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To : \_\_\_\_\_

## Specification of FDTC TFT-LCD module

|                        |
|------------------------|
| <b>FLC48SXC8V-11AA</b> |
|------------------------|

| Approval           |
|--------------------|
| Date :<br><br>By : |

This Product is designed, developed and manufactured as contemplated for general use, including without limitation, general office use, personal use, household use, and ordinary industrial use, but is not designed, developed and manufactured as contemplated for use accompanying fatal risks or dangers that, unless extremely high safety is secured, could lead directly to death, personal injury, severe physical damage or other loss (hereinafter "High Safety Required Use"), including without limitation, nuclear reaction control in nuclear facility, aircraft flight control, air traffic control, mass transport control, medical life support system, missile launch control in weapon system. Fujitsu shall not be liable against the Customer and/or any third party for any claims or damages arising in connection with the High Safety Required Use of the Product without permission.

Specification No. : Tech Bes LCD-00267

Issue Date : July 8, 2004

Issued by : F. Yamada

F. Yamada  
Director

Products Engineering Dept., LCD Products Div.

**FUJITSU DISPLAY TECHNOLOGIES CORPORATION**



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|      |      |        |       |       |             | TITLE <b>FLC48SXC8V-11AA</b>             |  |
|      |      |        |       |       |             | DRAW. NO. <b>Tech Bes LCD-00267</b>      |  |
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**1. APPLICATION**

This specification is applied to the 19-inch SXGA supported TFT-LCD module.

A

A

**2. PRODUCT NAME AND MODEL NUMBER**

2-1 Product Name : LCD Module

2-2 Model Name : FLC48SXC8V-11AA

2-3 Drawing Number : NA19026-C281

B

B

**3. OVERVIEW**

This LCD module has a TFT active matrix type liquid crystal panel 1280x1024 pixels, and diagonal size of 48cm(19-inch). This LCD has a LVDS dual interface and can display 16,777,216 colors.

The power supply of this LCD module is +5V DC voltage.

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C

**4. CONFIGURATION**

This LCD module consists of a color TFT-LCD panel that is mounted with TFT driver ICs and a cold-cathode fluorescent tube back-light.

The inverter for the back-light is not included.

Figure 4-1 shows a block diagram of this LCD module.

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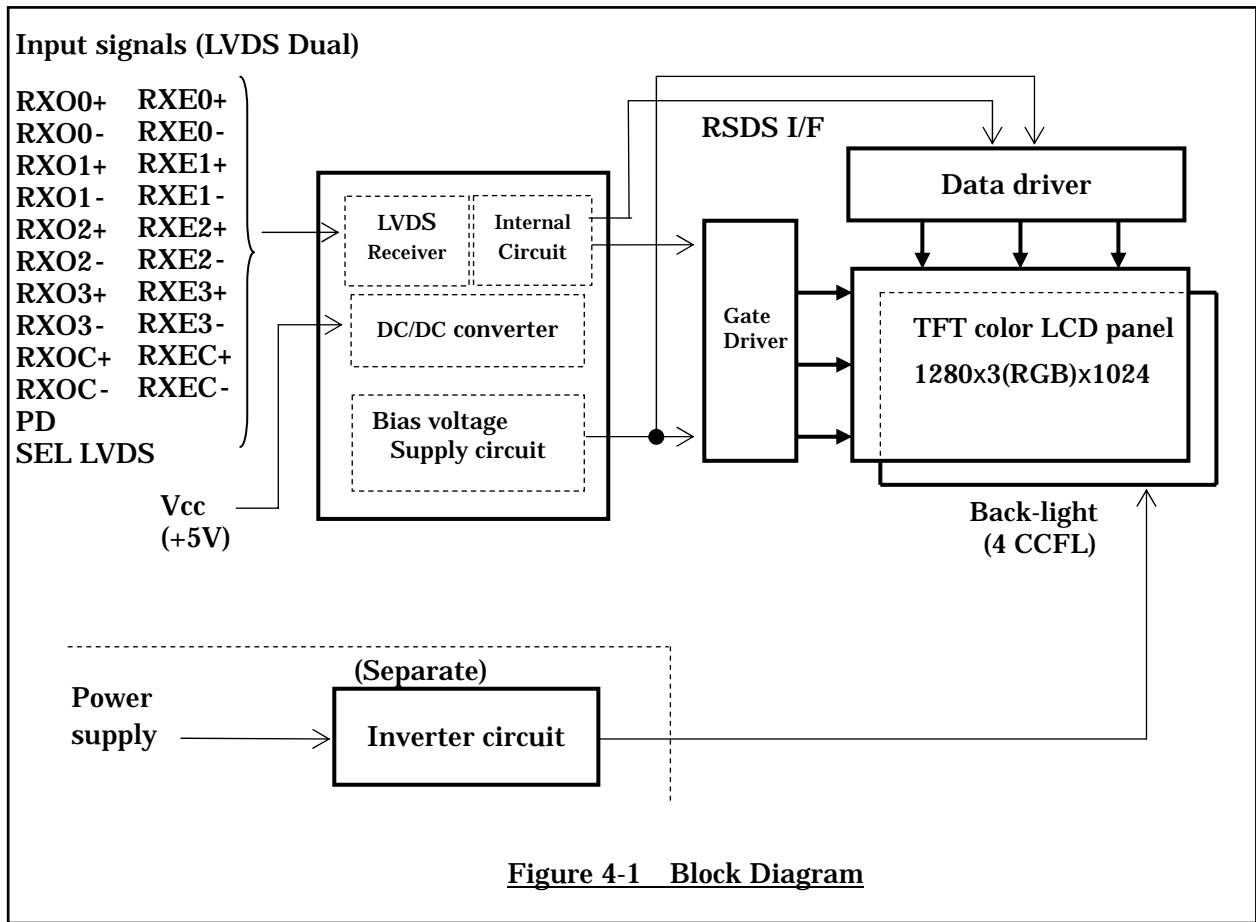
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|      |      |        |       |       |             | DRAW. NO. <b>Tech Bes LCD-00267</b>      |  |
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|      |      |        |       |       |             | 3/                                       |  |



## 5. MECHANICAL SPECIFICATIONS

Table 5-1 shows the mechanical specifications of this LCD module.

**Table 5-1 Mechanical Specifications**

| Item               | Specifications     | Unit | Remark   |
|--------------------|--------------------|------|--|
| Dimensions         | 404.2x330x20(TYP.) | mm   | Edge type back-light is used.<br>(CCFLx4)<br><br>Without inverter.<br><br>For details on dimensions,<br>see dimensional outline drawing.<br>(Figure 20-1,2)<br><br>Excluding inverter. |
| Display Resolution | (1280x3)x1024      | —    |  |
| Display Dot Area   | 376.32x301.056     | mm   |  |
| Dot Pitch          | (0.098x3)x0.294    | mm   |  |
| Pixel Aspect Ratio | 1:1                | —    |  |
| Weight             | 2,800 MAX.         | g    |  |
| FG-SG              | Short circuit      | —    |  |

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|        |      |        |       |       |  | DRAW. NO. <b>Tech Bes LCD-00267</b> |  |
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|        |      |        |       |       |  | 4 /                                 |  |

### 6. ABSOLUTE MAXIMUM RATING

Table 6-1 shows the absolute maximum rating of this LCD module.

**Table 6-1 Absolute Maximum Rating**

| Item   | Symbol          | Condition | MIN. | TYP. | MAX. | Unit |
|--|-----------------|-----------|------|------|------|------|
| Supply Voltage   | V <sub>CC</sub> | Ta=25°C   | -0.3 | —    | 6.0  | V    |
| Input Signal Voltage<br>(LVDS signal,<br>PD,SEL LVDS ) | V <sub>IN</sub> | Ta=25°C   | -0.3 | —    | 3.6  | V    |

### 7. RECOMMENDED OPERATING CONDITIONS

Table 7-1 shows the recommended operating conditions of this LCD module.

**Table 7-1 Recommended Operating Conditions**

| Item                  | Symbol          | MIN.            | TYP. | MAX. | Unit |
|-----------------------|-----------------|-----------------|------|------|------|
| Supply Voltage(Logic) | V <sub>CC</sub> | 4.75            | —    | 5.25 | V    |
| Ripple Voltage        | V <sub>CC</sub> | V <sub>RP</sub> | —    | 0.1  | V    |

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## 8. ELECTRICAL SPECIFICATIONS

Table 8-1 shows the electrical specifications of this LCD module. Figure 8-1 shows the measurement circuit. Figure 8-2(A) shows the equivalent circuit of the logic signal input area. Figure 8-2(B) shows the equivalent circuit of the supply voltage Input area.

**Table 8-1 Electrical Specifications**

| Item                                      | Symbol               | Condition  | MIN.   | TYP. | MAX. | Unit | Remark            |
|---|----------------------|--|--|------|------|------|-------------------|
| Differential-input Voltage (Hign)         | V <sub>IH</sub>      | V <sub>CM</sub> =+1.2V   | —  | —    | 100  | mV   |                   |
| Differential-input Voltage (Low)          | V <sub>IL</sub>      |  | -100   | —    | —    | mV   |                   |
| Input Voltage (High)                      | V <sub>IH</sub>      | V <sub>CC</sub> =+5.0±0.25V<br>V <sub>SS</sub> =0V<br>DCLK=54MHz<br>Ta=25° C | 2.0  | —    | 3.3  | V    | PD<br>SEL<br>LVDS |
| Input Voltage (Low)                       | V <sub>IL</sub>      |  | 0  | —    | 0.8  | V    |                   |
| Supply Current                            | I <sub>CC</sub>      |  | —  | 900  | 1500 | mA   | *1                |
| Supply Rush Current                       | I <sub>SCC</sub>     |  | —  | —    | 3.5  | A    | *2                |
| Supply Rush Current Duration(1.5A excess) | T <sub>SCC</sub>     | —  | —  | 1.0  | ms   |      |                   |
| BACK LIGHT                                | CCFL Turn on Voltage | V <sub>S</sub>   | f <sub>L</sub> =50kHz, Ta=25°C                               | —    | 1400 | 1600 | V <sub>rms</sub>  |
|   |                      |  | f <sub>L</sub> =50kHz, Ta=0°C                                | —    | 1500 | 1600 |                   |
| D   | Lighting Voltage     | V <sub>L</sub>   | f <sub>L</sub> =50kHz<br>I <sub>L</sub> =7mA                 | —    | 750  | —    | V <sub>rms</sub>  |
|   | Lighting Frequency   | f <sub>L</sub>   | V <sub>L</sub> =750V <sub>rms</sub>                          | 40   | 50   | 60   | kHz               |
|   | Tube Current         | I <sub>L</sub>   | f <sub>L</sub> =50kHz<br>V <sub>L</sub> =750V <sub>rms</sub> | 4    | 7    | 8    | mArms *4          |

(\*1) Typical current situation : Color bar pattern. V<sub>CC</sub>=5.0V  
Maximum current situation : White pattern. V<sub>CC</sub>=4.75V  
Without rush current.

(\*2) These items prescribe the rush current for starting internal DC/DC.  
Charging current to capacitors of V<sub>CC</sub> is not prescribed.

(\*3) Back-light specifications are valid when using a suitable inverter such as the FLCV-13

(\*4) Tube current (I<sub>L</sub>) shows the value of the current that is consumed at one lamp.  
This LCD module has 4 lamps. Each 2 lamps are placed at upper side and lower side of the display.  
2 lamps is connected in parallel. Each low voltage terminals are connected with separate cable to Back-light connecter.

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|        |      |        |       |       |             | TITLE              |  | FLC48SXC8V-11AA |       |  |     |
|        |      |        |       |       |             | DRAW. NO.          |  |                 | CUST. |  |     |
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Measurement circuit is based on Figure 8-1.

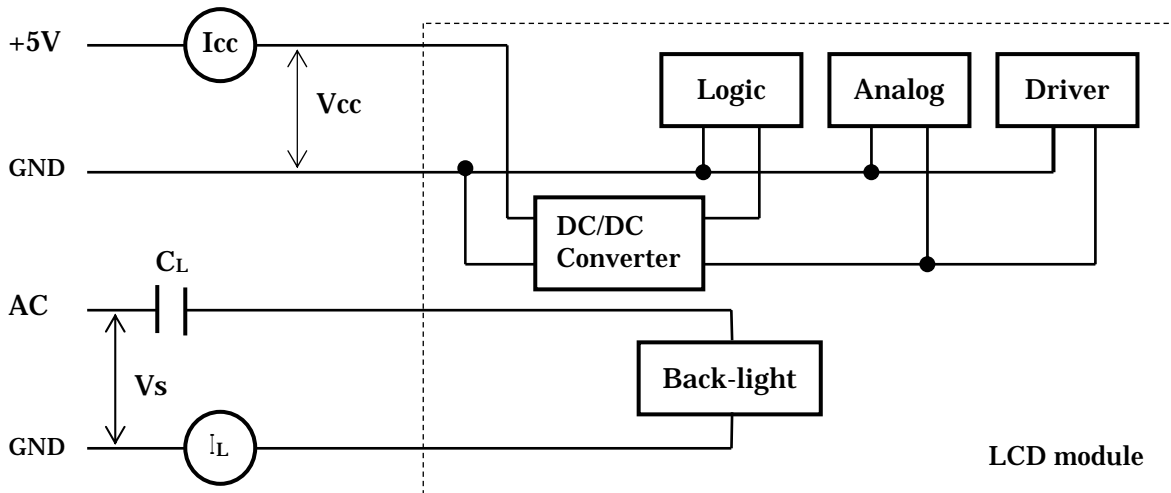


Figure 8-1 Measurement circuit

Input signals (LVDS Dual)

- RX00+ RXE0+
- RX00- RXE0-
- RX01+ RXE1+
- RX01- RXE1-
- RX02+ RXE2+
- RX02- RXE2-
- RX03+ RXE3+
- RX03- RXE3-
- RXOC+ RXEC+
- RXOC- RXEC-

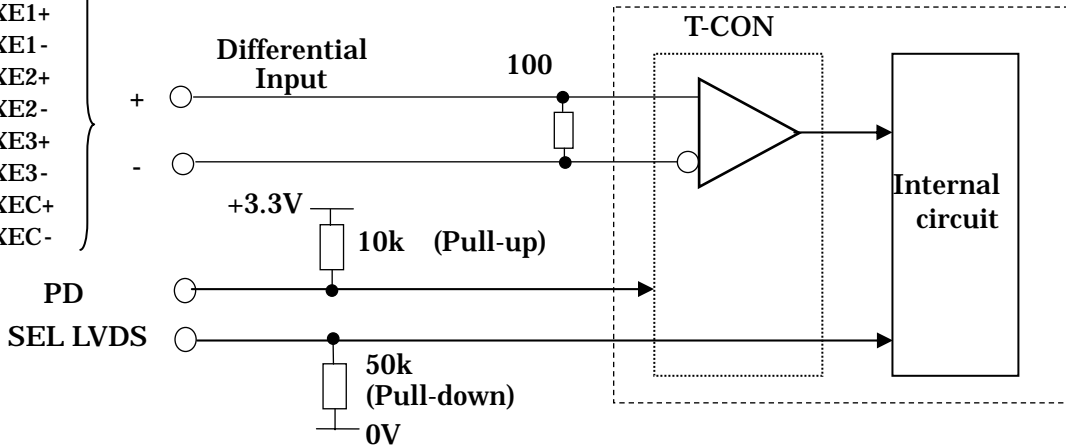


Figure 8-2(A) Equivalent circuit of logic signal Input

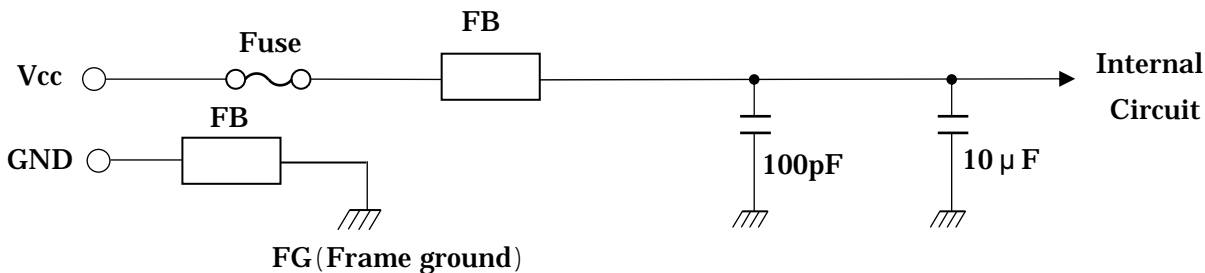


Figure 8-2(B) Equivalent circuit of power supply

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| DRAW. NO.                                |  | Tech Bes LCD-00267 |
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# 9. OPTICAL SPECIFICATIONS

Table 9-1 shows the optical specifications of this LCD module.

