock                                                   |
| (9) Backlight             | Cold Cathode Fluorescent Lamp (CFL) x 1                     |
| (10) Weight               | 350 g typ                                                   |
| (11) Power Supply Voltage | 3.3V only                                                   |
| (12) Touch panel          | Resistance type                                             |

|                            |                      |            |                                |               |
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| Displays,<br>Hitachi, Ltd. | Date<br>Aug. 4, 2000 | Sh.<br>No. | 3284PS 2703 - SX19V007-Z2A - 3 | Page<br>3-1/1 |
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### 4. ABSOLUTE MAXIMUM RATINGS

| 4. 1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS (LCM) |          |      |         |      | VSS=0V/Standard |
|------------------------------------------------|----------|------|---------|------|-----------------|
| ITEM                                           | SYMBOL   | MIN  | MAX     | UNIT | COMMENT         |
| Power Supply for Logic                         | VDD-VSS  | 0    | 7.0     | V    |                 |
| Contrast Adjustment Voltage                    | VCON-VSS | 0    | VDD     | V    |                 |
| Input Voltage                                  | VI       | -0.3 | VDD+0.3 | V    | Note 1          |
| Input Current                                  | I        | 0    | 1       | A    |                 |
| Static Electricity                             |          | -    | -       | -    | Note 2          |

Note 1 DISP=OFF, FILM, CL1, CL2, DO-D7

Note 2 Make certain you are grounded when handling LCM

### 4. 2 ELECTRICAL ABSOLUTE MAXIMUM RATINGS (TOUCH PANEL)

| ITEM    | SPECIFICATION | NOTE |
|---------|---------------|------|
| Voltage | (7VDC) (max)  |      |
| Current | (25mA) (max)  |      |

### 4. 3 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

| ITEM                | OPERATING      |                       | STORAGE        |                                  | COMMENT              |
|---------------------|----------------|-----------------------|----------------|----------------------------------|----------------------|
|                     | MIN            | MAX                   | MIN            | MAX                              |                      |
| Ambient Temperature | 5°C            | 50°C                  | -20°C          | 60°C                             | Note 2, 3            |
| Humidity            | Note 1         |                       | Note 1         |                                  | Without condensation |
| Vibration           | -              | 2.45 m/s <sup>2</sup> | -              | 11.76 m/s <sup>2</sup><br>Note 5 | Note 4               |
| Shock               | -              | 29.4 m/s <sup>2</sup> | -              | 490 m/s <sup>2</sup><br>Note 5   | XYZ directions 11ms  |
| Corrosive Gas       | Not Acceptable |                       | Not Acceptable |                                  |                      |

Note 1 Ta<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-----<48h, at 60°C-----<168h

Note 3 Background color changes slightly depending on ambient temperature.  
This phenomenon is reversible.

Note 4 5Hz~100Hz (Except resonance frequency)

Note 5 This module should be operated normally after finish the test.

Note 6 When LCM is operated at 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 at 5°C will be slower.

|                            |                      |            |                                |               |
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|----------------------------|----------------------|------------|--------------------------------|---------------|

## 5. ELECTRICAL CHARACTERISTICS

### 5.1 ELECTRICAL CHARACTERISTICS OF LCD

| ITEM                                      | SYMBOL                                                | CONDITION                                                 | MIN         | TYP  | MAX           | UNIT |
|-------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------|-------------|------|---------------|------|
| Power Supply Voltage                      | VDD                                                   | VDD-VSS=3.3V                                              | 3.15        | 3.30 | 3.45          | V    |
| Contrast Adjustment Voltage (Note 1)      | VCON                                                  | -                                                         | 0.8         | -    | 2.8           | V    |
| Input Voltage for Logic Circuits (Note 2) | VI                                                    | "H" level<br>"L" level                                    | 0.8VDD<br>0 | -    | VDD<br>0.2VDD | V    |
| Power Supply Current (Note 3)(Note 4)     | IDD                                                   | VDD-VSS=3.3V                                              | Q           | -    | 40            | mA   |
|                                           |                                                       | fFLM=70Hz                                                 | CF          | -    | 65            | mA   |
|                                           |                                                       | VDD-VSS=3.3V                                              | Q           | -    | 50            | mA   |
|                                           |                                                       | fFLM=100Hz                                                | CF          | -    | 80            | mA   |
| Input Leak Current                        | I <sub>con</sub> (Note 5)<br>I <sub>in</sub> (Note 2) | V <sub>con</sub> =0.8-2.8V<br>V <sub>in</sub> =VDD or VSS | -           | -    | (20)<br>±1.0  | μA   |
| Contrast Adjustment Voltage (Note 6)      | V <sub>con</sub>                                      | Ta=5°C, φ=0°<br>Ta=25°C, φ=0°<br>Ta=40°C, φ=0°            | 0.8         | 1.65 | -             | V    |
| Frame Frequency (Note 7)                  | fFLM                                                  | -                                                         | 70          | 100  | 120           | Hz   |

(Note 1) In proportion as the VCON voltage decrease the brightness will increase.

(Note 2) DISP=OFF, FLM, CL1, CL2, DD-D7

(Note 3) Duty=1/497, Ta=25°C, Display pattern: "Q" test pattern(Q), Checker pattern(CF).

(Note 4) Rush Current of Power ON: 2A(PK) × 100μs

(Note 5) VCON

(Note 6) The Contrast Adjustment Voltage is specified as 1.8±0.3V under the condition, when an optimum contrast is obtained by naked eyes as the "Q" test pattern.

fFLM=100Hz, Duty=1/497

(Note 7) Need to make sure of flickering and rippling of display when setting the Frame Frequency in your set.

(Note 8) Absolute maximum ratings voltage of CFL cable for this module is as follows.

V<sub>CFL</sub> side: 2kV

V<sub>SS</sub> side: 300V

This inverter design shall not exceed the rated voltage.

|                            |      |              |            |                                |      |       |
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|----------------------------|------|--------------|------------|--------------------------------|------|-------|

## 5.2 ELECTRICAL CHARACTERISTICS OF TOUCH PANEL

### 5.2.1 OPERATING CONDITION

| ITEM              | SPECIFICATION |
|-------------------|---------------|
| Operating Voltage | 5VDC          |
| Operating Current | 10-25mA       |

### 5.2.2 ELECTRICAL CHARACTERISTICS

| ITEM                        | SPECIFICATION  | NOTE                  |
|-----------------------------|----------------|-----------------------|
| Resistance between terminal | X1-X2<br>Y1-Y2 | 350-1050Ω<br>200-600Ω |
| Insulance Resistance        | X-Y            | 10MΩ min              |
| Linearity                   | X<br>Y         | 1.5% max<br>1.5% max  |
| Chattering                  |                | 10ms max              |

### 5.2.3 MECHANICAL CHARACTERISTICS

| ITEM               | SPECIFICATION | NOTE       |
|--------------------|---------------|------------|
| Pen input pressure | 0.5N max      |            |
| Surface hardness   | 2H min        | JIS K 5400 |

### 5.2.4 OPTICAL CHARACTERISTICS

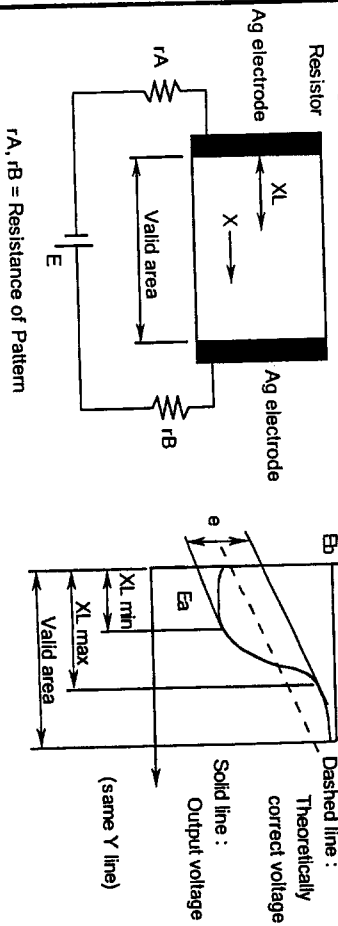
| ITEM         | SPECIFICATION | NOTE |
|--------------|---------------|------|
| Transparency | 79% min       |      |

|                            |      |              |            |                                |      |       |
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### Note 1 : Test Method and Conditions

The difference ("e") between the theoretical output voltage and the actual output voltage when pressure is applied to any point within the valid area must be as indicated below.

$$e \leq \text{applied voltage} \times 0.03 (\pm 0.015)$$



### 5.3 ELECTRICAL CHARACTERISTICS OF BACKLIGHT

| ITEM                           | SYMBOL   | MIN  | TYP   | MAX  | UNIT | NOTE    |
|--------------------------------|----------|------|-------|------|------|---------|
| Lamp Voltage                   | VL       | -    | (460) | -    | Vrms | Ta=25°C |
| Frequency                      | fL       | (50) | (60)  | (70) | Hz   |         |
| Lamp Current (1 lamp) (Note 6) | L        | 3.0  | (4.0) | 5.0  | mA   | Ta=25°C |
| Starting discharge Voltage     | VS       | 1400 | -     | -    | Vrms | Ta=5°C  |
|                                | (Note 2) |      |       |      |      |         |

(Note 1) Please design your lamp driving circuit (inverter) according to the above specifications, and inform Hitachi of it.