Table 9-1 Optical Specifications

Ta=25°C, Signal timing=Typ.

| Item   | Symbol          | Condition                  | Specifications                          |                        |                                  | Unit  | Remark |                              |                         |                  |
|--|-----------------|----------------------------|---|------------------------|----------------------------------|-------|--------|------------------------------|-------------------------|------------------|
|  |                 |                            | MIN.                                    | TYP.                   | MAX.                             |       |        |                              |                         |                  |
| Visual Angle                                       | Horizontal      | $\theta_{L,R}$             | CR 10                                   | $\theta_{U,D}=0^\circ$ | 85                               | —     | —      | deg                          | (1)(2)<br>(3)(5)<br>(6) |                  |
|  | Vertical        | $\theta_{U,D}$             |   | $\theta_{L,R}=0^\circ$ | 85                               | —     | —      | deg                          |                         |                  |
|  | All Direction   | $\theta$                   |   | —                      | 80                               | —     | —      | deg                          |                         |                  |
| Contrast Ratio                                     | CR              | $\theta_{L,R,U,D}=0^\circ$ |   |                        | 400                              | 700   | —      | —                            | White/Black             | (1)(2)<br>(3)(5) |
| Response Time(Rise) ③<br>(B→W)                     | ③ $\tau_{rise}$ | $\theta_{L,R,U,D}=0^\circ$ | Ta=25°C                                 | —                      | 15                               | 30    | ms     | (1)<br>(4)<br>(5)            |                         |                  |
|  |                 |                            | Ta=0°C                                  | —                      | 50                               | 100   | ms     |                              |                         |                  |
| Response Time(Fall) ③<br>(W→B)                     | ③ $\tau_{fall}$ | $\theta_{L,R,U,D}=0^\circ$ | Ta=25°C                                 | —                      | 10                               | 25    | ms     | (1)<br>(4)<br>(5)            |                         |                  |
|  |                 |                            | Ta=0°C                                  | —                      | 50                               | 100   | ms     |                              |                         |                  |
| ③ Response Time (Rise or Fall)<br>(All gray scale) | $\tau_{avg}$    | $\theta_{L,R,U,D}=0^\circ$ | Ta=25°C                                 | —                      | ④ 10<br><del>12</del>            | —     | ms     | Average of Response Time, *2 |                         |                  |
| Brightness   | I               | $\theta_{L,R,U,D}=0^\circ$ |   |                        | 210                              | 300   | —      | cd/m <sup>2</sup>            | White *1                | (1)(5)           |
| Brightness Uniformity                              | $\Delta I$      | $V_{CC}=5V$<br>$I_L=7mA$   |   |                        | 70                               | —     | —      | %                            |                         | (1)(5)<br>(7)    |
| Chromaticity                                       | W               | x                          | fL=50kHz<br>R*,G*,B* Signal<br>=All "H" |                        | 0.283                            | 0.313 | 0.343  | —                            |                         | (1)<br>(5)       |
|  |                 | y                          |   |                        | 0.299                            | 0.329 | 0.359  | —                            |                         |                  |
|  | R<br>G<br>B     | (x, y)                     |   | Red                    | (0.640, 0.349) Typ.              |       |        |                              |                         |                  |
|  |                 |                            |   | Green                  | (0.283, 0.598) Typ.              |       |        |                              |                         |                  |
| Blue   |                 |                            | (0.142, 0.071) Typ.                     |                        |                                  |       |        |                              |                         |                  |
| LCD Panel Type                                     |                 |                            |   |                        | TFT Color                        |       |        |                              |                         |                  |
| Display Mode                                       |                 |                            |   |                        | Normaly Black                    |       |        |                              |                         |                  |
| Wide Viewing Angle Technology                      |                 |                            |   |                        | MVA                              |       |        |                              |                         |                  |
| Optimum Viewing Angle                              |                 |                            |   |                        | — (symmentry)                    |       |        |                              | (6)                     |                  |
| Display Color                                      |                 |                            |   |                        | 16,777,216 (8-bit color)         |       |        |                              |                         |                  |
| Color of non-display area                          |                 |                            |   |                        | Black                            |       |        |                              |                         |                  |
| Surface Treatment                                  |                 |                            |   |                        | Anti-glare(Haze value:(25%), 2H) |       |        |                              |                         |                  |

(\*1) Value at 15~20 minutes after lighting on.

③ (\*2) In case of applying FLCB-12, (First Response Time Driving Circuit)

(Note) •CS-1000 (MINOLTA Co., Ltd.) Field=1°, L=500mm

• Back-light current = 7mA, Dark room condition(1 lux or less)

Be carefull that the luminance meter, which you use, may not be able to get correct brightenss if it's no set correctly.

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|      |          |        |       |       |                            | DRAW. NO. |  | Tech Bes LCD-00267 |     |
| 04   | 20040708 |        |       |       | Revise of Response time.   |           |  | CUST.              |     |
| 03   | 20040625 |        |       |       | Addition of Response time. |           |  |                    |     |
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Note 1) Definition of Viewing Angle (1)

Based on Figure 9-1.

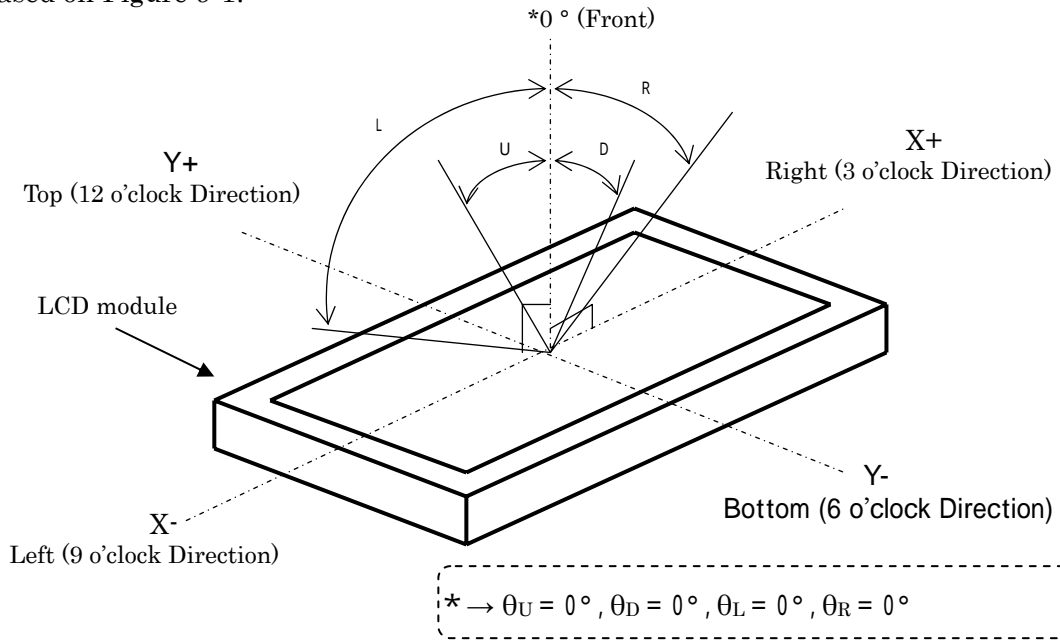


Figure 9-1 Definition of Viewing Angle (1)

Note 2) Definition of Viewing Angle (2)

Based on Figure 9-2.

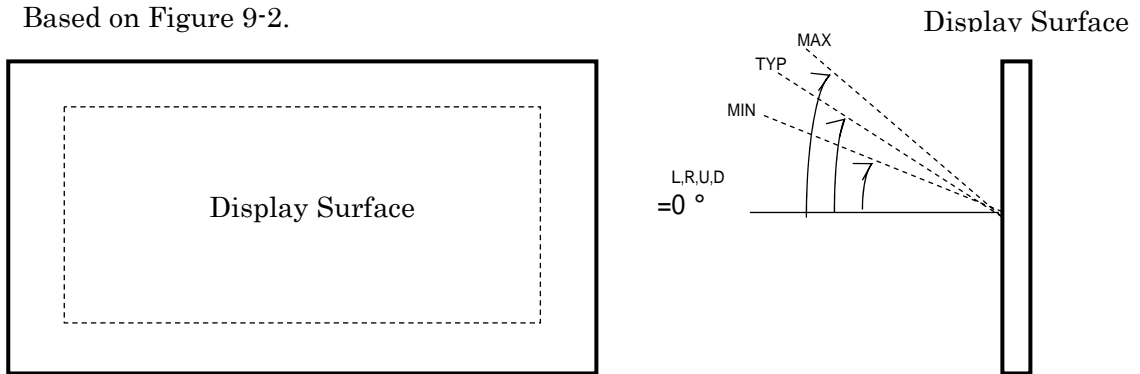


Figure 9-2 Definition of Viewing Angle (2)

Note 3) Definition of Contrast Ratio (CR)

Determined by Formula (1) based on Figure 9-3 Voltage-Brightness characteristics.

$$= \frac{L_W \text{ (Brightness at white)}}{L_B \text{ (Brightness at black)}} \dots\dots(1)$$

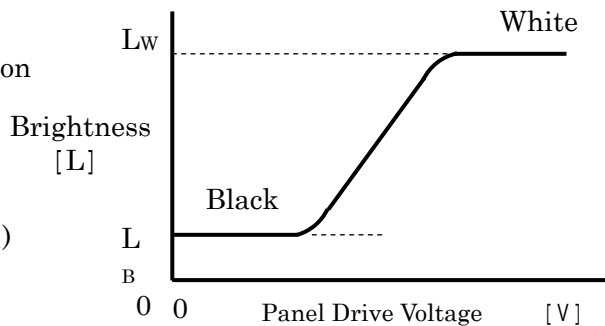


Figure 9-3 Voltage-Brightness Characteristics

|      |                          |  |  |  |
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Note 4) Definition of Response Time ㊟

Based on Figure 9-4.

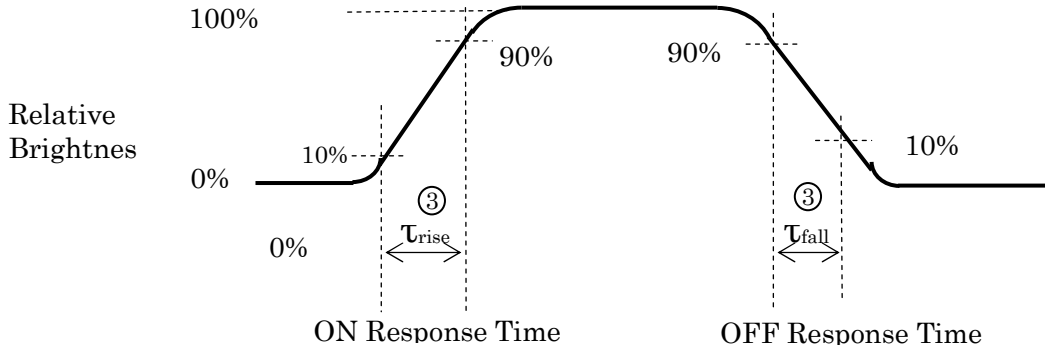


Figure 9-4 Definition of Response Time

Note 5) Contrast Ratio and Response Measurement System

Based on Figure 9-5.

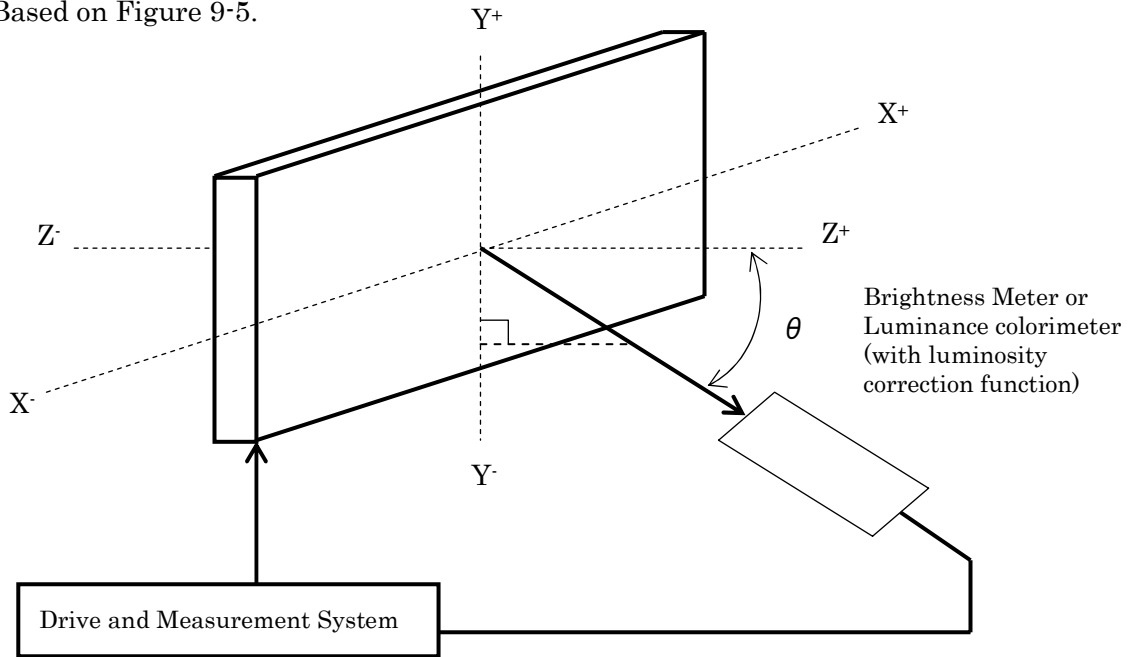


Figure 9-5 Contrast Ratio and Response Time Measurement System

|      |                          |
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|        |          |        |       |       |                                  | TITLE                                    |  | FLC48SXC8V-11AA    |  |
|        |          |        |       |       |                                  | DRAW. NO.                                |  | Tech Bes LCD-00267 |  |
| 03     | 20040625 |        |       |       | Change response time definition. |  |  | CUST.              |  |
| 02     | 20040602 |        |       |       | Change response time definition. |  |  |                    |  |
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Note 6) Definition of Optimum Viewing Angle

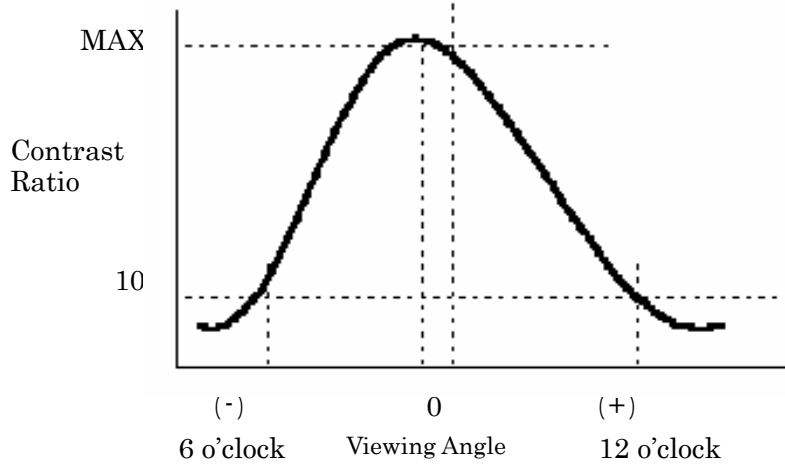


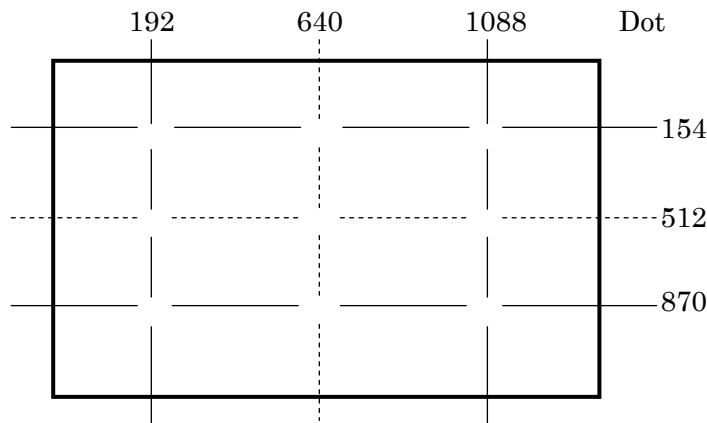
Figure 9-6 Definition of Viewing Angle

Note 7) Definition of Brightness Uniformity

Brightness uniformity is defined by the following formula.