(Note 2) Starting discharge voltage is increased when LCM is operating at low er temperature. Please check the characteristics of your inverter before applying to your set.

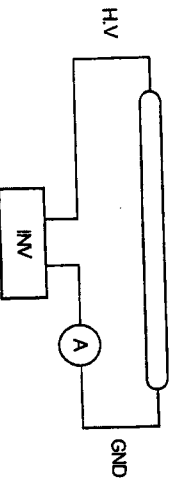
(Note 3) Average life time of CFL will be decreased when LCM is operating at low er temperature.

(Note 4) Under low er 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 CFL is used over 4.5mA, it may cause uneven contrast near CFL location, due to heat dispersion from CFL.

(Note 6) Under low er temperature, please check CFL characteristics on your inverter.

(Note 7)



(Note 8) We recommend to equip protection circuit (To stop output) which works under abnormal operation to the inverter for CFL.

|                            |                      |            |                                |               |
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### 6. OPTICAL CHARACTERISTICS

#### 6.1 OPTICAL CHARACTERISTICS OF LCD

Ta=25°C (Backlight On)

| ITEM                          | SYMBOL          | CONDITION                                    | MIN | TYP    | MAX | UNIT | NOTE       |
|-------------------------------|-----------------|----------------------------------------------|-----|--------|-----|------|------------|
| View ing area                 | $\phi 2-\phi 1$ | $\theta=0^\circ, K \geq 2.0$                 | -   | (40)   | -   | deg  | 1), 2)     |
| Contrast ratio                | K               | $\phi=0^\circ, \theta=0^\circ$<br>fFLM=100Hz | -   | (40)   | -   | -    | 3), 5), 6) |
|                               |                 | $\phi=0^\circ, \theta=0^\circ$<br>fFLM=70Hz  | 20  | (30)   | -   | -    |            |
| Response time (rise)          | tr              | $\phi=0^\circ, \theta=0^\circ$               | -   | (300)  | -   | ms   | 4)         |
| Response time (fall)          | tf              | $\phi=0^\circ, \theta=0^\circ$               | -   | (250)  | -   | ms   | 4)         |
| Color tone<br>(Primary Color) |                 |                                              |     |        |     |      |            |
| Red                           | x               |                                              | -   | (0.49) | -   | -    |            |
|                               | y               |                                              | -   | (0.30) | -   | -    |            |
| Green                         | x               |                                              | -   | (0.31) | -   | -    |            |
|                               | y               |                                              | -   | (0.51) | -   | -    |            |
| Blue                          | x               |                                              | -   | (0.16) | -   | -    |            |
|                               | y               |                                              | -   | (0.14) | -   | -    |            |
| White                         | x               |                                              | -   | (0.28) | -   | -    |            |
|                               | y               |                                              | -   | (0.30) | -   | -    |            |

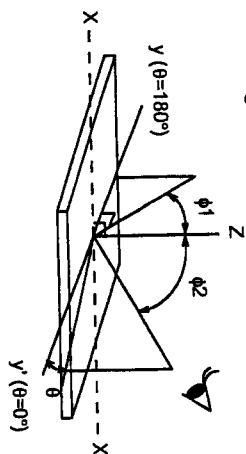
(Measurement condition : Hitachi standard, Duty=1/497)

Note 1)-7) : See next page.

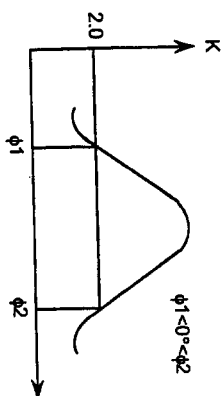
|                            |                      |            |                                |               |
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Note 1. Definition of  $\theta$  and  $\phi$

(Normal)  
Viewing direction

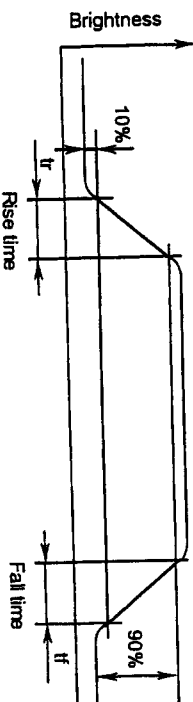
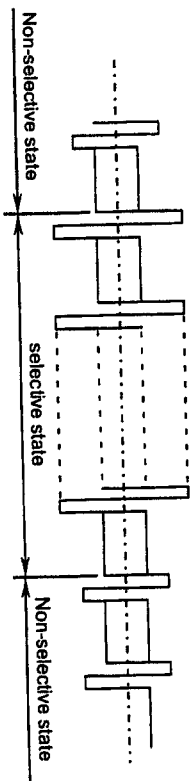


Note 2. Definition of viewing angle  $\phi_1$  and  $\phi_2$



Contrast ratio K vs viewing angle  $\phi$

Note 4. Definition of optical response time



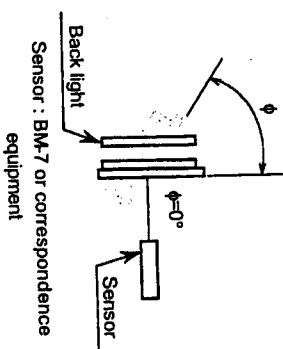
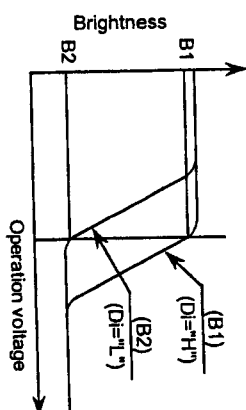
Note 5. Hitachi will not do 100% inspection for minimum value. Minimum value is for reference.

Note 6. Hitachi will do sampling inspection for minimum value.

Note 7. The LCD driving voltage should be adjusted at the voltage where the peak contrast is obtained.

Note 3. Definition of contrast "K"

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



|                            |                      |            |                                |               |
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## 6.2 OPTICAL CHARACTERISTICS OF BACKLIGHT

| ITEM                  | MIN | TYP  | MAX | UNIT              | NOTE                                                        |
|-----------------------|-----|------|-----|-------------------|-------------------------------------------------------------|
| Brightness            | -   | (70) | -   | cd/m <sup>2</sup> | IL=4.0mA<br>Note 1), 2)                                     |
| Rise Time             | -   | 5    | -   | Minute            | IL=4.0mA<br>Brightness 80%<br>Undermentioned<br>Note 1), 4) |
| Brightness Uniformity | -   | -    | ±30 | %                 |                                                             |

Measurement condition : Hitachi standard)

CFL : INITIAL, Ta=25°C

Display data should be all "ON"

The LCD driving voltage should be adjusted at the voltage where the peak contrast is obtained, when set pattern is all "Q".

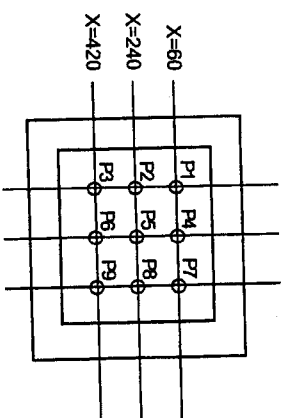
(Note 1) Measurement after 10 minutes from CFL operating.

Average value of 9 points (Note 3).

(Note 2) Brightness control : 100%

(Note 3) Measurement of the following 9 places on the display.