Brightness (I1 ~ I9) are measured at the following 9 points (1 - 9) on the display area that is shown in Figure 9-7.

$$\text{Brightness Uniformity ( L )} = \frac{|\text{Min. In }|}{|\text{Max. In }|} \times 100 (\%) , n = 1 \text{ to } 9$$



Note) Each measurement point (1 - 9) defines the center spot of view of Brightness Meter. The tolerance of measurement position is ±3mm.

Figure 9-7 Measurement Points

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|        |      |        |       |       |             | CUST.     |  |                    |      |
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## 10. INTERFACE SPECIFICATIONS

### 10-1 Signal descriptions

Table 10-1 shows the description and configuration of interface signals (CN1).

Table 10-1 Interface signals (CN1)

| Pin No. | Symbol   | I/O | Function                    |
|---------|----------|-----|-----------------------------|
| 1       | RxO0-    | I   | Negative differential input |
| 2       | RxO0+    | I   | Positive differential input |
| 3       | RxO1-    | I   | Negative differential input |
| 4       | RxO1+    | I   | Positive differential input |
| 5       | RxO2-    | I   | Negative differential input |
| 6       | RxO2+    | I   | Positive differential input |
| 7       | GND      |     | Ground                      |
| 8       | RxOC-    | I   | Negative differential input |
| 9       | RxOC+    | I   | Positive differential input |
| 10      | RxO3-    | I   | Negative differential input |
| 11      | RxO3+    | I   | Positive differential input |
| 12      | RxE0-    | I   | Negative differential input |
| 13      | RxE0+    | I   | Positive differential input |
| 14      | GND      |     | Ground                      |
| 15      | RxE1-    | I   | Negative differential input |
| 16      | RxE1+    | I   | Positive differential input |
| 17      | GND      |     | Ground                      |
| 18      | RxE2-    | I   | Negative differential input |
| 19      | RxE2+    | I   | Positive differential input |
| 20      | RxEC-    | I   | Negative differential input |
| 21      | RxEC+    | I   | Positive differential input |
| 22      | RxE3-    | I   | Negative differential input |
| 23      | RxE3+    | I   | Positive differential input |
| 24      | GND      |     | Ground                      |
| 25      | SEL LVDS | I   | Select LVDS Mapping         |
| 26      | PD       |     | LVDS Core Power Down        |
| 27      | TST      |     | Test pin *1                 |
| 28      | Vcc      |     | +5V power supply            |
| 29      | Vcc      |     | +5V power supply            |
| 30      | Vcc      |     | +5V power supply            |

Connector : FI-X30SSL-HF (Japan Aviation Electronics)

User's connector : FI-X30M (FPC type)

FI-X30H (Wire type) , FI-X30HL (Wire with lock)

FI-X30C (Coaxial cable type) , FI-X30C2L (Coaxial cable with lock)

\*1: Keep open. (Internal test use only.)

\*2: When using a connector other than the recommended one , a defect in the initial stage or a problem concerning long term reliability may occur.

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|------|--------|--------|-------|-------|--|--|--|-------|--|-------------|--|-----|
|      |        |        |       |       |  |  |  |       |  | TITLE       | FLC48SXC8V-11AA                          |     |
|      |        |        |       |       |  |  |  |       |  | DRAW. NO.   | Tech Bes LCD-00267                       |     |
|      |        |        |       |       |  |  |  |       |  |             | CUST.                                    |     |
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10-2 LVDS Data Assignment

Table 10-2A,10-2B show the LVDS Data Assignment.

Table 10-2A LVDS Data Assignment(SEL LVDS=L)

| Input signal *1 |      | Transmitter<br>DS90CF383,C385 |          | Interface connector |            |           | Receiver<br>DS90CF386<br>THC63LVDF84 |         | LCD<br>Control<br>input |           |         |         |
|-----------------|------|-------------------------------|----------|---------------------|------------|-----------|--------------------------------------|---------|-------------------------|-----------|---------|---------|
|                 |      | pin                           | INPUT    | System side         | LCD module |           | pin                                  | OUTPUT  |                         |           |         |         |
|                 |      |                               |          |                     |            | pin       |                                      |         |                         |           |         |         |
| LVDS<br>Odd     | RO2  | 51                            | TxIN0    | Tx OUT0+            | 2          | RxO0+     | 27                                   | RxOUT0  | RO2                     |           |         |         |
|                 | RO3  | 52                            | TxIN1    |                     |            |           | 29                                   | RxOUT1  | RO3                     |           |         |         |
|                 | RO4  | 54                            | TxIN2    |                     |            |           | 30                                   | RxOUT2  | RO4                     |           |         |         |
|                 | RO5  | 55                            | TxIN3    |                     |            |           | 32                                   | RxOUT3  | RO5                     |           |         |         |
|                 | RO6  | 56                            | TxIN4    |                     |            |           | 33                                   | RxOUT4  | RO6                     |           |         |         |
|                 | RO7  | 3                             | TxIN6    | Tx OUT0-            | 1          | RxO0-     | 35                                   | RxOUT6  | RO7                     |           |         |         |
|                 | GO2  | 4                             | TxIN7    |                     |            |           | 37                                   | RxOUT7  | GO2                     |           |         |         |
|                 | GO3  | 6                             | TxIN8    |                     |            |           | 38                                   | RxOUT8  | GO3                     |           |         |         |
|                 | GO4  | 7                             | TxIN9    |                     |            |           | Tx OUT1+                             | 4       | RxO1+                   | 39        | RxOUT9  | GO4     |
|                 | GO5  | 11                            | TxIN12   |                     |            |           |                                      |         |                         | 43        | RxOUT12 | GO5     |
|                 | GO6  | 12                            | TxIN13   | 45                  | RxOUT13    | GO6       |                                      |         |                         |           |         |         |
|                 | GO7  | 14                            | TxIN14   | Tx OUT1-            | 3          | RxO1-     |                                      |         |                         | 46        | RxOUT14 | GO7     |
|                 | BO2  | 15                            | TxIN15   |                     |            |           |                                      |         |                         | 47        | RxOUT15 | BO2     |
|                 | BO3  | 19                            | TxIN18   |                     |            |           | 51                                   | RxOUT18 | BO3                     |           |         |         |
|                 | BO4  | 20                            | TxIN19   |                     |            |           | Tx OUT2+                             | 6       | RxO2+                   | 53        | RxOUT19 | BO4     |
|                 | BO5  | 22                            | TxIN20   |                     |            |           |                                      |         |                         | 54        | RxOUT20 | BO5     |
|                 | BO6  | 23                            | TxIN21   | 55                  | RxOUT21    | BO6       |                                      |         |                         |           |         |         |
|                 | BO7  | 24                            | TxIN22   | Tx OUT2-            | 5          | RxO2-     |                                      |         |                         | 1         | RxOUT22 | BO7     |
|                 | RSVD | 27                            | TxIN24   |                     |            |           |                                      |         |                         | 3         | RxOUT24 | Not use |
|                 | RSVD | 28                            | TxIN25   |                     |            |           | 5                                    | RxOUT25 | Not use                 |           |         |         |
|                 | ENAB | 30                            | TxIN26   |                     |            |           | 6                                    | RxOUT26 | ENAB                    |           |         |         |
|                 | RO0  | 50                            | TxIN27   |                     |            |           | 7                                    | RxOUT27 | RO0                     |           |         |         |
|                 | RO1  | 2                             | TxIN5    | Tx OUT3+            | 11         | RxO3+     | 34                                   | RxOUT5  | RO1                     |           |         |         |
|                 | GO0  | 8                             | TxIN10   |                     |            |           | 41                                   | RxOUT10 | GO0                     |           |         |         |
|                 | GO1  | 10                            | TxIN11   |                     |            |           | 42                                   | RxOUT11 | GO1                     |           |         |         |
| BO0             | 16   | TxIN16                        | Tx OUT3- |                     |            |           | 10                                   | RxO3-   | 49                      | RxOUT16   | BO0     |         |
| BO1             | 18   | TxIN17                        |          |                     |            |           |                                      |         | 50                      | RxOUT17   | BO1     |         |
| RSVD            | 25   | TxIN23                        |          | 2                   | RxOUT23    | Not use   |                                      |         |                         |           |         |         |
| DCLK            | 31   | TxCLK IN                      |          | TxCLK OUT+          | 9          | RxCLK IN+ |                                      |         | 26                      | RxCLK OUT | DCLK    |         |
|                 |      |                               |          | TxCLK OUT-          | 8          | RxCLK IN- |                                      |         |                         |           |         |         |
| LVDS<br>Even    | RE2  | 51                            | TxIN0    | Tx OUT0+            | 13         | RxE0+     | 27                                   | RxOUT0  | RE2                     |           |         |         |
|                 | RE3  | 52                            | TxIN1    |                     |            |           | 29                                   | RxOUT1  | RE3                     |           |         |         |
|                 | RE4  | 54                            | TxIN2    |                     |            |           | 30                                   | RxOUT2  | RE4                     |           |         |         |
|                 | RE5  | 55                            | TxIN3    |                     |            |           | 32                                   | RxOUT3  | RE5                     |           |         |         |
|                 | RE6  | 56                            | TxIN4    |                     |            |           | 33                                   | RxOUT4  | RE6                     |           |         |         |
|                 | RE7  | 3                             | TxIN6    | Tx OUT0-            | 12         | RxE0-     | 35                                   | RxOUT6  | RE7                     |           |         |         |
|                 | GE2  | 4                             | TxIN7    |                     |            |           | 37                                   | RxOUT7  | GE2                     |           |         |         |
|                 | GE3  | 6                             | TxIN8    |                     |            |           | Tx OUT1+                             | 16      | RxE1+                   | 38        | RxOUT8  | GE3     |
|                 | GE4  | 7                             | TxIN9    |                     |            |           |                                      |         |                         | 39        | RxOUT9  | GE4     |
|                 | GE5  | 11                            | TxIN12   |                     |            |           |                                      |         |                         | 43        | RxOUT12 | GE5     |
|                 | GE6  | 12                            | TxIN13   | 45                  | RxOUT13    | GE6       |                                      |         |                         |           |         |         |
|                 | GE7  | 14                            | TxIN14   | Tx OUT1-            | 15         | RxE1-     |                                      |         |                         | 46        | RxOUT14 | GE7     |
|                 | BE2  | 15                            | TxIN15   |                     |            |           | 47                                   | RxOUT15 | BE2                     |           |         |         |
|                 | BE3  | 19                            | TxIN18   |                     |            |           | 51                                   | RxOUT18 | BE3                     |           |         |         |
|                 | BE4  | 20                            | TxIN19   |                     |            |           | Tx OUT2+                             | 19      | RxE2+                   | 53        | RxOUT19 | BE4     |
|                 | BE5  | 22                            | TxIN20   |                     |            |           |                                      |         |                         | 54        | RxOUT20 | BE5     |
|                 | BE6  | 23                            | TxIN21   | 55                  | RxOUT21    | BE6       |                                      |         |                         |           |         |         |
|                 | BE7  | 24                            | TxIN22   | Tx OUT2-            | 18         | RxE2-     |                                      |         |                         | 1         | RxOUT22 | BE7     |
|                 | RSVD | 27                            | TxIN24   |                     |            |           |                                      |         |                         | 3         | RxOUT24 | Not use |
|                 | RSVD | 28                            | TxIN25   |                     |            |           | 5                                    | RxOUT25 | Not use                 |           |         |         |
|                 | RSVD | 30                            | TxIN26   |                     |            |           | 6                                    | RxOUT26 | Not use                 |           |         |         |
|                 | RE0  | 50                            | TxIN27   |                     |            |           | 7                                    | RxOUT27 | RE0                     |           |         |         |
|                 | RE1  | 2                             | TxIN5    | Tx OUT3+            | 23         | RxE3+     | 34                                   | RxOUT5  | RE1                     |           |         |         |
|                 | GE0  | 8                             | TxIN10   |                     |            |           | 41                                   | RxOUT10 | GE0                     |           |         |         |
|                 | GE1  | 10                            | TxIN11   |                     |            |           | 42                                   | RxOUT11 | GE1                     |           |         |         |
| BE0             | 16   | TxIN16                        | Tx OUT3- |                     |            |           | 22                                   | RxE3-   | 49                      | RxOUT16   | BE0     |         |
| BE1             | 18   | TxIN17                        |          |                     |            |           |                                      |         | 50                      | RxOUT17   | BE1     |         |
| RSVD            | 25   | TxIN23                        |          | 2                   | RxOUT23    | Not use   |                                      |         |                         |           |         |         |
| DCLK            | 31   | TxCLK IN                      |          | TxCLK OUT+          | 21         | RxCLK IN+ |                                      |         | 26                      | RxCLK OUT | Not use |         |
|                 |      |                               |          | TxCLK OUT-          | 20         | RxCLK IN- |                                      |         |                         |           |         |         |

\*1 ·RSVD (reserved) pin on a transmitter should be connected with Ground.  
·Input odd or even data depending on the display position of the LCD module.

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|        |      |        |       |       |             | TITLE<br>FLC48SXC8V-11AA                 |  |
|        |      |        |       |       |             | DRAW. NO.<br>Tech Bes LCD-00267          |  |
|        |      |        |       |       |             | CUST.                                    |  |
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Table 10-2B LVDS Data Assignment(SEL LVDS=H)

| Input signal *1 |      | Transmitter DS90CF383,C385 |          | Interface connector |            |           | Receiver DS90CF386 THC63LVDF84 |         | LCD Control input |           |         |     |
|-----------------|------|----------------------------|----------|---------------------|------------|-----------|--------------------------------|---------|-------------------|-----------|---------|-----|
|                 |      | pin                        | INPUT    | System side         | LCD module |           | pin                            | OUTPUT  |                   |           |         |     |
|                 |      |                            |          |                     | pin        |           |                                |         |                   |           |         |     |
| LVDS<br>Odd     | RO0  | 51                         | TxIN0    | Tx OUT0+            | 2          | RxO0+     | 27                             | RxOUT0  | RO0               |           |         |     |
|                 | RO1  | 52                         | TxIN1    |                     |            |           | 29                             | RxOUT1  | RO1               |           |         |     |
|                 | RO2  | 54                         | TxIN2    |                     |            |           | 30                             | RxOUT2  | RO2               |           |         |     |
|                 | RO3  | 55                         | TxIN3    |                     |            |           | 32                             | RxOUT3  | RO3               |           |         |     |
|                 | RO4  | 56                         | TxIN4    |                     |            |           | 33                             | RxOUT4  | RO4               |           |         |     |
|                 | RO5  | 3                          | TxIN6    | Tx OUT0-            | 1          | RxO0-     | 35                             | RxOUT6  | RO5               |           |         |     |
|                 | GO0  | 4                          | TxIN7    |                     |            |           | 37                             | RxOUT7  | GO0               |           |         |     |
|                 | GO1  | 6                          | TxIN8    |                     |            |           | 38                             | RxOUT8  | GO1               |           |         |     |
|                 | GO2  | 7                          | TxIN9    |                     |            |           | 39                             | RxOUT9  | GO2               |           |         |     |
|                 | GO3  | 11                         | TxIN12   |                     |            |           | 43                             | RxOUT12 | GO3               |           |         |     |
|                 | GO4  | 12                         | TxIN13   | Tx OUT1+            | 4          | RxO1+     | 45                             | RxOUT13 | GO4               |           |         |     |
|                 | GO5  | 14                         | TxIN14   |                     |            |           | 46                             | RxOUT14 | GO5               |           |         |     |
|                 | BO0  | 15                         | TxIN15   |                     |            |           | Tx OUT1-                       | 3       | RxO1-             | 47        | RxOUT15 | BO0 |
|                 | BO1  | 19                         | TxIN18   |                     |            |           |                                |         |                   | 51        | RxOUT18 | BO1 |
|                 | BO2  | 20                         | TxIN19   |                     |            |           |                                |         |                   | 53        | RxOUT19 | BO2 |
|                 | BO3  | 22                         | TxIN20   | 54                  | RxOUT20    | BO3       |                                |         |                   |           |         |     |
|                 | BO4  | 23                         | TxIN21   | 55                  | RxOUT21    | BO4       |                                |         |                   |           |         |     |
|                 | BO5  | 24                         | TxIN22   | Tx OUT2+            | 6          | RxO2+     | 1                              | RxOUT22 | BO5               |           |         |     |
|                 | RSVD | 27                         | TxIN24   |                     |            |           | 3                              | RxOUT24 | Not use           |           |         |     |
|                 | RSVD | 28                         | TxIN25   |                     |            |           | 5                              | RxOUT25 | Not use           |           |         |     |
|                 | ENAB | 30                         | TxIN26   |                     |            |           | 6                              | RxOUT26 | ENAB              |           |         |     |
|                 | RO6  | 50                         | TxIN27   |                     |            |           | 7                              | RxOUT27 | RO6               |           |         |     |
|                 | RO7  | 2                          | TxIN5    | Tx OUT3+            | 11         | RxO3+     | 34                             | RxOUT5  | RO7               |           |         |     |
|                 | GO6  | 8                          | TxIN10   |                     |            |           | 41                             | RxOUT10 | GO6               |           |         |     |
|                 | GO7  | 10                         | TxIN11   |                     |            |           | 42                             | RxOUT11 | GO7               |           |         |     |
| BO6             | 16   | TxIN16                     | Tx OUT3- |                     |            |           | 10                             | RxO3-   | 49                | RxOUT16   | BO6     |     |
| BO7             | 18   | TxIN17                     |          |                     |            |           |                                |         | 50                | RxOUT17   | BO7     |     |
| RSVD            | 25   | TxIN23                     |          | 2                   | RxOUT23    | Not use   |                                |         |                   |           |         |     |
| DCLK            | 31   | TxCLK IN                   |          | TxCLK OUT+          | 9          | RxCLK IN+ |                                |         | 26                | RxCLK OUT | DCLK    |     |
|                 |      |                            |          | TxCLK OUT-          | 8          | RxCLK IN- |                                |         |                   |           |         |     |
| LVDS<br>Even    | RE0  | 51                         | TxIN0    | Tx OUT0+            | 13         | RxE0+     | 27                             | RxOUT0  | RE0               |           |         |     |
|                 | RE1  | 52                         | TxIN1    |                     |            |           | 29                             | RxOUT1  | RE1               |           |         |     |
|                 | RE2  | 54                         | TxIN2    |                     |            |           | 30                             | RxOUT2  | RE2               |           |         |     |
|                 | RE3  | 55                         | TxIN3    |                     |            |           | 32                             | RxOUT3  | RE3               |           |         |     |
|                 | RE4  | 56                         | TxIN4    |                     |            |           | 33                             | RxOUT4  | RE4               |           |         |     |
|                 | RE5  | 3                          | TxIN6    | Tx OUT0-            | 12         | RxE0-     | 35                             | RxOUT6  | RE5               |           |         |     |
|                 | GE0  | 4                          | TxIN7    |                     |            |           | 37                             | RxOUT7  | GE0               |           |         |     |
|                 | GE1  | 6                          | TxIN8    |                     |            |           | 38                             | RxOUT8  | GE1               |           |         |     |
|                 | GE2  | 7                          | TxIN9    |                     |            |           | 39                             | RxOUT9  | GE2               |           |         |     |
|                 | GE3  | 11                         | TxIN12   |                     |            |           | 43                             | RxOUT12 | GE3               |           |         |     |
|                 | GE4  | 12                         | TxIN13   | Tx OUT1+            | 16         | RxE1+     | 45                             | RxOUT13 | GE4               |           |         |     |
|                 | GE5  | 14                         | TxIN14   |                     |            |           | 46                             | RxOUT14 | GE5               |           |         |     |
|                 | BE0  | 15                         | TxIN15   |                     |            |           | Tx OUT1-                       | 15      | RxE1-             | 47        | RxOUT15 | BE0 |
|                 | BE1  | 19                         | TxIN18   |                     |            |           |                                |         |                   | 51        | RxOUT18 | BE1 |
|                 | BE2  | 20                         | TxIN19   |                     |            |           |                                |         |                   | 53        | RxOUT19 | BE2 |
|                 | BE3  | 22                         | TxIN20   | 54                  | RxOUT20    | BE3       |                                |         |                   |           |         |     |
|                 | BE4  | 23                         | TxIN21   | 55                  | RxOUT21    | BE4       |                                |         |                   |           |         |     |
|                 | BE5  | 24                         | TxIN22   | Tx OUT2+            | 19         | RxE2+     | 1                              | RxOUT22 | BE5               |           |         |     |
|                 | RSVD | 27                         | TxIN24   |                     |            |           | 3                              | RxOUT24 | Not use           |           |         |     |
|                 | RSVD | 28                         | TxIN25   |                     |            |           | 5                              | RxOUT25 | Not use           |           |         |     |
|                 | RSVD | 30                         | TxIN26   |                     |            |           | 6                              | RxOUT26 | Not use           |           |         |     |
|                 | RE6  | 50                         | TxIN27   |                     |            |           | 7                              | RxOUT27 | RE6               |           |         |     |
|                 | RE7  | 2                          | TxIN5    | Tx OUT3+            | 23         | RxE3+     | 34                             | RxOUT5  | RE7               |           |         |     |
|                 | GE6  | 8                          | TxIN10   |                     |            |           | 41                             | RxOUT10 | GE6               |           |         |     |
|                 | GE7  | 10                         | TxIN11   |                     |            |           | 42                             | RxOUT11 | GE7               |           |         |     |
| BE6             | 16   | TxIN16                     | Tx OUT3- |                     |            |           | 22                             | RxE3-   | 49                | RxOUT16   | BE6     |     |
| BE7             | 18   | TxIN17                     |          |                     |            |           |                                |         | 50                | RxOUT17   | BE7     |     |
| RSVD            | 25   | TxIN23                     |          | 2                   | RxOUT23    | Not use   |                                |         |                   |           |         |     |
| DCLK            | 31   | TxCLK IN                   |          | TxCLK OUT+          | 21         | RxCLK IN+ |                                |         | 26                | RxCLK OUT | Not use |     |
|                 |      |                            |          | TxCLK OUT-          | 20         | RxCLK IN- |                                |         |                   |           |         |     |

\*1 ·RSVD (reserved) pin on a transmitter should be connected with Ground.  
 ·Input odd or even data depending on the display position of the LCD module.

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|        |      |        |       |       |             | TITLE              |  | FLC48SXC8V-11AA |  |
|        |      |        |       |       |             | DRAW. NO.          |  |                 | CUST.                                    |
|        |      |        |       |       |             | Tech Bes LCD-00267 |  |                 |  |
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| DESIG. |      |        | CHECK |       | APPR.       |                    |  | 14/             |  |

10-3 Color Data Assignment

Table 10-3 shows the Color Data Assignment.

Table 10-3 Color Data Assignment

| Color       |          | R Input data |    |    |    |    |    |    |    | G Input data |    |    |    |    |    |    |    | B Input data |    |    |    |    |    |    |    |   |
|-------------|----------|--------------|----|----|----|----|----|----|----|--------------|----|----|----|----|----|----|----|--------------|----|----|----|----|----|----|----|---|
|             | Odd      | R7           | R6 | R5 | R4 | R3 | R2 | R1 | R0 | G7           | G6 | G5 | G4 | G3 | G2 | G1 | G0 | B7           | B6 | B5 | B4 | B3 | B2 | B1 | B0 |   |
|             | Even     | R7           | R6 | R5 | R4 | R3 | R2 | R1 | R0 | G7           | G6 | G5 | G4 | G3 | G2 | G1 | G0 | B7           | B6 | B5 | B4 | B3 | B2 | B1 | B0 |   |
| Basic Color | Black    | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | Blue     | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  |   |
|             | Green    | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | Cyan     | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  |   |
|             | Red      | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | Magenta  | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  |   |
|             | Yellow   | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | White    | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  |   |
| Red         | Black    | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | ↑        | 1            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |
|             | ↑        | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  |   |
|             | ↓        | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  |   |
|             | Brighter | 253          | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 1            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |
|             | ↓        | 254          | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |
|             | Red      | 255          | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |
| Green       | Black    | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | ↑        | 1            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |
|             | ↑        | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  |   |
|             | ↓        | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  |   |
|             | Brighter | 253          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 1            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |
|             | ↓        | 254          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |
|             | Green    | 255          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |
| Blue        | Black    | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | ↑        | 1            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1 |
|             | ↑        | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  |   |
|             | ↓        | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  |   |
|             | Brighter | 253          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 1 |
|             | ↓        | 254          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0 |
|             | Blue     | 255          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1 |

Note.1) Definition of gray scale:Color (n)...”n” indicates gray scale level.

Larger number means brighter level.

Note.2) Data: 1:High, 0:Low

Note 3) Color data consist of 8 bit red, green and blue data of odd and even number pixel data.

Total data number is 48 signals. This module is able to display 16,777,216 colors because each red, green and blue data is controlled independently.

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|        |      |        |       |       |             |                    |  |                 |       |  |     |
|--------|------|--------|-------|-------|-------------|--------------------|--|-----------------|-------|--|-----|
|        |      |        |       |       |             | TITLE              |  | FLC48SXC8V-11AA |       |  |     |
|        |      |        |       |       |             | DRAW. NO.          |  |                 | CUST. |  |     |
|        |      |        |       |       |             | Tech Bes LCD-00267 |  |                 |       |  |     |
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10-4 Input Signal Timing

Table 10-4 and Figure 10-1 shows the Input Signal Timing at LVDS transmitter.

Table 10-4 Timing Characteristics

(Ta=0~50°C, Vcc=5±0.25V)

| Item                | Symbol              | Min.   | Typ.        | Max. | Unit    | Remark |               |
|---------------------|---------------------|--------|-------------|------|---------|--------|---------------|
| DCLK signal (Clock) | Period              | Tc     | 14.3        | 18.5 | 25.0    | ns     |               |
|                     | Frequency           | 1/Tc   | 40          | 54   | 70      | MHz    |               |
|                     | Duty                | Tch/Tc | 45          | 50   | 55      | %      |               |
|                     | High time           | TelkH  | 5.0         | —    | —       | ns     |               |
|                     | Low time            | TelkL  | 5.0         | —    | —       | ns     |               |
| DCLK-Data Timing    | Setup time          | Tset   | 3           | —    | —       | ns     | LVDS Tr spec. |
|                     | Hold time           | Thold  | 5           | —    | —       | ns     |               |
| ENAB signal         | Hor. Period (1)     | Th     | 5350/Tc+435 | 844  | 887 *1  | DCLK   | Tc=ns         |
|                     | Hor. Period (2)     | Th     | 648         | —    | 1023    | DCLK   | *4            |
|                     | Hor. Display period | Thd    | 640         | 640  | 640     | DCLK   | *2            |
|                     | Vertical Period     | Tv     | 1028 *1     | 1066 | 1088 *1 | Th     | 16.67ms       |
|                     | Ver. Frequency      | 1/Tv   | 50          | 60   | 76.2    | Hz     |               |
|                     | Ver. Display period | Tvd    | 1024        | 1024 | 1024    | Th     | *2            |
| Data-ENAB timing    | Tdn                 | —      | 0           | —    | DCLK    | *3     |               |

- \*1) • horizontal display position is specified by the rise of ENAB.  
The data latched at falling edge of DCLK after rise of ENAB is displayed at the left edge of the display area.  
• Vertical display position is specified by the rise of ENAB after low level continuation over 2048 DCLK.  
The data latched at the rise of ENAB is displayed at the top line of the display area.
- \*2) • If the “High” level period of ENAB is less than 640 DCLK or the number of ENAB in a frame period (Tv) is less than 1024, black color is displayed at the rest of the display area.
- \*3) • If ENAB does not synchronize with the effective display data, the display position does not fit to the display area.
- \*4) • Hor. Period (2) shows the operating range where internal circuit can work correctly.  
• When ENAB signal is out of Hor. Period (1), the display quality may deteriorate.

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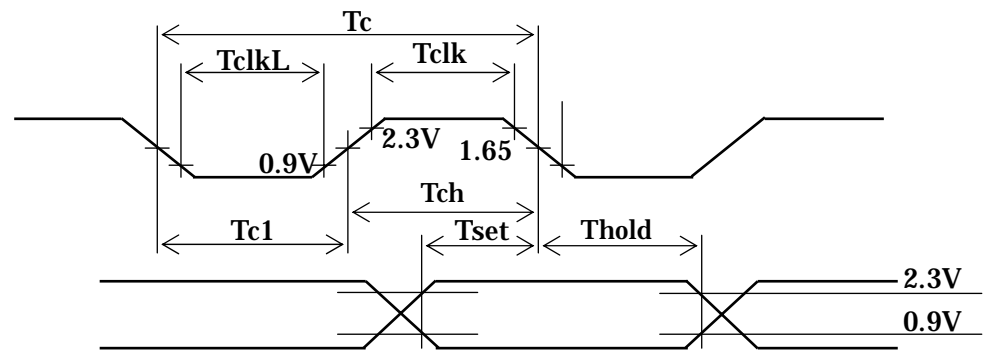
|      |      |        |       |       |             |                    |       |                 |       |  |     |
|------|------|--------|-------|-------|-------------|--------------------|-------|-----------------|-------|--|-----|
|      |      |        |       |       |             | TITLE              |       | FLC48SXC8V-11AA |       |  |     |
|      |      |        |       |       |             | DRAW. NO.          |       |                 | CUST. |  |     |
|      |      |        |       |       |             | Tech Bes LCD-00267 |       |                 |       |  |     |
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A

A

DCLK

ENAB  
RO7-0, RE7-0  
GO7-0, GE7-0  
BO7-0, BE7-0

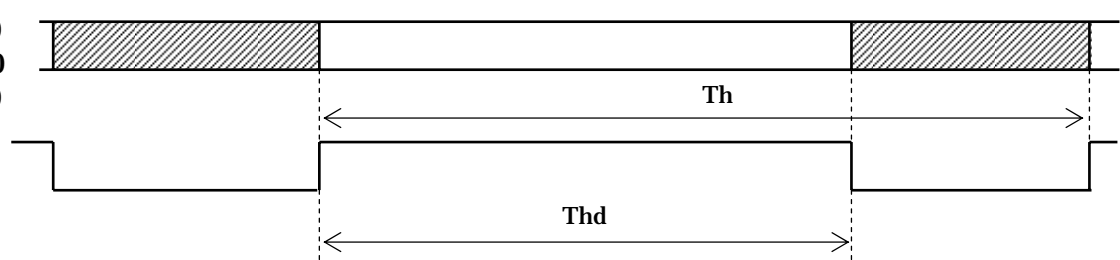


B

B

RO7-0, RE7-0  
GO7-0, GE7-0  
BO7-0, BE7-0

ENAB

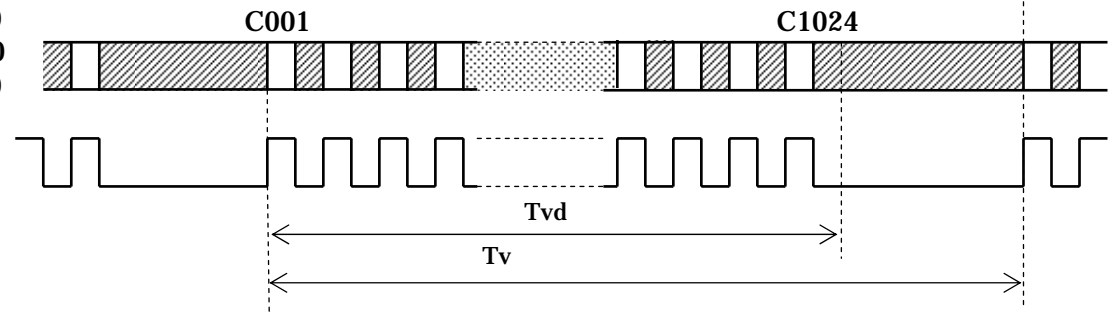


C

C

RO7-0, RE7-0  
GO7-0, GE7-0  
BO7-0, BE7-0

ENAB



D

D

DCLK

RO7-0, RE7-0  
GO7-0, GE7-0  
BO7-0, BE7-0

ENAB

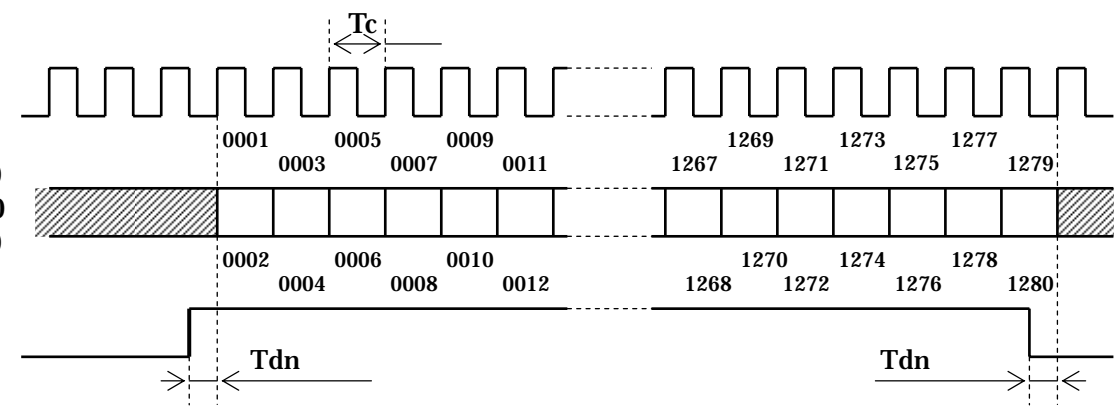


Figure 10-1 Input Signal Timing Chart

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|        |      |        |       |       |  |  |
|--------|------|--------|-------|-------|--|--|
|        |      |        |       |       | TITLE<br><b>FLC48SXC8V-11AA</b>          |  |
|        |      |        |       |       | DRAW. NO.<br><b>Tech Bes LCD-00267</b>   |  |
|        |      |        |       |       | CUST.                                    |  |
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|        |      |        |       |       | 17/                                      |  |