X=180 Y=960 Y=1740



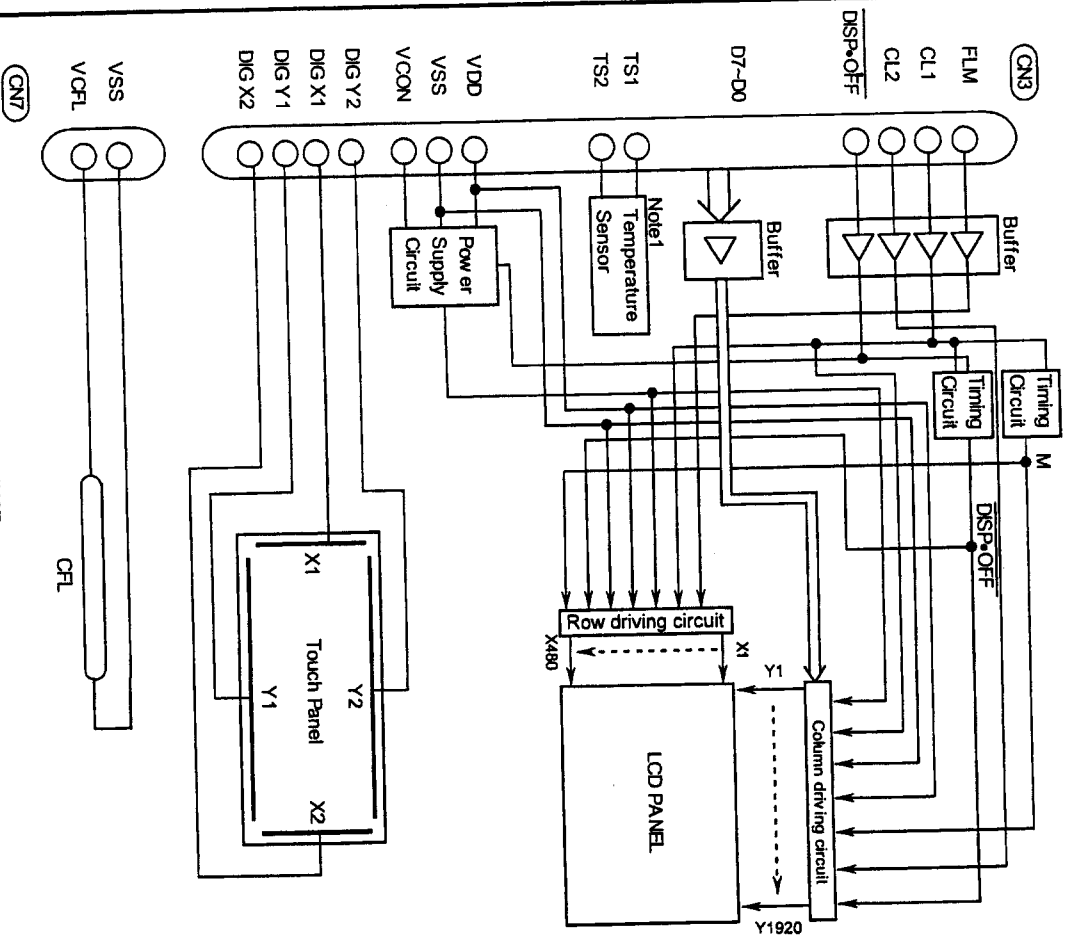
(Note 4) Definition of the brightness tolerance.

$$\left( \frac{\text{Max brightness or Min brightness} - \text{Average brightness}}{\text{Average brightness}} \right) \times 100$$

(Note 5) FFLM=100Hz, Duty=1/497

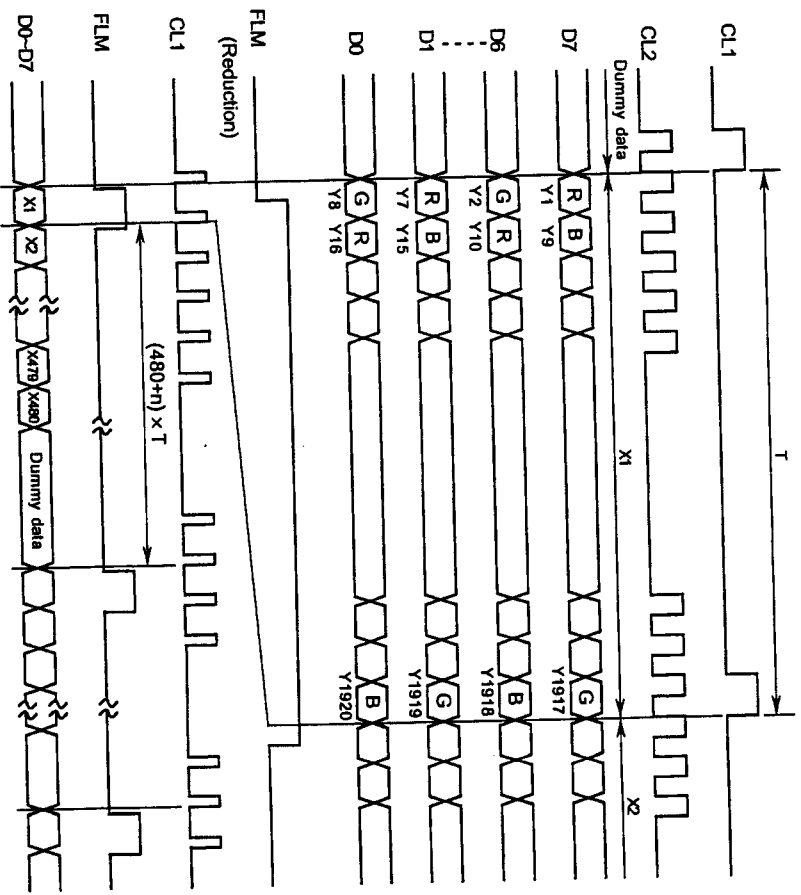
|                            |                      |            |                                |               |
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## 7. BLOCK DIAGRAM