F

**10-5 Correspondence between Data and Display Position**

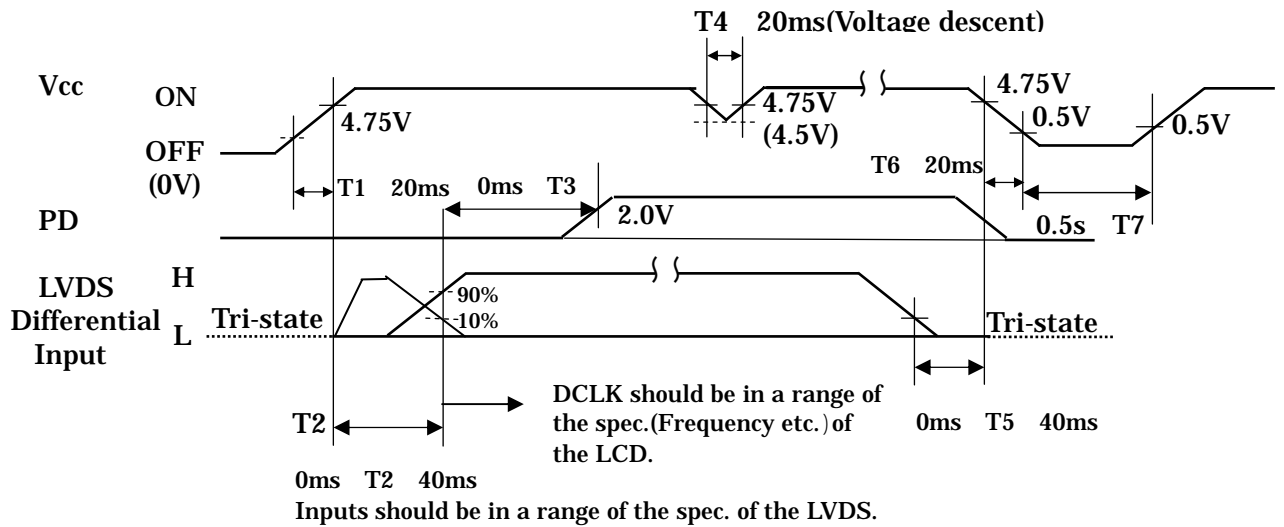
Figure 10-2 shows the Correspondence between Data and Display Position.

|       |            |            |            |            |            |            |            |            |            |            |
|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|       | S0001      | S0002      | S0003      | S0004      | S0005      | S0006      | S0007      | -----      | S3839      | S3840      |
| C001  | RO<br>0001 | GO<br>0001 | BO<br>0001 | RE<br>0002 | GE<br>0002 | BE<br>0002 | RO<br>0003 | GO<br>0003 | GE<br>1280 | BE<br>1280 |
| C1024 | RO<br>0001 | GO<br>0001 | BO<br>0001 | RE<br>0002 | GE<br>0002 | BE<br>0002 | RO<br>0003 | GO<br>0003 | GE<br>1280 | BE<br>1280 |

**Figure 10-2 Correspondence Data and Display Position**

**10-5 Power Supply Sequence**

The sequence of input signals and On/Off of the power supply of this LCD module should be in the specification shown in Figure 10-3 to prevent latch-up of the driver ICs and DC driving of the LCD panel.



\*Note : PD input can be set open, if it is not used.

**Figure 10-3 Power Supply Sequence**

DOCUMENT CONTROL SECTION

|        |      |        |       |       |  |  |  |
|--------|------|--------|-------|-------|--|--|--|
|        |      |        |       |       |  | TITLE<br><b>FLC48SXC8V-11AA</b>        |  |
|        |      |        |       |       |  | DRAW. NO.<br><b>Tech Bes LCD-00267</b> |  |
|        |      |        |       |       |  | CUST.                                  |  |
| EDIT   | DATE | DESIG. | CHECK | APPR. | DESCRIPTION                              |  |  |
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|        |      |        |       |       |  | 18/                                    |  |

# 11. BACK-LIGHT SPECIFICATIONS

## 11-1 Pin configuration for Back-light

Table 11-1 shows the description and Pin assignment of the connectors (CN-A to D) for the Back-light of this LCD module.

**Table 11-1 Pin Assignment of CN-A to CN-D**

| Pin | Signal          |                 |                 |                 | Function     | Cable color  |
|-----|-----------------|-----------------|-----------------|-----------------|--------------|--------------|
|     | CN-A            | CN-B            | CN-C            | CN-D            |              |              |
| 1   | V <sub>L1</sub> | V <sub>L2</sub> | V <sub>L3</sub> | V <sub>L4</sub> | Power supply | Pink ,Orange |
| 2   | —               | —               | —               | —               | —            | —            |
| 3   | GND             | GND             | GND             | GND             | Ground       | Blue, Gray   |

Connector : Housing : BHR-03VS-1  
 Contact : SBH-001T-P0.5  
 User's Connector : Post with base: SM02(8.0)B-BHS-1-TB  
 Supplier : Japan Solderless Terminal Trading Company LTD. (J.S.T.)

## 11-2 Life

The life of the back-light is a minimum of 50,000 hours at the following conditions.

### (1) Working conditions

Ambient temperature: 25 ± 5  
 Tube current (I<sub>L</sub>) : 7mA or less

### (2) Definition of life

Brightness becomes 50% or less than the minimum brightness value shown in Table 9-1.  
 The lamp cannot be lit by the minimum value of the breakdown voltage(1760Vrms) shown in Table 8-1.  
 Flashing.

## 11-4 Lamp assembly set (for replacement)

Lamp assembly set(with charge)is prepared for replacing old lamp to new one. This set consists of a upper lamp assembly and a lower lamp assembly.

Type number : FLCL-33  
 Minimum order qty. unit : 20 pcs.

DATE DOCUMENT CONTROL SECTION

|        |      |        |       |       |  |  |  |
|--------|------|--------|-------|-------|--|--|--|
|        |      |        |       |       |  | TITLE<br><b>FLC48SXC8V-11AA</b>        |  |
|        |      |        |       |       |  | DRAW. NO.<br><b>Tech Bes LCD-00267</b> |  |
|        |      |        |       |       |  | CUST.                                  |  |
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|        |      |        |       |       |  | 19/                                    |  |

## 12. APPEARANCE SPECIFICATIONS

### 12-1 Appearance

| No.        | Item                                       | Judgment method and standard   |                  |          |
|------------|--|--|------------------|----------|
| 1          | Bright spot (high and Low)                 | $\leq 4$ dots  | (Note 1)         |          |
| 2          | Bright spot connection (high and low)      | $\leq 2$ pair<br>(2 dot connection in horizontal only)   | (Note 1)         |          |
| 3          | Total of bright spot                       | $\leq 4$ dots  |                  |          |
| 4          | Dark spot                                  | $\leq 8$ dots  | (Note 2)         |          |
| 5          | Dark spot connection                       | $\leq 3$ pairs   | (Note 2)         |          |
| 6          | Total of dark spot                         | $\leq 8$ dots  | (Note 2)         |          |
| 7          | Total of dot defect (bright and dark)      | $\leq 8$ dots  |                  |          |
| 8          | Distance of bright spot                    | high-high  | $\geq 15$ mm     |          |
|            |  | others   | $\geq 5$ mm      |          |
| 9          | Distance of dark spot                      | $\geq 5$ mm  |                  |          |
| 10         | Scratch on polarizer, line shape           | $W \leq 0.03$  | Ignore           |          |
|            |  | $0.03 < W \leq 0.05$   | $L \leq 6$       | Ignore   |
|            |  |  | $6 < L \leq 12$  | $\leq 5$ |
|            |  | $0.05 < W \leq 0.10$   | $12 < L$         | 0        |
|            |  |  | $L \leq 0.6$     | Ignore   |
|            |  |  | $0.6 < L$        | 0        |
| $0.10 < W$ | 0  |  |                  |          |
| 11         | Dent on polarizer, dot shape               | $D \leq 0.3$   | Ignore           |          |
|            |  | $0.3 < D \leq 0.4$   | $\leq 5$         |          |
|            |  | $0.4 < D$  | 0                |          |
| 12         | Bubble in polarizer                        | $D \leq 0.3$   | Ignore           |          |
|            |  | $0.3 < D \leq 0.5$   | $\leq 5$         |          |
|            |  | $0.5 < D$  | 0                |          |
| 13         | Black white spot (Foreign circular matter) | $D \leq 0.3$   | Ignore           |          |
|            |  | $0.3 < D \leq 0.5$   | $\leq 5$         |          |
|            |  | $0.5 < D$  | 0                |          |
| 14         | Light leakage by foreign articles          | $D \leq 0.3$   | Ignore           |          |
|            |  | $0.3 < D \leq 0.6$   | $\leq 4$         |          |
|            |  | $0.6 < D$  | 0                |          |
| 15         | Lints, black/white line                    | $W \leq 0.03$  | Ignore           |          |
|            |  | $0.03 < W \leq 0.05$   | $L \leq 6$       | Ignore   |
|            |  |  | $6 < L \leq 12$  | $\leq 4$ |
|            |  | $0.05 < W \leq 0.10$   | $12 < L$         | 0        |
|            |  |  | $L \leq 0.6$     | Ignore   |
|            |  |  | $0.6 < L \leq 5$ | $\leq 2$ |
| $0.10 < W$ | $5 < L$                                    | 0  |                  |          |
|            |  | $(W+L)/2=D$  | Conform to No.13 |          |
| 16         | Mura                                       | Invisible under 6% ND filter from center of display.<br>(Display pattern : Black, White, 50% gray) |                  |          |

D:Average diameter [mm], W:Width [mm], L:Length [mm], S=(bright spot size)/(dot size)

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|--------|------|--------|-------|-------|-------------|--|--|
|        |      |        |       |       |             | TITLE<br>FLC48SXC8V-11AA                 |  |
|        |      |        |       |       |             | DRAW. NO.<br>Tech Bes LCD-00267          |  |
|        |      |        |       |       |             | CUST.                                    |  |
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**12-2 Dot defects (Bright spots, Dark spots)**

A

A

**12-2-1 Zone**

- Inside display dot area (376.32×301.056mm)
- Display dot area means active area.
- One pixel consists of 3 dots (red, green and blue).
- Foreign particle and scratch unharmed to display image, such as the foreign particle under polarizer film but outside of the display area and scratch on metal bezel, backlight module or polarizer film out of the display area, etc., are not counted.

B

B

**12-2-2 Bright spots**

**(1) Bright spots by the defect of TFT.**

- Visible under bias of 2% ND filter .....High bright spot R•G
- Visible under 5% but invisible under 2% ND filter .....Low bright spot R•G•B
- Invisible under bias of 5% ND filter.....Not counted

**(2) Bright spots by the light passing through tears, breaks, etc in color filter.**

- Exceed size of a half dot.....High bright spot
- A half dot or less .....Not counted

**(3) Bright spots by the light passing through tears, breaks, etc in chromium mask.**

- Exceed 50μm .....High bright spot
- 50μm or less .....Not counted

C

C

**12-2-3 Test condition**

- Inspector must observe the LCD screen from the normal direction under the illumination by a single 20W fluorescent lamp. The distance between the LCD screen and the inspector should be a height of 50cm above the worktable.  
The vertical illuminance is 300 to 600lux (reference value).
- Bright spot should be counted under entire black screen.
- Dark spot should be counted under entire white screen.
- Input signal timing should be typical value.

D

D

(Note1) Please do not mistake a single bright spot for a bright spot connection due to Cs(supplemental capacitance) line at the center of each dot.

(Note2) If a pixel is dark partially, it connects into the number of dark spots in accordance with following rule.

- (a)  $A < 1/3$  : Not count. Only one of 4 dark connection is allowed.
  - (b)  $1/3 \leq A < 2/3$  : Considered as 0.5 dot.
  - (c)  $2/3 \leq A$  : Considered as 1 dot.
- (A=Dark spot size/dot size)

E

DOCUMENT CONTROL SECTION

DATE

F

|        |      |        |       |       |  |  |  |
|--------|------|--------|-------|-------|--|--|--|
|        |      |        |       |       |  | TITLE<br><b>FLC48SXC8V-11AA</b>        |  |
|        |      |        |       |       |  | DRAW. NO.<br><b>Tech Bes LCD-00267</b> |  |
|        |      |        |       |       |  | CUST.                                  |  |
| EDIT   | DATE | DESIG. | CHECK | APPR. | DESCRIPTION                              |  |  |
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|        |      |        |       |       |  | 21 /                                   |  |

### 13. ENVIRONMENTAL SPECIFICATIONS

Table 13-1 show the environmental specifications.

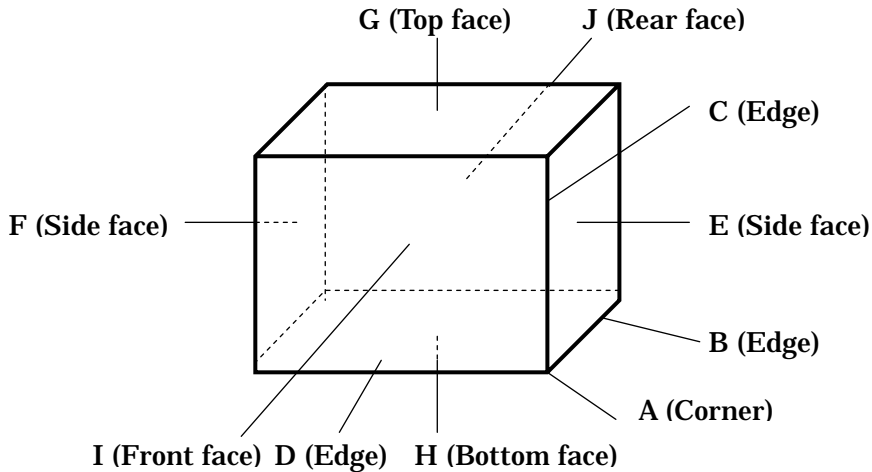
**Table 13-1 Environmental specifications**

| Item        | Condition     |   | Remark  |
|-------------|---------------|---|---|
| Temperature | Operation     | 0 ~ 55  | Temperature on surface of LCD panel (display area.)                   |
|             | Storage       | -20~60°C  |   |
| Humidity    | Operation     | 20~85 %RH   | Maximum wet-bulb temperature should not exceed 29°C. No condensation. |
|             | Storage       | 5~85%RH   |   |
| Vibration   | Non-operation | 10~500Hz, 1octave/ 20minute, 19.6m/s <sup>2</sup> (2G), 1.5mm max, 1hour each X, Yand Z directions. | For single module without package.                                    |
| Shock *1    | Non-operation | 294m/s <sup>2</sup> (30G), 6ms, 1time each ±X, ±Y and ±Z directions.                                |   |

NOTE: Table 13-2 and Figure 13-1 show the shock resistance standard when module is packaged.