## 8. INTERFACE TIMING CHART

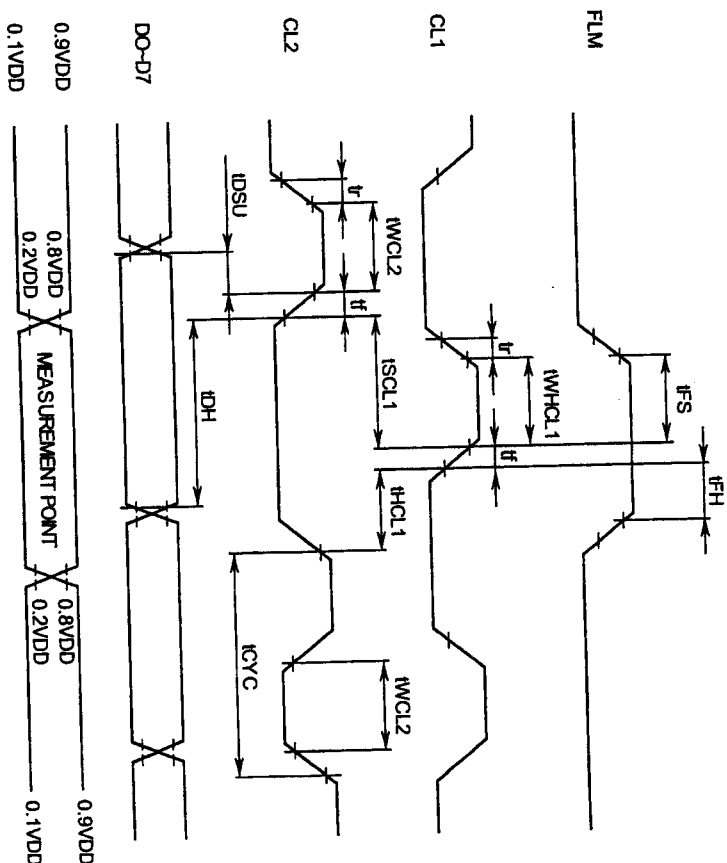
### 8.1 TIMING CHART



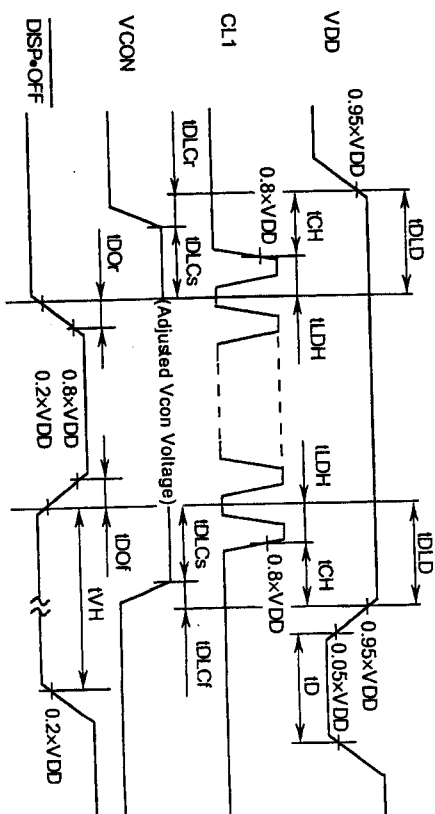
## 8.2 INTERFACE TIMING SPECIFICATION

VDD=3.3±0.15V, VSS=0V, Vcon=0.8~2.8V, Ta=+5°C~+40°C

| ITEM                           | SYMBOL             | MIN | TYP | MAX | UNIT |
|--------------------------------|--------------------|-----|-----|-----|------|
| CL1 pulse width $t_{\text{F}}$ | $t_{\text{WHCL1}}$ | 200 | —   | —   | ns   |
| Clock cycle time               | $t_{\text{CYC}}$   | 40  | —   | —   | ns   |
| CL2 pulse width                | $t_{\text{WHCL2}}$ | 15  | —   | —   | ns   |
| Clock set up time              | $t_{\text{SCH1}}$  | 20  | —   | —   | ns   |
| Clock hold time                | $t_{\text{HCL1}}$  | 50  | —   | —   | ns   |
| Clock rise fall time           | $t_{\text{r, f}}$  | —   | —   | 30  | ns   |
| Data set up time               | $t_{\text{DSU}}$   | 10  | —   | —   | ns   |
| Data hold time                 | $t_{\text{DH}}$    | 10  | —   | —   | ns   |
| *FLM* set up time              | $t_{\text{FS}}$    | 100 | —   | —   | ns   |
| *FLM* hold time                | $t_{\text{FH}}$    | 30  | —   | —   | ns   |



## 8.3 POWER ON / OFF SEQUENCE



| SYMBOL            | MIN | MAX | UNIT | COMMENT     |
|-------------------|-----|-----|------|-------------|
| $t_{\text{ILD}}$  | 70  | —   | ms   | (Note 1, 5) |
| $t_{\text{CH}}$   | 0   | 200 | ms   | (Note 1)    |
| $t_{\text{LDH}}$  | 20  | —   | ms   | (Note 1)    |
| $t_{\text{IDOf}}$ | —   | 100 | ns   | (Note 2)    |
| $t_{\text{IDCr}}$ | 0   | —   | ms   | (Note 2)    |
| $t_{\text{IDCf}}$ | 0   | —   | ms   | (Note 2, 3) |
| $t_{\text{IDCs}}$ | 0   | —   | ms   | (Note 4)    |
| $t_{\text{IDVH}}$ | 200 | —   | ms   | (Note 4)    |
| $t_{\text{ID}}$   | 400 | —   | ms   | (Note 1)    |

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

(Note 2) Hitachi recommends you to use  $\overline{\text{DISP-OFF}}$  function. Display quality may deteriorate if you don't use  $\overline{\text{DISP-OFF}}$  function.

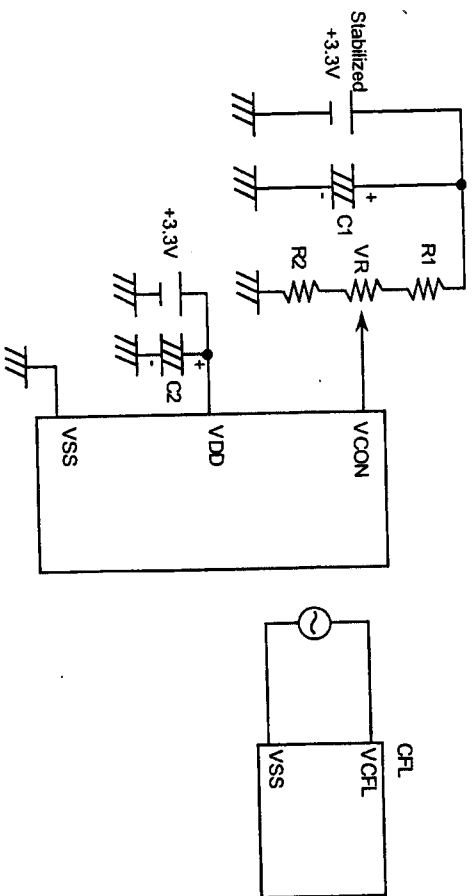
(Note 3)  $0.8 \leq V_{\text{con}} \leq 2.8\text{V}$

Vcon voltage should be set up to adjusted voltage before  $\overline{\text{DISP-OFF}}$  signal arises. Otherwise, when  $\overline{\text{DISP-OFF}}$  signal arises, adjusted contrast image may not be generated.

(Note 4) Please keep the specified sequence of  $\overline{\text{DISP-OFF}}$  signal because if the  $t_{\text{VH}}$  is short enough, LCD panel may not be restarted.

(Note 5) In case of  $t_{\text{ILD}}$  is less than 100ms, some lines may appear on screen. However, there is no problem on reliability.

# 8.4 POWER SUPPLY FOR LCM



|                            |      |              |            |                                |      |       |
|----------------------------|------|--------------|------------|--------------------------------|------|-------|
| Displays,<br>Hitachi, Ltd. | Date | Aug. 4, 2000 | Sh.<br>No. | 3284PS 2708 - SX19V007-Z2A - 3 | Page | 8-4/6 |
|----------------------------|------|--------------|------------|--------------------------------|------|-------|

# 8.5 INPUT DATA ALLOCATION TABLE

| Data Signal | D 7 | D 6 | D 5 | D 4 | D 3 | D 2 | D 1 | D 0 | D 7 | D 6 | D 5 | D 4 | D 3 | D 2 | D 1 | D 0 |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1           |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 2           |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 3           |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 4           |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 5           |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 6           |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 7           |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 8           |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 9           |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 10          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 11          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 12          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 13          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 14          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 15          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 16          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 17          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 18          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 19          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 20          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 21          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 22          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 23          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 24          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 25          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 26          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 27          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 28          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 29          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 30          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 31          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 32          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 33          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 34          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 35          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 36          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 37          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 38          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 39          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 40          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 41          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 42          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 43          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 44          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 45          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 46          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 47          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 48          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 49          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 50          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 51          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 52          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 53          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 54          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 55          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 56          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 57          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 58          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 59          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 60          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 61          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 62          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 63          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 64          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 65          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 66          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 67          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 68          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 69          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 70          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 71          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 72          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 73          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 74          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 75          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 76          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 77          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 78          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 79          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 80          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 81          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 82          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 83          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 84          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 85          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 86          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 87          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 88          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 89          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 90          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 91          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 92          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 93          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 94          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 95          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 96          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 97          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 98          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 99          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 100         |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

R: RED  
G: GREEN  
B: BLUE

|                            |      |              |            |                                |      |       |
|----------------------------|------|--------------|------------|--------------------------------|------|-------|
| Displays,<br>Hitachi, Ltd. | Date | Aug. 4, 2000 | Sh.<br>No. | 3284PS 2708 - SX19V007-Z2A - 3 | Page | 8-5/6 |
|----------------------------|------|--------------|------------|--------------------------------|------|-------|



# 8.6 INTERNAL PIN CONNECTION

CN3 MOLEX 52435-2891

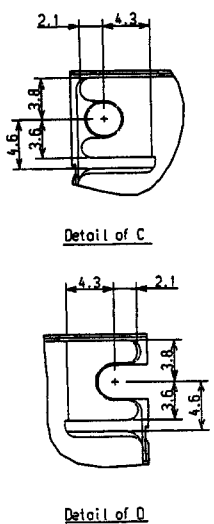
| Pin No. | SIGNAL      | LEVEL | FUNCTION                |
|---------|-------------|-------|-------------------------|
| 1       | TS2         | -     | Temperature Sensor PIN2 |
| 2       | TS1         | -     | Temperature Sensor PIN1 |
| 3       | VSS         | -     | GND                     |
| 4       | Vcon        | -     | Contrast Adjust         |
| 5       | VSS         | -     | GND                     |
| 6       | VDD         | -     | Power Supply for Logic  |
| 7       | VDD         | -     | Power Supply for Logic  |
| 8       | DISP-ON/OFF | H/L   | H: ON / L: OFF          |
| 9       | D7          | H/L   | Display Data            |
| 10      | D6          |       |                         |
| 11      | D5          |       |                         |
| 12      | D4          |       |                         |
| 13      | D3          |       |                         |
| 14      | D2          |       |                         |
| 15      | D1          |       |                         |
| 16      | D0          |       |                         |
| 17      | VSS         | -     | GND                     |
| 18      | CL2         | H/L   | Data Shift              |
| 19      | VSS         | -     | GND                     |
| 20      | CL1         | H/L   | Data Latch              |
| 21      | VSS         | -     | GND                     |
| 22      | FLM         | H     | First Line Marker       |
| 23      | VSS         | -     | GND                     |
| 24      | VSS         | -     | GND                     |
| 25      | DKGY2       | -     | Touch panel Y2          |
| 26      | DKGX1       | -     | Touch panel X1          |
| 27      | DKGY1       | -     | Touch panel Y1          |
| 28      | DKGX2       | -     | Touch panel X2          |

CN7 JST : BHSR-02VS-1 (Suitable Connector : (1) SMO2B-BHSS-1-TB

or  
(2) Housing : BHSMR-02VS-1  
Contact pin : SBHSM-002T-P0.5)

| Pin No. | SIGNAL | LEVEL | FUNCTION             |
|---------|--------|-------|----------------------|
| 1       | VCFL   | A.C.  | Power Supply for CFL |
| 2       | VSS    | -     | GND for CFL          |

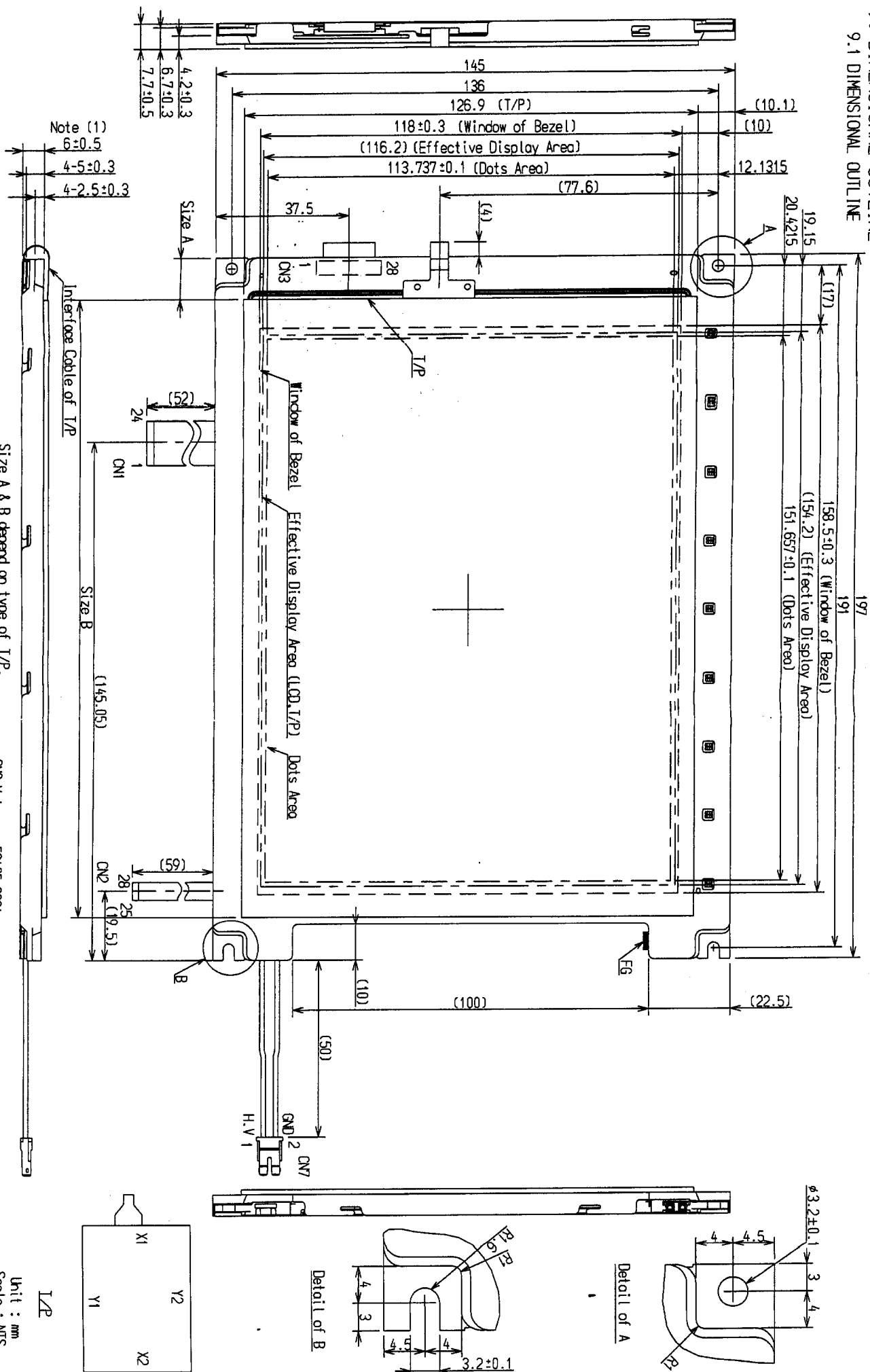
| Displays,<br>Hitachi, Ltd. | Date | Aug. 4, 2000 | Sh.<br>No. | 3284PS 2708 - SX19V007-ZZA - 3 | Page | 8-6/6 |
|----------------------------|------|--------------|------------|--------------------------------|------|-------|
|----------------------------|------|--------------|------------|--------------------------------|------|-------|



Unit : mm  
Scale : NTS

## 9.2 BACK SIDE

## 9.1 DIMENSIONAL OUTLINE



Note(1) Measurement Should be under a pressure of  $9.8 \times 10^4 \text{ Pa}$  (1.0kgf/cm<sup>2</sup>) at the measurement point.

Size A & B depend on type of T/P.

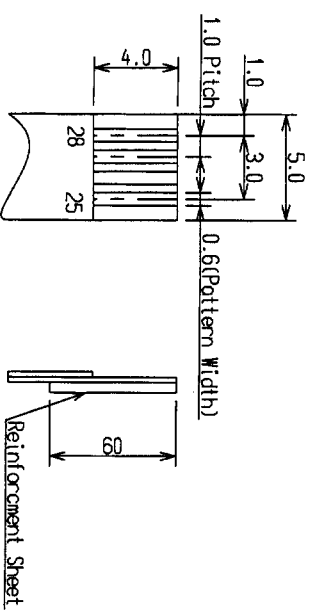
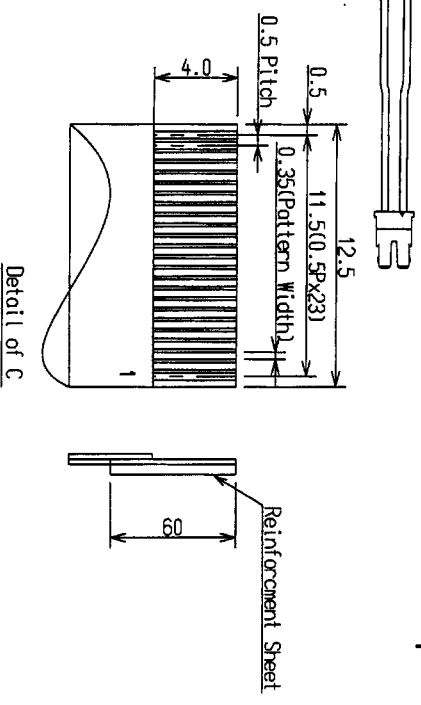
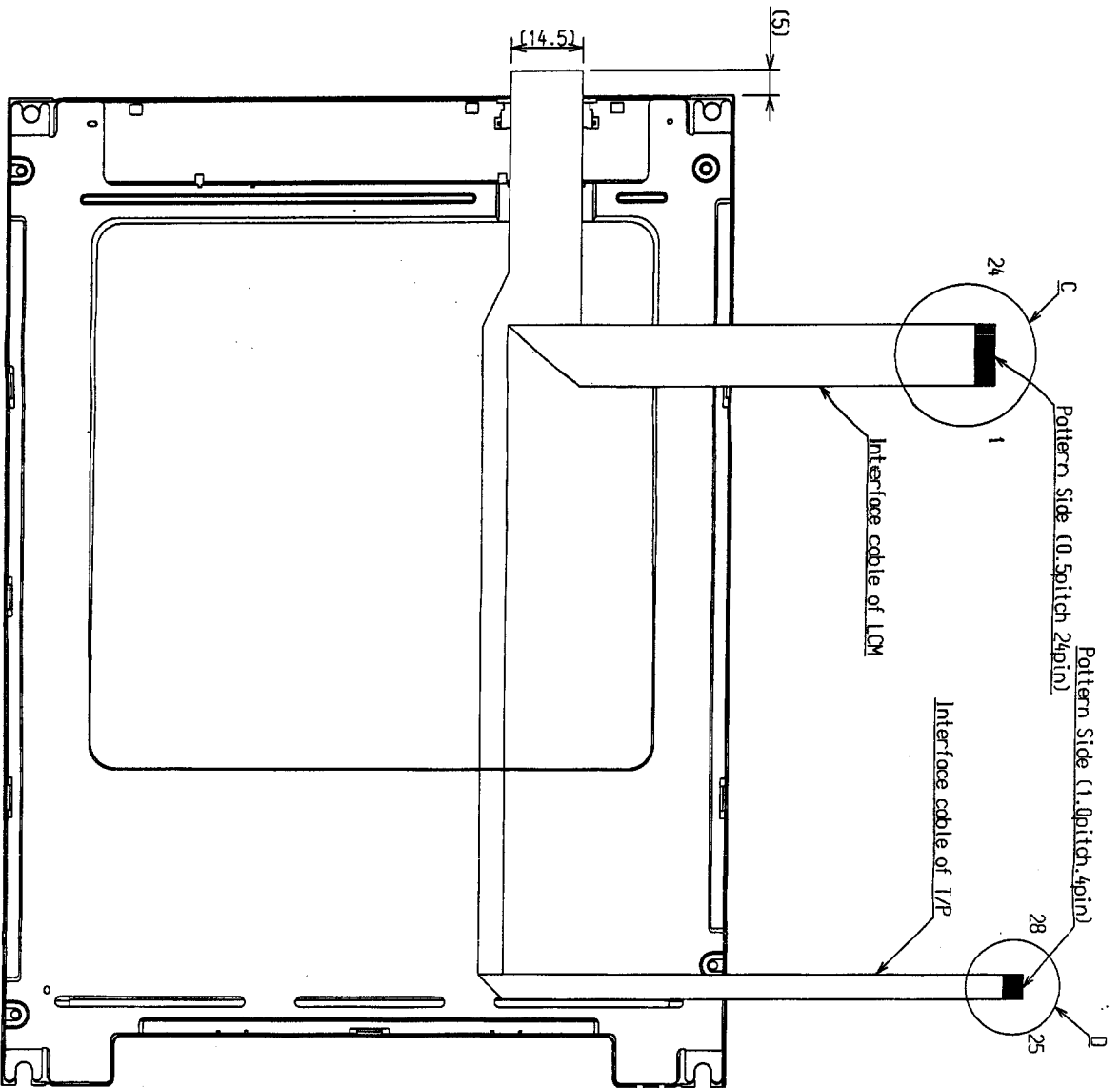
| T/P    | Size A  | Size B |
|--------|---------|--------|
| Type A | (11.65) | 173.2  |
| Type B | (14.15) | 170.0  |