**Table 13-2 Shock resistance standard when module is packaged**

| Dropping location | Dropping height | Count  |
|-------------------|-----------------|--------|
| A~J               | 60cm            | 1 time |



**Figure 13-1 Direction to apply shock to package**

DOCUMENT CONTROL SECTION

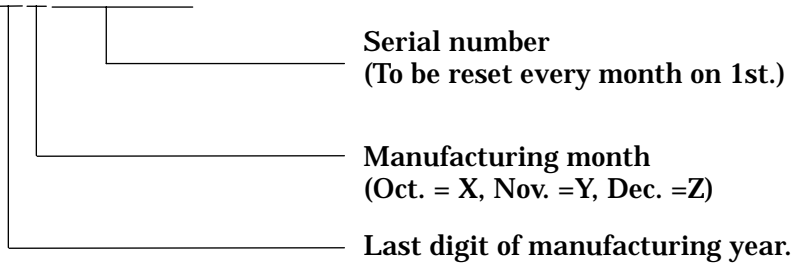
DATE

|        |      |        |       |       |  |  |  |
|--------|------|--------|-------|-------|--|--|--|
|        |      |        |       |       |  | TITLE<br><b>FLC48SXC8V-11AA</b>        |  |
|        |      |        |       |       |  | DRAW. NO.<br><b>Tech Bes LCD-00267</b> |  |
|        |      |        |       |       |  | CUST.                                  |  |
| EDIT   | DATE | DESIG. | CHECK | APPR. | DESCRIPTION                              |  |  |
| DESIG. |      |        | CHECK |       | FUJITSU DISPLAY TECHNOLOGIES CORPORATION |  |  |
|        |      |        |       |       |  | 22 /                                   |  |

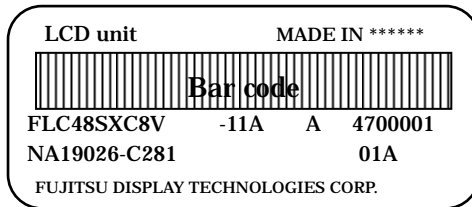
**14. INDICATIONS**

This module has the following indications.

- (1) Product name : LCD unit
- (2) Model Number : FLC48SXC8V-11AA
- (3) Product Drawing Number : NA19026-C281
- (4) Manufacturing Number : **4 7 0 0 0 1**



- (5) Version number : **01A** (Example)  
-1st 2 digits "01" means operational version.  
-3rd alphabet means functional version.
- (6) Manufacturer Country Name :
- (7) Company Name : FUJITSU DISPLAY TECHNOLOGIES CORP.
- (8) Disposal method of cold-cathode tubes.
- (9) Caution when changing cold-cathode tubes.



**Figure 14-1 Product Label (Example)**

**15. PACKAGING**

**15-1 Packing specifications**

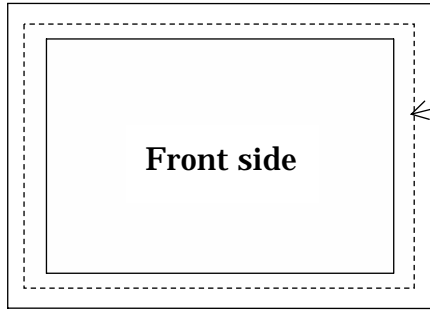
- (1) 5 LCD modules/1package.
- (2) Weight : approximately 14kg /1package.
- (3) Outline dimensions: 499mm (W)x 250mm (D)x 464mm (H)

**15-2 Packing method**

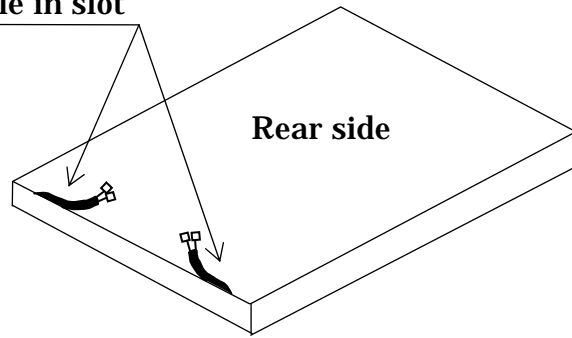
Figure 15-2 show the packing method.

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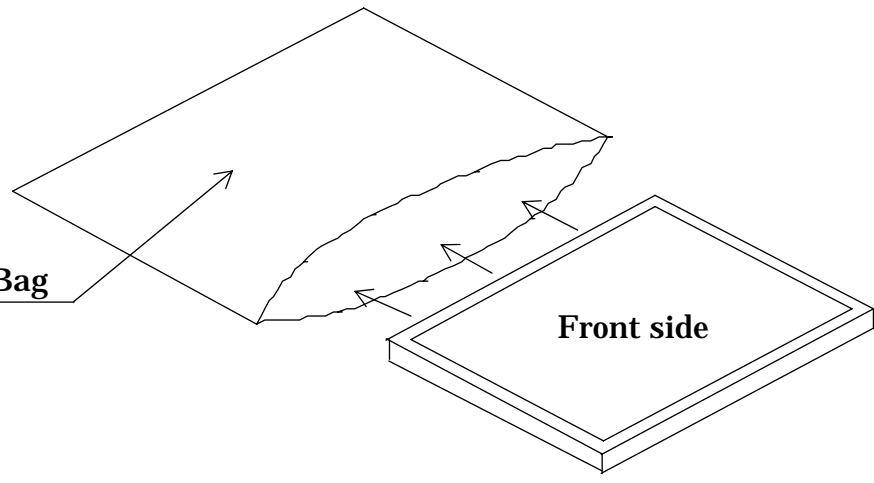
|                    |      |        |       |       |             |  |  |
|--------------------|------|--------|-------|-------|-------------|--|--|
|                    |      |        |       |       |             | TITLE<br><b>FLC48SXC8V-11AA</b>        |  |
|                    |      |        |       |       |             | DRAW. NO.<br><b>Tech Bes LCD-00267</b> |  |
| <b>02 20040602</b> |      |        |       |       |             | <b>Correction of packing box size.</b> |  |
| EDIT               | DATE | DESIG. | CHECK | APPR. | DESCRIPTION |  | FUJITSU DISPLAY TECHNOLOGIES CORPORATION |
| DESIG.             |      |        | CHECK |       | APPR.       |  | 23/                                      |



Put the cable in slot



Anti-Electric Bag



**Fig.15-2 (a) Packaging Method**

|      |                          |  |  |  |  |
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|      |                          |  |  |  |  |

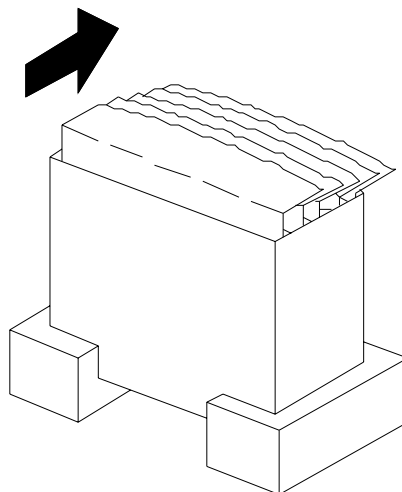
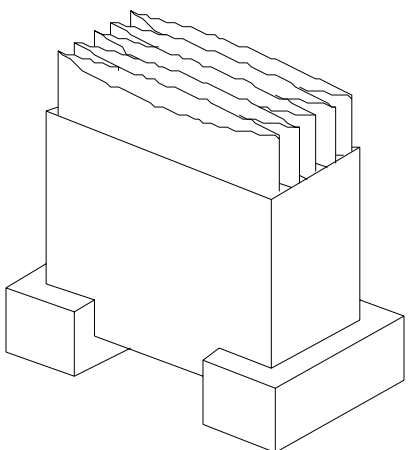
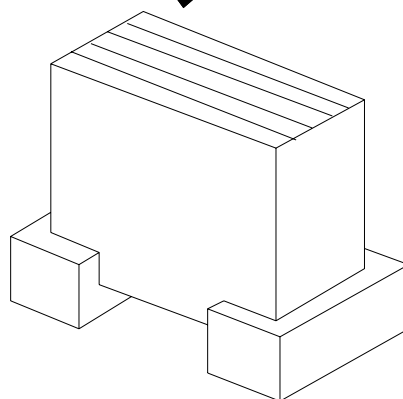
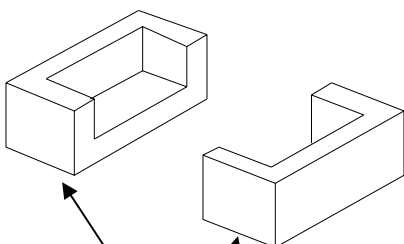
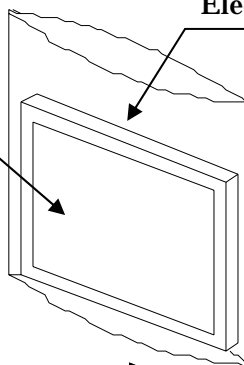
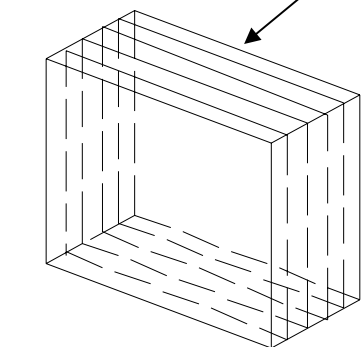
|        |      |        |       |       |  |             |  |      |       |
|--------|------|--------|-------|-------|--|-------------|--|------|-------|
|        |      |        |       |       |  | TITLE       | FLC48SXC8V-11AA                          |      |       |
|        |      |        |       |       |  | DRAW. NO.   | Tech Bes LCD-00267                       |      | CUST. |
|        |      |        |       |       |  |             |  |      |       |
| EDIT   | DATE | DESIG. | CHECK | APPR. |  | DESCRIPTION | FUJITSU DISPLAY TECHNOLOGIES CORPORATION | 24 / |       |
| DESIG. |      |        |       | CHECK |  |             |  |      |       |

Partition Box

Anti-  
Electrostatic bag

LCD Unit

Holder



**Cautious**  
Do not to put Anti-electrostatic bag  
in the partition box.

**The bending direction should  
be arranged.**

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TITLE FLC48SXC8V-11AA

DRAW. NO. CUST.

Tech Bes LCD-00267

FUJITSU DISPLAY TECHNOLOGIES CORPORATION

25 /

A

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A

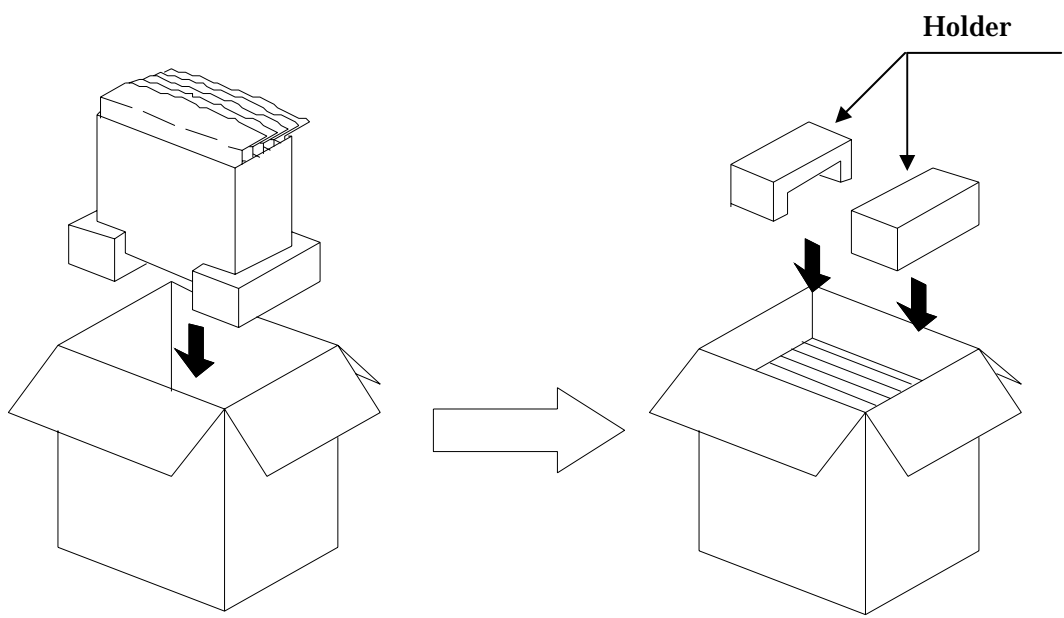
B

C

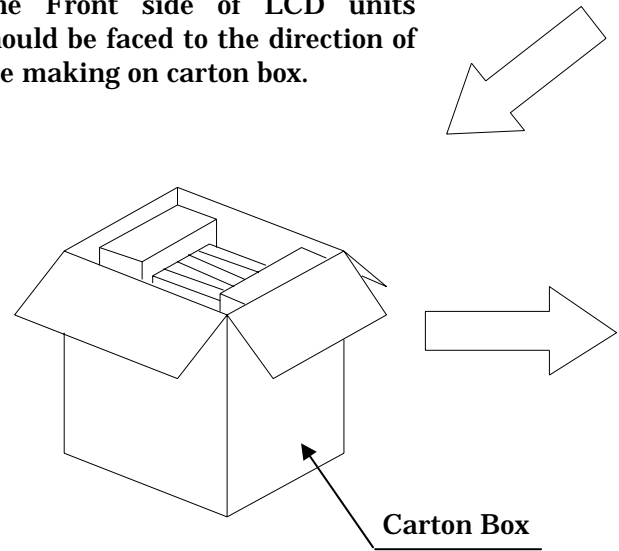
D

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The Front side of LCD units should be faced to the direction of the making on carton box.



**Sample of carton label**

|                |                 |               |     |
|----------------|-----------------|---------------|-----|
| 型格 (TYPE)      | FLC48SXC8V -11A | A数量 (QTY.)    | 5   |
| 図番 (DRWG. NO.) | NA19026-C281    | 版数 (REV. NO.) | 01A |
| Bar code       | 4600001         | Bar code      |     |
|                | 4600002         |               |     |
|                | 4600003         |               |     |
|                | 4600004         |               |     |
|                | 4600005         |               |     |
| Bar code       |                 |               |     |
| MADE IN *****  |                 |               |     |

**Fig.15-2 (b) Packaging Method**

DOCUMENT CONTROL SECTION

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|        |      |        |       |       |             |                    |  |                 |  |      |
|--------|------|--------|-------|-------|-------------|--------------------|--|-----------------|--|------|
|        |      |        |       |       |             | TITLE              |  | FLC48SXC8V-11AA |  |      |
|        |      |        |       |       |             | DRAW. NO.          |  |                 | CUST.                                    |      |
|        |      |        |       |       |             | Tech Bes LCD-00267 |  |                 |  |      |
| EDIT   | DATE | DESIG. | CHECK | APPR. | DESCRIPTION |                    |  |                 | FUJITSU DISPLAY TECHNOLOGIES CORPORATION | 26 / |
| DESIG. |      |        | CHECK |       |             | APPR.              |  |                 |  |      |

1

2

3

4

A

A

B

B

C

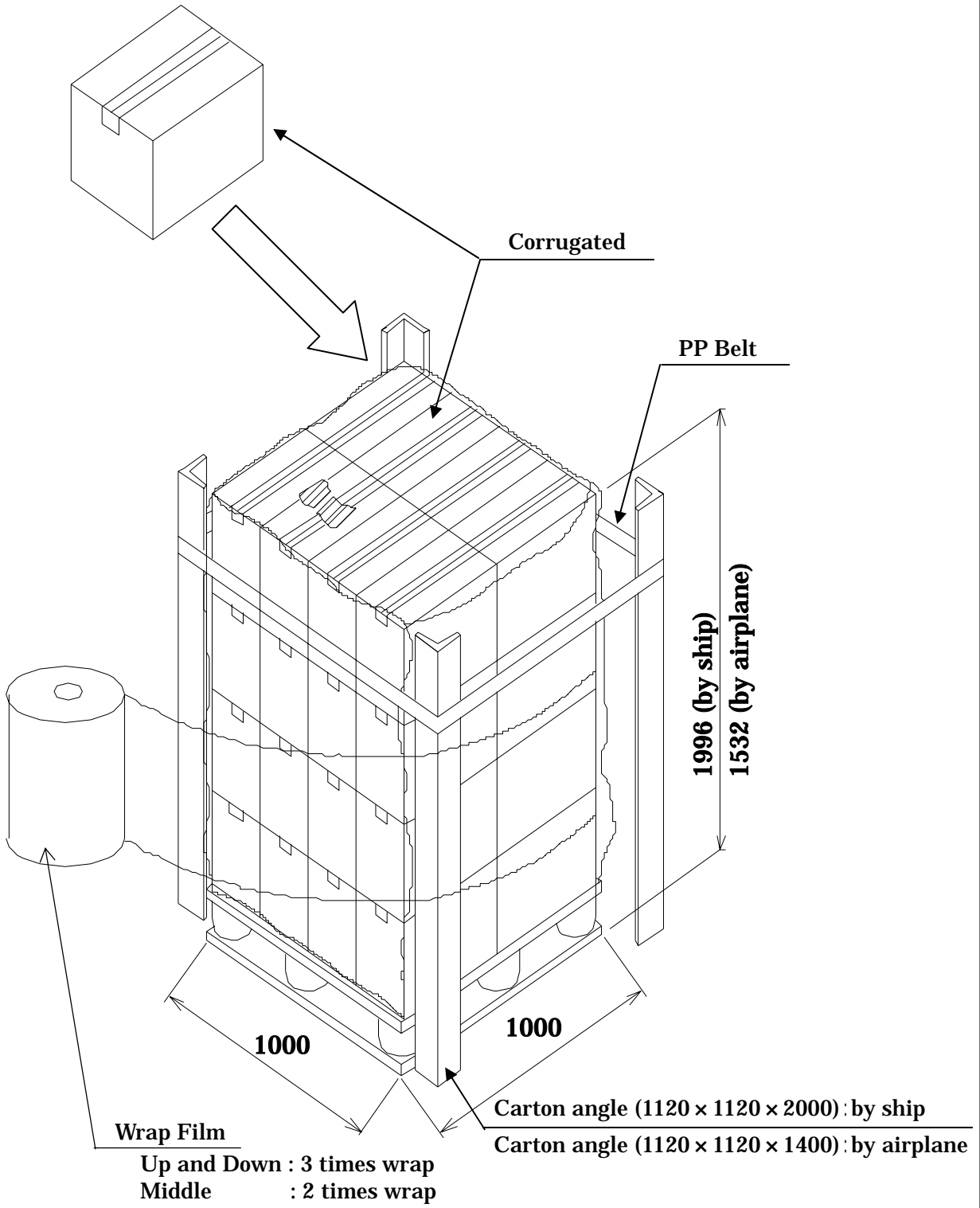
C

D

D

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**Note:1) 8 boxes × 4 layers (maximum 32 boxes) : by ship**  
**8 boxes × 3 layers (maximum 24 boxes) : by airplane**  
**Note:2) This drawing shows marine transportation specification.**

**Fig.15-2 (c) Packaging Method**

|                          |  |
|--------------------------|--|
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|        |      |        |       |       |  |  |  |
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|        |      |        |       |       |  | TITLE<br><b>FLC48SXC8V-11AA</b>        |  |
|        |      |        |       |       |  | DRAW. NO.<br><b>Tech Bes LCD-00267</b> |  |
|        |      |        |       |       |  | CUST.                                  |  |
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| DESIG. |      |        | CHECK |       | FUJITSU DISPLAY TECHNOLOGIES CORPORATION |  |  |
|        |      |        |       |       |  | 27 /                                   |  |

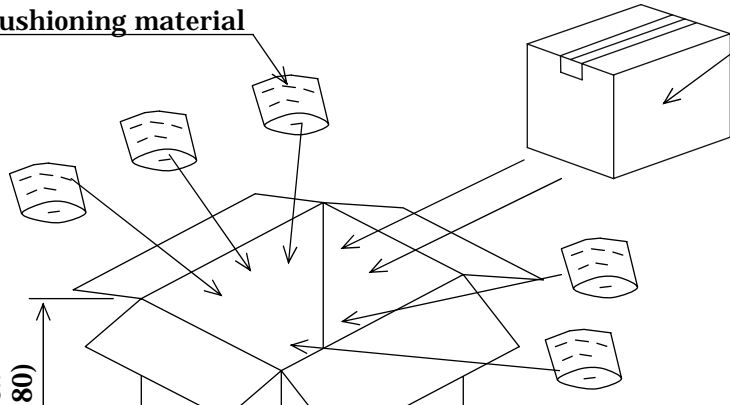
1

A

A

Cushioning material

Corrugated carton (A)  
with LCD modules



B

B

Corrugated fiberboard shipping container (B)

602  
(580)

446  
(430)

646  
(630)

C

C

Note 1) The carton (A) should be placed in the middle of the container (B) with enough cushioning materials.

Note2) The figures in ( ) show inside measurements of the container (B).

Figure.15-2 (d) Packing method

D

D

DOCUMENT CONTROL SECTION

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|        |      |        |       |       |  |  |  |
|--------|------|--------|-------|-------|--|--|--|
|        |      |        |       |       |  | TITLE<br><b>FLC48SXC8V-11AA</b>        |  |
|        |      |        |       |       |  | DRAW. NO.<br><b>Tech Bes LCD-00267</b> |  |
|        |      |        |       |       |  | CUST.                                  |  |
| EDIT   | DATE | DESIG. | CHECK | APPR. | DESCRIPTION                              |  |  |
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|        |      |        |       |       |  | 28 /                                   |  |

**16.WARRANTY**

The warranty period is one year after shipping. Products which fail during this period are repaired or replaced without charge, unless the failure is caused by user.

**17.PRECAUTIONS**

Adhere to the following precautions to use this LCD module properly.

**(1) Fail safe design**

LCD module has an inherent chance of failure. Customers must protect against injury, damage or loss from such failures by incorporating safety design measures into your facility and equipment such as redundancy, fire protection, and prevention of over-current levels and other abnormal operating conditions.

**(2) Handling of LCD panel**

**Do not apply any strong mechanical shock to the LCD panel.**

Since the LCD panel is made of glass, excessive shock may damage the panel or cause a malfunction.

**Do not press hard on the LCD panel surface.**

In the LCD panel, the gap between two glass plates is kept perfectly even to maintain display properties and reliability. The hard pressure on the LCD panel may cause the following problems. If the pressure is over 2kg/cm<sup>2</sup>, the problem don't return to normal condition.

Ununiformity of color

Disorder of orientation of liquid crystal

Problem returns to normal condition after a while. Problem returns to normal condition by turning the power off and turning on again.

However these operations should be avoided to insure reliability.

**Do not scratch the polarizer film on the LCD panel surface.**

- Do not press or rub the display surface with a hard tool, tweezers, etc.
- For handling, use cotton or conductive gloves so that the display surface is not soiled.
- If dust or dirt soils the display surface, clean it as follows with a soft cloth (deerskin, etc.)

[Dust] Wipe off with a soft cloth. (do not rub.)

[Dirt ] Apply clear water to a soft cloth and squeeze hard out of water drops, then lightly wipe off the specified parts. Only if the dirt is hardly wiped off, use isopropyl alcohol or ethanol.

Be careful not to splash the water or the solvents on the edge of polarizer and in the LCD unit.

The polarizer possibly exfoliates due to the solvent and water penetrated between the polarizer and the LCD panel.

Do not use unspecified solvent such as ketone (acetone, etc.) and aromatics (xylene, toluene, etc.)

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|        |      |        |       |       |  | TITLE<br><b>FLC48SXC8V-11AA</b>        |  |
|        |      |        |       |       |  | DRAW. NO.<br><b>Tech Bes LCD-00267</b> |  |
|        |      |        |       |       |  | CUST.                                  |  |
| EDIT   | DATE | DESIG. | CHECK | APPR. | DESCRIPTION                              |  |  |
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|        |      |        |       |       |  | 29 /                                   |  |

A

(Caution) Be careful not to allow the water or solvent to enter the module.

- If saliva or water drops are left for a long period of time, the part may become deformed or discolored.

Wipe off immediately in the same way as for dirt.

- Do not allow oil to adhere to the module since excessive oil is hard to clean.

**Do not place or contact objects on the display surface for a long period of time.**

This may make some parts of the LCD module distorted and the quality of display may deteriorate.

B

**(3) Handling of LCD module**

**Do not pull the cold-cathode tube cable strongly.**

If the cable is pulled with the strength of 2kg or more, the cable may be damaged or may lose reliability.

**Assemble the module into user's system in a dust free environment.**

Conductive foreign matter adheres to the module may cause failures.

**Take anti-electrostatic measures for assembling the module.**

Since the LCD module contains CMOS-ICs, the following points should be observed.

C

- For assembling the module, operator should be grounded and wear cotton or conductive gloves.
- Floor of work area and work table to assemble the LCD module should be covered with electrostatic shielding in order to discharge static electricity via an earth wire.
- If necessary, ground operation tools (soldering iron, radio pliers, tweezers, etc.).
- Do not take the module out of the conductive bag until the module is assembled.
- Do not assemble the module under low humidity (50%RH or less).

**Do not pull the connecting cable on the rear face of the LCD module strongly.**

D

**Do not disassemble or remodel the LCD module.**

Disassembly or remodeling of the LCD module may result in malfunctions or deterioration of the display quality and reliability.

**(4) Precautions in regards of operating the LCD module**

**Adhere to the specified power supply sequence.**

If not followed, the CMOS-IC may cause a latch-up, or DC voltage may be applied to the liquid crystal, which cause a failure or serious deterioration in display quality.

**Do not operate the LCD module when condensation occurs.**

If the LCD module is operated when condensation is on the terminals of the LCD panel, the terminals cause electrochemical reaction, and may reach disconnection. Condensation easily occurs especially when the module is moved from cold environment to warm environment.

DOCUMENT CONTROL SECTION

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|        |      |        |       |       |  |                                 |  |
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|        |      |        |       |       |  | TITLE<br>FLC48SXC8V-11AA        |  |
|        |      |        |       |       |  | DRAW. NO.<br>Tech Bes LCD-00267 |  |
|        |      |        |       |       |  | CUST.                           |  |
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The following troubles occur when the LCD module is not used under recommended temperature.

- Operation under high temperature(>50 ): Display colors shift to blue.
- Storage under high temperature(>60 ): The polarizer film deteriorates and contrast decreases.
- Operation under low temperature(< 0 ): The response speed decreases considerably.
- Storage under low temperature(<-20 ): The liquid crystal may solidify and become damaged.

B

Be sure to input the control signals at the correct timing.

If control signals (DCLK, ENAB) are not input, or if the timing is out of the specified timing, DC voltage may be applied to the liquid crystal and, as a result, cause image sticking or deterioration of contrast.

(5) Precautions in regards of designing module mounting

Excessive force should not be applied to the screen or the rear side of the LCD module.

Excessive pressure on the screen caused by the installation of the LCD module may deteriorate display quality and reliability.

Brightness uniformity and the reliability of CCFL may decrease if the pressure is applied to the backlight module.

Avoid twisting and bending the LCD module.

Excessive twist and bend may damage display quality and reliability.

Avoid extending the power cable between the LCD module and inverter.

This may cause the backlight to flicker or not to light.

Keep the backlight cable apart from the metal enclosure of the LCD module.

When frequency current for backlight driving leak to the metal enclosure, the desired brightness may not be assured.

When mounting LCD module with M3 screws (x4), tighten the screws with torque 3.5kgf.

C

D

(6) Storage method

Do not store the LCD module in an atmosphere of organic solvent or corrosive gas.

In an organic solvent atmosphere, the polarizer film discolors and display quality deteriorates.

In a corrosive gas environment, various parts of the module may corrode or deteriorate.

Store the LCD module in a FDTC package.

At storing, FDTC packages can be stacked up to 3 boxes.

The LCD module is in an anti-static bag. Keep the module in that status.

E

DOCUMENT CONTROL SECTION

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|        |      |        |       |       |             |  |  |
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|        |      |        |       |       |             | TITLE<br>FLC48SXC8V-11AA                 |  |
|        |      |        |       |       |             | DRAW. NO.<br>Tech Bes LCD-00267          |  |
|        |      |        |       |       |             | CUST.                                    |  |
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**The LCD module is recommended to be stored in humidity controlled, cool and dark locations.**

**Recommended storage environment**

- Place : Dark (avoid direct sunlight)
- Temperature : 10 ~ 35
- Humidity : 50 ~ 60%RH

Note) If the module is left in an environment of 60 and above for a long period of time, optical characteristics may deteriorate.

**(7) Disposal Method**

**LCD module**

The components of this LCD module can be grouped into metal, resin, glass and so on. As the backlight contains CCFL which includes mercury, it must be disposed according to the local ordinance or regulations.

**Package**

All the packages are made of recyclable papers except the anti-ESD bag.

**(8) CAUTION IN DESIGNING INVERTER**

Fluorescent lamps driven by high voltage are included in this LCD module. Please stand to the instructions below when designing inverter that lights the fluorescent lamps. Otherwise it may lead to FATAL FAILURE, such as SMOKING or FIRING.

**APPLY PROTECTIVE CIRCUIT** in preparation for lamp breaking, wire breaking and short circuit. The protective circuit should also detect half open circuit and wire breaking in narrow gap etc.. Otherwise it may lead to fatal failure.

**KEEP ENOUGH CURRENT CAPACITY** of inverter output for leakage current, which leaks from lamps and wire to surrounding metal material. Usually output current of about 1.5 times as same as the lamp current is necessary. But it sometimes varies due to characteristics of the inverter itself. So before determining design, please check characteristics of the inverter by connecting it to the LCD module.

**KEEP ENOUGH TEMPERATURE MARGIN** for each parts mounted on inverter. Temperature of the parts becomes higher when they are mounted in the final products due to heating inside. The temperature of each parts **MUST NOT** increase over the guaranteed temperature.

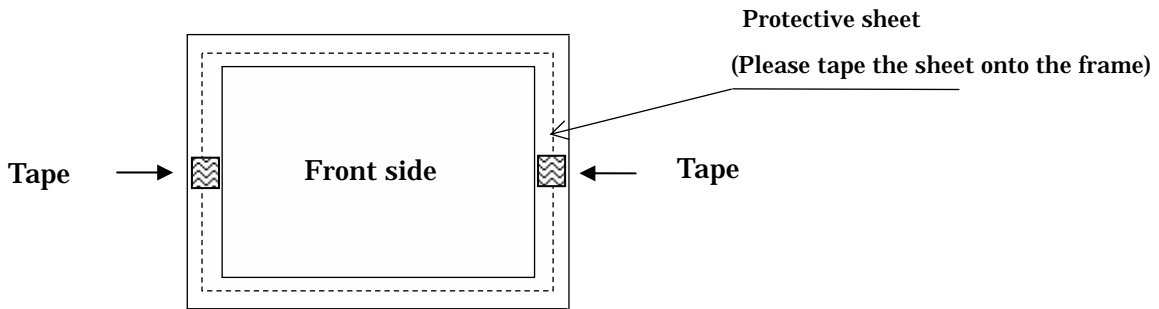
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|--------|------|--------|-------|-------|--|--|--|
|        |      |        |       |       |  | TITLE<br><b>FLC48SXC8V-11AA</b>        |  |
|        |      |        |       |       |  | DRAW. NO.<br><b>Tech Bes LCD-00267</b> |  |
|        |      |        |       |       |  | CUST.                                  |  |
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| DESIG. |      |        | CHECK |       | FUJITSU DISPLAY TECHNOLOGIES CORPORATION |  |  |
|        |      |        |       |       |  | 32 /                                   |  |

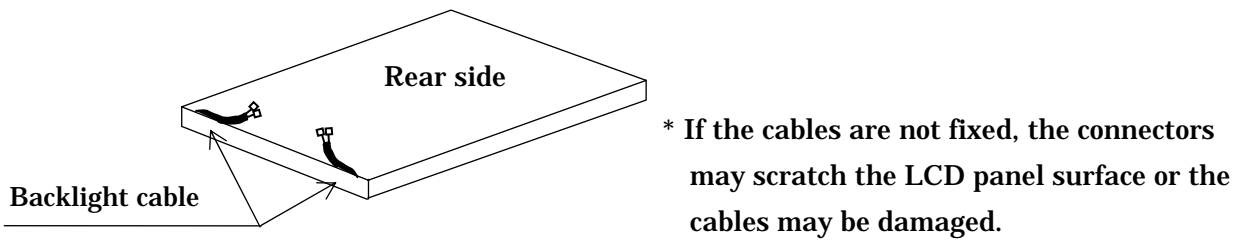
**( 8 ) Return method of the LCD module requested for repair or analysis of the problem**

- When returning the LCD modules, adhere to the following procedures not to damage the LCD panel or the backlight cables. (Fig. 17-1(a)~(b))  
When the LCD module is returned without following the specified packaging procedures, FDTC will not take responsibility for the damages caused by the failure of the packaging method.
- Please be cautious not to put fingerprints or other stains on the display by wearing a glove or fingerstall when managing LCD module modules, including faulty modules that require to be returned .