CN3 Molex : 52435-2891  
CN7 JST : BHSR-02VS-1

|                            |      |              |             |                            |
|----------------------------|------|--------------|-------------|----------------------------|
| Displays,<br>Hitachi, Ltd. | Date | July 26, '99 | S h.<br>No. | 3283PS 2709-SX19V001-Z2A-2 |
|----------------------------|------|--------------|-------------|----------------------------|

Unit : mm  
Scale : NTS  
Measurement tolerance :  $\pm 0.5$

## 9.2 BACK SIDE



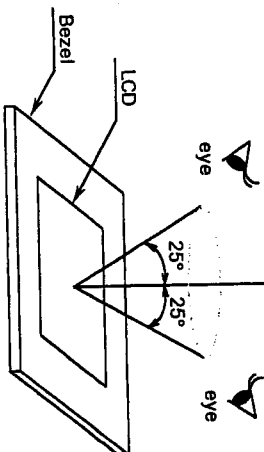
Unit : mm  
Scale : NTS

## 10. APPEARANCE STANDARD

### 10.1 APPEARANCE INSPECTION CONDITION

Visual inspection should be done under the following condition.

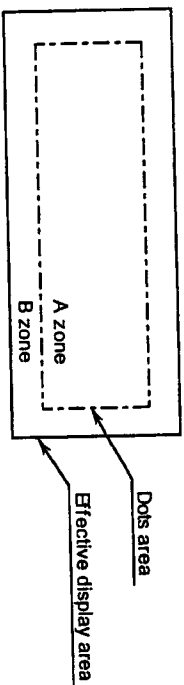
- (1) The inspection should be done in a dark room.
- (2) The CFL should be lighted with the prescribed inverter.
- (3) The distance between eyes of an inspector and the LCD Module is 25cm.
- (4) The viewing zone is shown in the figure.  
Viewing angle  $\leq 25^\circ$



### 10.2 DEFINITION OF ZONE

A zone : The dots area specified at page 9-1/2 of this document.

B zone : Area between the effective display area line and the dots area (A zone) line specified at page 9-1/2 of this document.



## 10.3 APPEARANCE SPECIFICATION

### (1) LCD APPEARANCE

If the problem related to this section occurs about this item, the responsible persons of both party (Customer and HITACHI) will discuss the matter in detail.

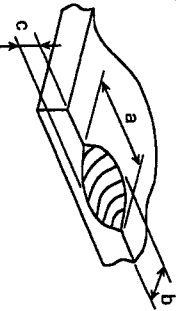
| No. | ITEM                                 | CRITERIA                                                               | APPLIED ZONE              |
|-----|--------------------------------------|------------------------------------------------------------------------|---------------------------|
|     | Scratches                            | Distinguished one is not acceptable (To be judged by HITACHI STANDARD) | A                         |
|     | Dent                                 | Same as above                                                          | A                         |
|     | Wrinkles in Polarizer                | Same as above                                                          | A                         |
| L   | Bubbles                              | Average diameter D (mm)                                                | Maximum acceptable number |
|     |                                      | $D \leq 0.2$                                                           | Ignored                   |
|     |                                      | $0.2 < D \leq 0.3$                                                     | 12                        |
|     |                                      | $0.3 < D \leq 0.5$                                                     | 3                         |
|     |                                      | $0.5 < D$                                                              | none                      |
| C   | Stains, Foreign materials, Dark spot | Filamentous (Line shape)                                               |                           |
|     |                                      | Length L (mm)                                                          | Width W (mm)              |
|     |                                      | $L \leq 2.0$                                                           | $W \leq 0.03$             |
|     |                                      | $L \leq 3.0$                                                           | $0.03 < W \leq 0.05$      |
|     |                                      | $L \leq 2.5$                                                           | $0.05 < W \leq 0.1$       |
| D   |                                      | Round (Dot shape)                                                      |                           |
|     |                                      | Average diameter D (mm)                                                | Maximum acceptable number |
|     |                                      | $D < 0.2$                                                              | Ignored                   |
|     |                                      | $0.2 \leq D < 0.3$                                                     | 10                        |
|     |                                      | $0.3 \leq D < 0.4$                                                     | 5                         |
|     |                                      | $0.4 \leq D$                                                           | none                      |
|     |                                      | The total number                                                       | Filamentous + Round = 10  |
|     |                                      | Those wiped out easily are acceptable                                  |                           |
|     | Color tone                           | To be judged by HITACHI STANDARD                                       | A                         |
|     | Color uniformity                     | Same as above                                                          | A                         |

| CRITERIA                         |                                                       |                         |               |                           |               | APPLIED ZONE |                                  |         |      |
|----------------------------------|-------------------------------------------------------|-------------------------|---------------|---------------------------|---------------|--------------|----------------------------------|---------|------|
| No.                              | ITEM                                                  |                         |               |                           |               |              |                                  |         |      |
| L                                | Contrast irregularity (Spot)                          | Average diameter D (mm) | Contrast      | Maximum acceptable number | Minimum space | A            |                                  |         |      |
|                                  |                                                       | D≤0.25                  |               |                           |               |              | To be judged by HITACHI STANDARD | ignored | —    |
|                                  |                                                       | 0.25<D≤0.35             |               |                           |               |              |                                  | 10      | 20mm |
|                                  |                                                       | 0.35<D≤0.5              |               |                           |               |              |                                  | 4       | 20mm |
|                                  |                                                       | 0.5<D≤0.7               |               |                           |               |              |                                  | 3       | 50mm |
|                                  |                                                       | 0.7<D                   |               |                           |               |              |                                  | none    | —    |
| C                                | Contrast irregularity (Line)<br>(A pair of scratches) | Width W (mm)            | Length L (mm) | Maximum acceptable number | Minimum space | A            |                                  |         |      |
|                                  |                                                       | W ≤ 0.25                | L ≤ 1.2       | 2                         | 20mm          |              |                                  |         |      |
|                                  |                                                       | W ≤ 0.2                 | L ≤ 1.5       | 3                         | 20mm          |              |                                  |         |      |
|                                  |                                                       | W ≤ 0.15                | L ≤ 2.0       | 3                         | 20mm          |              |                                  |         |      |
|                                  |                                                       | W ≤ 0.1                 | L ≤ 3.0       | 4                         | 20mm          |              |                                  |         |      |
|                                  |                                                       | The w hole number       |               |                           |               |              | 6                                |         |      |
| Rubbing Scratch                  |                                                       |                         |               |                           |               | —            |                                  |         |      |
| To be judged by HITACHI STANDARD |                                                       |                         |               |                           |               |              |                                  |         |      |
|                                  |                                                       |                         |               |                           |               |              |                                  |         |      |

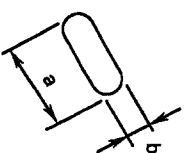
## (2) CFL BACKLIGHT APPEARANCE

| No. | ITEM                     | CRITERIA                |                           |                           |  | APPLIED ZONE |
|-----|--------------------------|-------------------------|---------------------------|---------------------------|--|--------------|
| C   | Dark spots               | Average diameter D (mm) | Maximum Acceptable number |                           |  | A            |
| F   | White spots              | D ≤ 0.4                 | Ignored                   |                           |  |              |
| L   | Foreign materials (Spot) | 0.4 < D                 | none                      |                           |  |              |
| B   | Foreign materials (Line) | Width W (mm)            | Length L (mm)             | Maximum acceptable number |  | A            |
| A   |                          | W ≤ 0.2                 | L ≤ 2.5                   | 1                         |  |              |
| C   |                          |                         | 2.5 < L                   | none                      |  |              |
| K   |                          | 0.2 < W                 | —                         | none                      |  |              |
| L   | Scratches                | Width W (mm)            | Length L (mm)             | Maximum acceptable number |  |              |
| I   |                          | W ≤ 0.1                 | —                         | Ignored                   |  |              |
| G   |                          | 0.1 < W ≤ 0.2           | L ≤ 11.0                  | 1                         |  | A            |
| H   |                          |                         | 11.0 < L                  | none                      |  |              |
| T   |                          | 0.2 < W                 | —                         | none                      |  |              |

## (3) TOUCH PANEL APPEARANCE

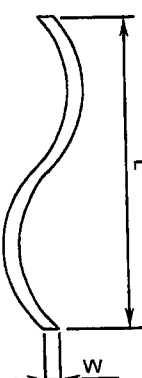
| No. | ITEM                                       | CRITERIA                                                                                                                                                           |                                    | APPLIED ZONE |
|-----|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--------------|
|     | Foreign material<br>(Black or White spots) | Average diameter D (mm)                                                                                                                                            | Criteria                           | A            |
|     |                                            | $D \leq 0.25$                                                                                                                                                      | ignored                            |              |
|     |                                            | $0.25 < D \leq 0.35$                                                                                                                                               | 6                                  |              |
|     |                                            | $0.35 < D$                                                                                                                                                         | none                               |              |
|     |                                            | Width W (mm)                                                                                                                                                       | Criteria                           |              |
|     | Foreign material (Line)<br>or<br>Scratches | $W \leq 0.05$                                                                                                                                                      | ignored                            | A            |
|     |                                            | $0.05 < W \leq 0.1$                                                                                                                                                | $10 \leq L$ : none<br>$L < 10$ : 4 |              |
|     |                                            | $0.1 < W$                                                                                                                                                          | Spot spec                          |              |
|     |                                            | Average diameter D (mm)                                                                                                                                            | Criteria                           |              |
|     |                                            | $D \leq 0.2$                                                                                                                                                       | ignored                            |              |
|     | Fisheyes on film surface                   | $0.2 < D \leq 0.4$                                                                                                                                                 | 6                                  | A            |
|     |                                            | $0.4 < D \leq 0.6$                                                                                                                                                 | 2                                  |              |
|     |                                            | $0.6 < D$                                                                                                                                                          | none                               |              |
|     |                                            |                                                                                                                                                                    |                                    |              |
|     |                                            |                                                                                                                                                                    |                                    |              |
|     | Uncleanliness                              | No conspicuous dirt                                                                                                                                                |                                    | A            |
|     |                                            | $a \leq 5, b \leq 2, c \leq 1.1$                                                                                                                                   |                                    |              |
|     |                                            | None of the above figures may be exceeded.<br>The number of chipped are as does not need to be considered.<br>(This specification applied to corner of glass also) |                                    |              |
|     | Glass chipping                             |                                                                                 |                                    |              |
|     | Glass Crack                                | No cracks are allowed. No chipping to touch with circuit.                                                                                                          |                                    |              |
|     | Waviness of Top Sheet Surface              | Fluorescent lamp must not appear distorted.                                                                                                                        |                                    | A            |
|     | Newton Ring                                | No unusual interference fringe must show when seen through the top surface sheet                                                                                   |                                    | A            |

Note (1) Definition of Average diameter (D)



$$D = \frac{a+b}{2}$$

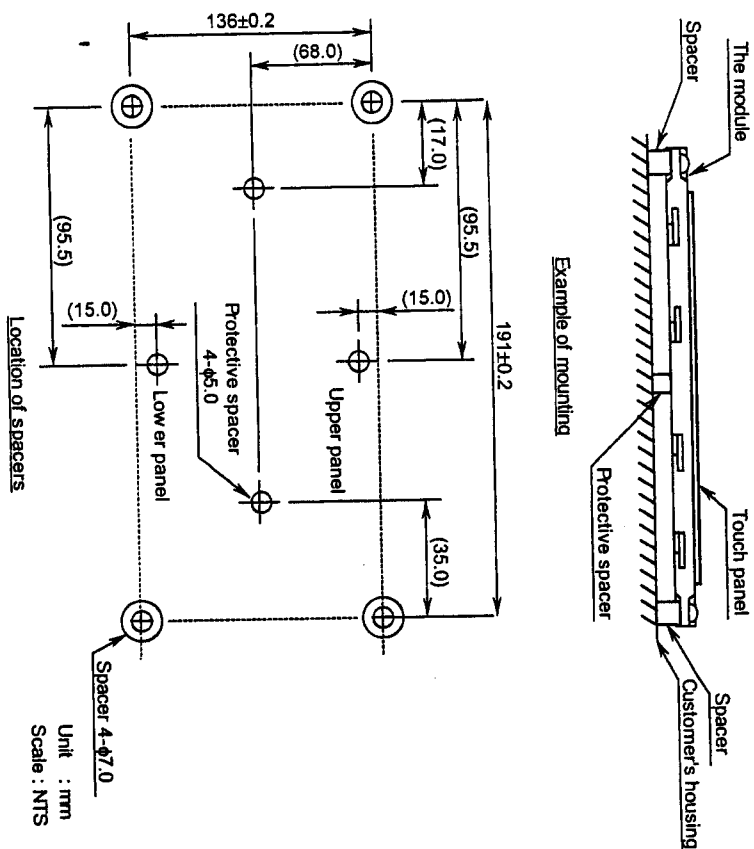
Note (2) Definition of Length (L) and Width (W)



## 11. PRECAUTION IN DESIGN

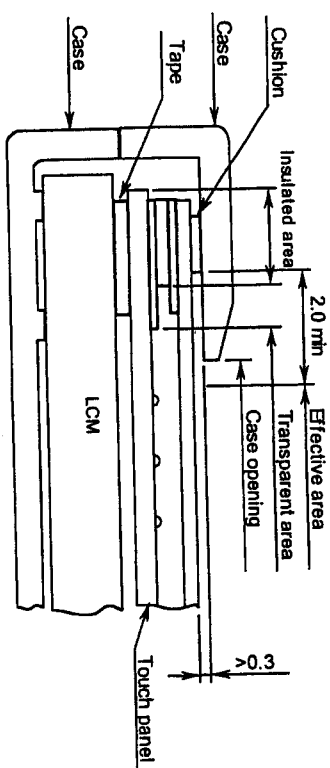
### 11.1 MOUNTING PRECAUTION

Please mount the LCD Module using mounting holes arranged in 4 corners, and please pay attention to the following.



- (1) To prevent the module cover from being pressed, the distance between the module and the fitting plate, which means the length of the spacers, should be shorter than 1.0mm.
- (2) We recommend you to use protective spacers in order to protect the module from any kinds of shocks to your set.
- (3) For the module to be used at upright position, the case shall have a structure where the touch panel screen does not shift with its own weight.

- (4) When assembling the touch panel and your case, please refer to the figure below.



- (5) The clearance between the touch panel and the case shall be designed so that the case edge never presses the input screen when it is deformed by heat or other causes.
- (6) The case shall be designed not to touch the tail portion (FPC for touch panel).
- (7) The boundary space between the effective area and the insulated area is unstable. Touching this area may effect the operation of the touch panel. The case must be designed so that it does not touch the boundary space.

### 11.2 PRECAUTIONS AGAINST ELECTROSTATIC DISCHARGE

As this module contains CMOS LSIs, it is not strong against electrostatic discharge. Make certain that the operator's body is connected to the ground through a list band etc. And don't touch I/F pins directly.

### 11.3 POWER ON SEQUENCE

Input signals should not be applied to LCD module before power supply voltage is applied and reaches to specified voltage (3.0±0.15V). If the above sequence is not kept, CMOS LSIs of LCD module may be damaged due to latch up phenomenon.

### 11.4 HANDLING PRECAUTIONS

- (1) Since the polarizer on the top, and the aluminum plate on the bottom tend to be easily damaged, they should be handled with full care so as not to get them touched, pushed or rubbed by a piece on glass, tweezers and anything else which are harder than a pencil lead 3H.
  - (2) As the adhesives used for adhering upper/lower polarizers and aluminum plate are made of organic substances which will be deteriorated by a chemical reaction with such chemicals as acetone, toluene, ethanol and isopropylalcohol. The following solvents are recommended for use : Normal hexane
- Please contact us when it is necessary for you to use chemicals other than the above.

|                            |                      |            |                                |                |
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- (3) Lightly wipe to clean the dirty surface with absorbent cotton or other soft material like chamois, soaked in the recommended chemicals without scrubbing it hardy.  
Always wipe the surface horizontally or vertically. Never give a wipe in a circle. To prevent the display surface from damage and keep the appearance in good state, it is sufficient, in general, to wipe it with absorbent cotton.

- (4) Immediately wipe off saliva or water drop attached on the display area because it may cause deformation or faded color.

- (5) Foggy dew deposited on the surface may cause a damage, stain or dirt to the polarizer.  
When you need to take out the LCD module from some place at low temperature for test, etc. it is required to be warmed them up to be temperature higher than room temperature before taking them out.

- (6) Touching the display area or HF pins with bare hands or contaminating them are prohibited, because the stain on the display area and poor insulation between terminals are often caused by being touched with bare hands.  
(Some cosmetics are detrimental to polarizers.)

- (7) In general, the glass is fragile so that it, especially on its periphery, tends to be cracked or chipped in handling. Please do not give the LCD module sharp shocks caused by falling etc.

- (8) Maximum pressure to the surface must be less than  $1.96 \times 10^4$  Pa.  
And if the pressure area is less than  $1 \text{ cm}^2$ , maximum pressure must be less than 1.96N.

- (9) Top sheets shall be cleaned gently using a soft cloth such as those used for glasses.  
Hard wiping accumulated dust will leave scars on the surface even using a cloth.

#### 11.5 OPERATION PRECAUTION

- (1) Using a LCM module beyond its maximum ratings may result in its permanent destruction.  
LCM module's should usually be used under recommended operating conditions shown in chapter 5. Exceeding any of these conditions may adversely affect its reliability.

- (2) Response time will be extremely delayed at lower temperature than the specified operating temperature range and on the other hand LCD's show a dark blue color at higher temperature. However those phenomena do not mean defects of the LCD module. Those phenomena will disappear in the specified operating temperature range.

- (3) If the display area is pushed hard during operation, some display patterns will be abnormally displayed.

|                            |      |              |            |                                |      |        |
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- (4) A slight dew depositing on terminals may cause electrochemical reaction which leads to terminal open circuit. Please operate the LCD module under the relative condition of 40°C 85%RH.

- (5) Resistance range : Your controller shall be set up to allow the resistance range of touch panel specified in our CAS.

- (6) Pointed position of touch panel may shift owing to a change in resistance of touch panel depending on the operation condition. To compensate this shift, the set shall be given a calibration function.

- (7) Input shall be made with a stylus pen (polyacetal, R0.8). Chances are very high that use of a metal piece including a ball point pen or sharp edge will impair accuracy.

- (8) The touch panel is an auxiliary input device. The system shall be designed to have other input device.

#### 11.6 STORAGE

In case of storing LCD module for a long period of time (for instance, for years) for the purpose of replacement use, the following precautions necessary.

- (1) Store the LCD modules in a dark place ; do not expose them to sunlight or ultraviolet rays.

- (2) Keep the temperature between 10°C and 35°C at normal humidity.

- (3) Store the LCD modules in the container which is used for shipping from us.

- (4) No articles shall be left on the surface over an extended period of time.

#### 11.7 SAFETY

The LCD modules include Cold Cathode Fluorescent Lamp (CFL). CFL contains a small amount of mercury. Please follow local ordinances or regulations for disposal.

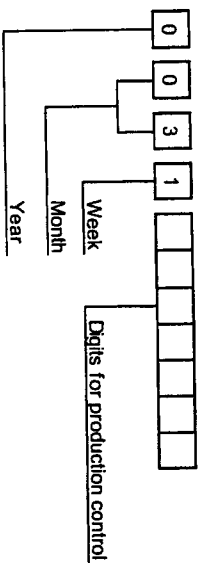
Wear finger coils or gloves whenever handling or assembling a touch panel because its glass edges are sharp.

|                            |      |              |            |                                |      |        |
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## 12. DESIGNATION OF LOT MARK

### 12.1 LOT MARK

Lot mark is consisted of 4 digits for production lot and 6 or 7 digits for production control.



| Year | Figure in lot mark |
|------|--------------------|
| 2000 | 0                  |
| 2001 | 1                  |
| 2002 | 2                  |
| 2003 | 3                  |

| Month | Figure in lot mark | Month | Figure in lot mark |
|-------|--------------------|-------|--------------------|
| Jan.  | 01                 | July  | 07                 |
| Feb.  | 02                 | Aug.  | 08                 |
| Mar.  | 03                 | Sep.  | 09                 |
| Apr.  | 04                 | Oct.  | 10                 |
| May   | 05                 | Nov.  | 11                 |
| June  | 06                 | Dec.  | 12                 |

| Week (day in Calendar) | Figure in lot mark |
|------------------------|--------------------|
| 1-7                    | 1                  |
| 8-14                   | 2                  |
| 15-21                  | 3                  |
| 22-28                  | 4                  |
| 29-31                  | 5                  |

|                         |      |              |         |                                |      |        |
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## 12.2 REVISION

| REV No. | ITEM                                      | LOT No. | PRODUCTION CONTROL No. |
|---------|-------------------------------------------|---------|------------------------|
| A       | -                                         | 0031TN  | 00001-                 |
| B       | Vcon tuned under low and high temperature | 0042TN  | 00001-                 |
| C       | Segment LCD Driver : BD66134U             | -       | 00001-                 |
| D       | Segment LCD Driver : WFP-7102             | -       | 00001-                 |

## 12.3 LOCATION OF LOT MARK

Either Label A or Label B is being attached on the back side of LCM.

Label A

**HITACHI**

SX19V007-ZZA

REV. ☐ MADE IN ☐

Lot No. Production Control No. Rev No. Note 1

Label B

**HITACHI**

SX19V007-ZZA

Lot No. Production Control No. REV. ☐ MADE IN ☐

Rev No. Note 1

高電圧注意  
WARNING HIGH VOLTAGE

52 00 04 6 K 1 1 20001

Note 1 : JAPAN or TAIWAN

|                         |      |              |         |                                |      |        |
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### 13. PRECAUTION FOR USE

- (1) A limit sample should be provided by the both parties on an occasion when the both parties agree to its necessity.  
Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.
- (2) On the following occasions, the handling of the problem should be decided through discussion and agreement between responsible persons of the both parties.
  - (1) When a question is arisen in the specifications.
  - (2) When a new problem is arisen which is not specified in the specifications.
  - (3) When an inspection specification change or operating condition change by customer is reported to HITACHI, and some problem is arisen in the specification due to the change.
  - (4) When a new problem is arisen at the customer's operating set for sample evaluation
- (3) Regarding the treatment for maintenance and repairing, both parties will discuss it in six month later after latest delivery of this product.

The precaution that should be observed when handling LCM have been explained above.  
If any points are unclear or if you have any requests, please contact Hitachi.

|                            |      |              |            |                              |      |        |
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