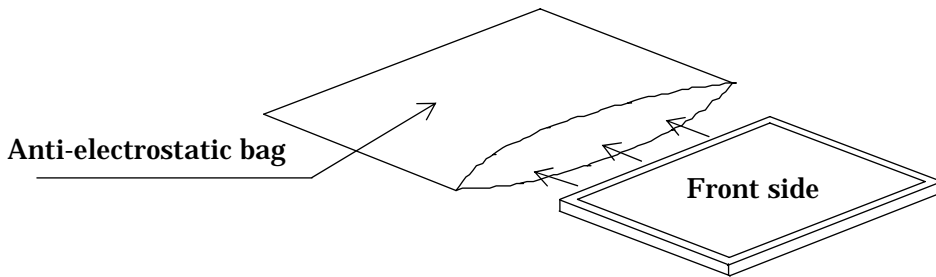
**(1) Attach protective sheet.**



**(2) Put the backlight cables in slots.**



**(3) Put the LCD module into the anti-electrostatic bag  
(Please do not use torn anti-electrostatic bags)**



**Fig. 17-1(a) Packaging method**

|                          |
|--------------------------|
| DOCUMENT CONTROL SECTION |
| DATE                     |

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|      |      |        |       |       |             | DRAW. NO.<br><b>Tech Bes LCD-00267</b>   |  |
|      |      |        |       |       |             | CUST.                                    |  |
| EDIT | DATE | DESIG. | CHECK | APPR. | DESCRIPTION | FUJITSU DISPLAY TECHNOLOGIES CORPORATION |  |
|      |      |        |       |       |             | 33 /                                     |  |

(4) Storage into the carton box

• When using the carton box manufactured by FDTC

(Please use carton boxes and arrowheads that are not collapsed)

A

A

Partition Box

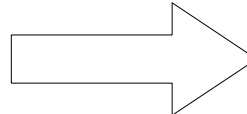
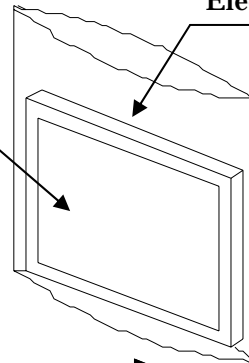
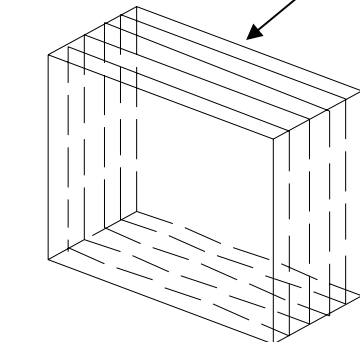
Anti-

Electrostatic bag

LCD Unit

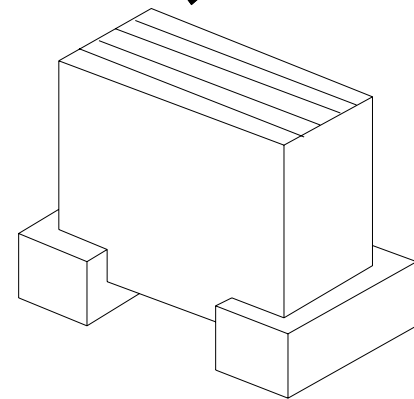
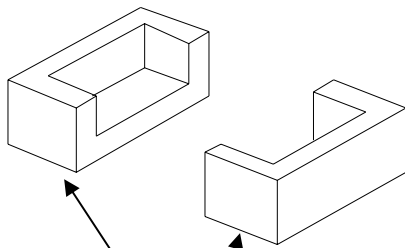
B

B



C

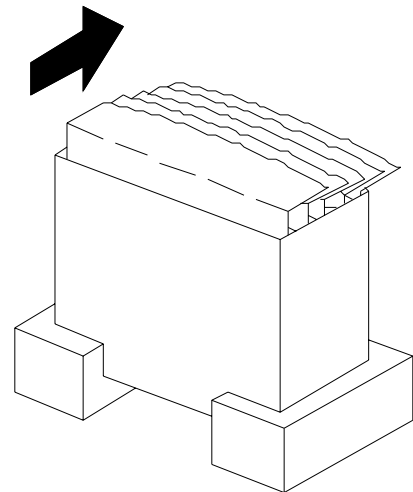
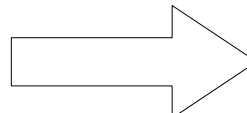
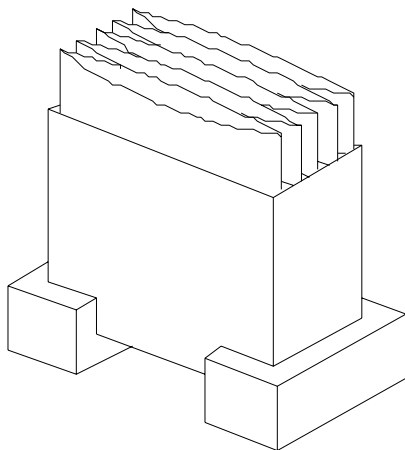
C



Holder

D

D



**Cautious**

**Do not to put Anti-electrostatic bag in the partition box.**

**The bending direction should be arranged.**

DOCUMENT CONTROL SECTION

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|  |  |                    |
|--|--|--------------------|
| TITLE                                    |  | FLC48SXC8V-11AA    |
| DRAW. NO.                                |  | Tech Bes LCD-00267 |
| FUJITSU DISPLAY TECHNOLOGIES CORPORATION |  | CUST.              |
| 34 /                                     |  |                    |

A

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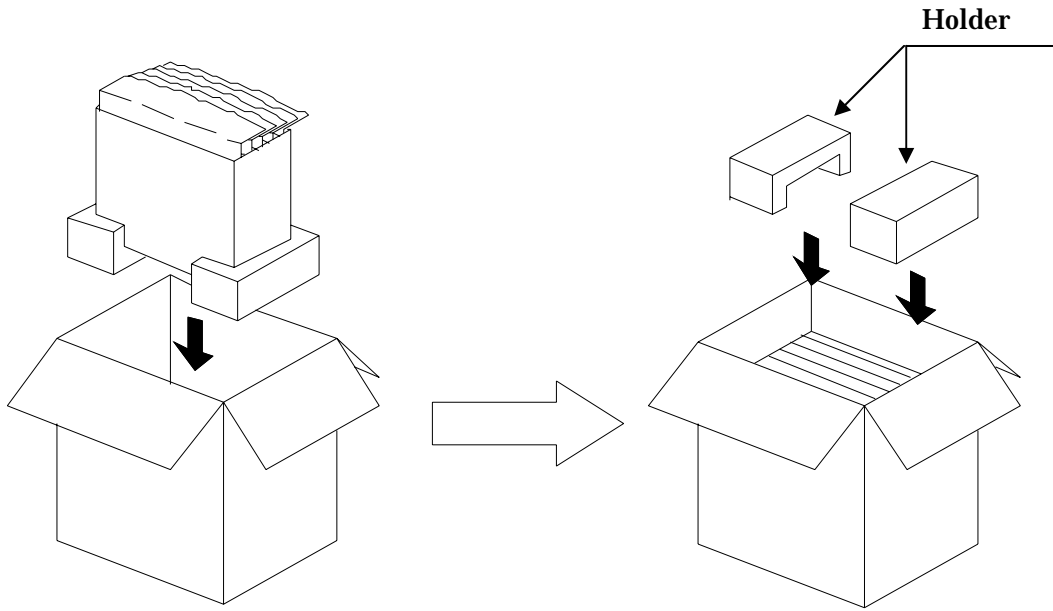
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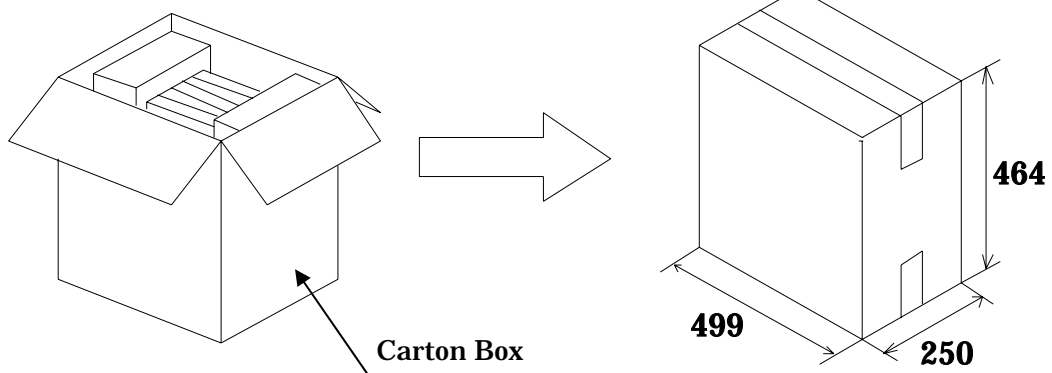
D

E

F



The Front side of LCD units should be faced to the direction of the making on carton box.



**\*\*The arrowheads are shown on the holders.\*\***

**Fig. 17-1(b) Packaging method**

- When not using the carton box manufactured by FDTC  
Please pack the LCD modules one by one and make sure not to damage the LCD modules when transporting.

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|        |      |        |       |       |  | TITLE<br><b>FLC48SXC8V-11AA</b>        |  |
|        |      |        |       |       |  | DRAW. NO.<br><b>Tech Bes LCD-00267</b> |  |
|        |      |        |       |       |  | CUST.                                  |  |
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| DESIG. |      |        | CHECK | APPR. | FUJITSU DISPLAY TECHNOLOGIES CORPORATION |  |  |
|        |      |        |       |       |  | 35 /                                   |  |

**(9) Others**

**If the LCD panel is damaged, do not inhale and do not swallow the liquid crystal.**  
If the liquid crystal adhere to the body or cloths, wash it off with soap immediately.  
Follow regular precautions for electronic components.

**Flux residue on the printed circuit board is harmless to the quality and reliability of LCD module.**

FDTC has adopted non-wash technology on module assembly process.

**18. PRECAUTIONS FOR USE**

This Product is designed, developed and manufactured as contemplated for general use, including without limitation, general office use, personal use, household use, and ordinary industrial use, but is not designed, developed and manufactured as contemplated for use accompanying fatal risks or dangers that, unless extremely high safety is secured, could lead directly to death, personal injury, severe physical damage or other loss (hereinafter "High Safety Required Use"), including without limitation, nuclear reaction control in nuclear facility, aircraft flight control, air traffic control, mass transport control, medical life support system, missile launch control in weapon system. If customer's product possibly falls under the category of High Safety Required Use, please consult with our sales representatives in charge before such use. In addition, FDTC shall not be liable against the Customer and/or any third party for any claims or damages arising in connection with the High Safety Required Use of the Product without permission.

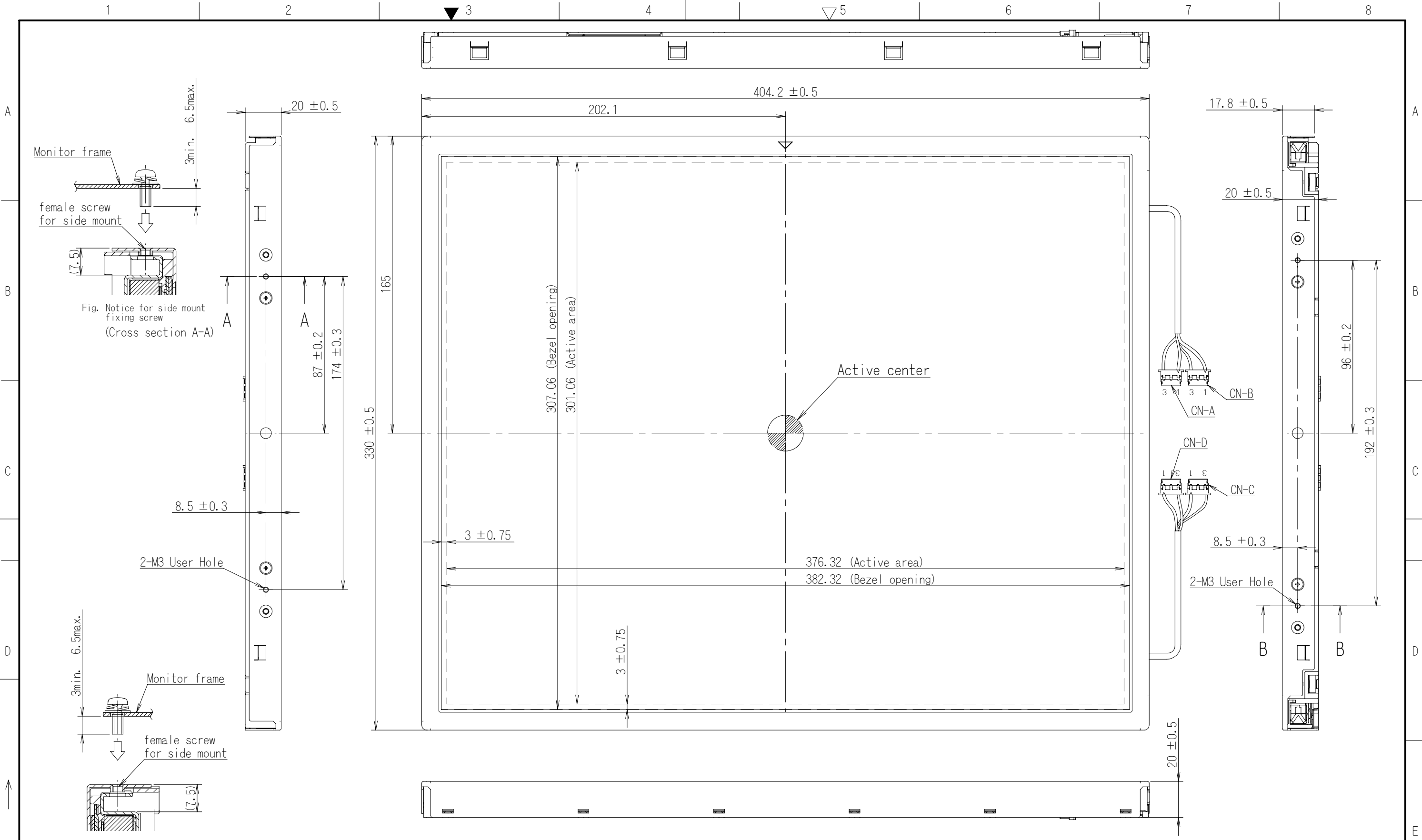
**19. MISCELLANEOUS**

Specifications of the TFT-LCD panel and other components used in the LCD module are subject to change. Both parties shall discuss together before change.

If any doubt is raised in the content of the specifications, both parties shall discuss and make best effort for the agreement.

|                          |
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|        |      |        |       |       |  | TITLE<br><b>FLC48SXC8V-11AA</b>        |  |
|        |      |        |       |       |  | DRAW. NO.<br><b>Tech Bes LCD-00267</b> |  |
|        |      |        |       |       |  | CUST.                                  |  |
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| DESIG. |      |        | CHECK |       | FUJITSU DISPLAY TECHNOLOGIES CORPORATION |  |  |
|        |      |        |       |       |  | 36 /                                   |  |



NOTE  
1) Unspecified tolerance to be  $\pm 0.5$

|        |      |        |       |             |       |  |  |  |                    |  |       |
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|        |      |        |       |             |       |  | TITLE                                    |  | FLC48SXC8V-11AA    |  |       |
|        |      |        |       |             |       |  | DRAW. NO.                                |  | Tech Bes LCD-00267 |  | CUST. |
|        |      |        |       |             |       |  | FUJITSU DISPLAY TECHNOLOGIES CORPORATION |  | 37/38              |  |       |
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1 2 3 4 5 6 7 8

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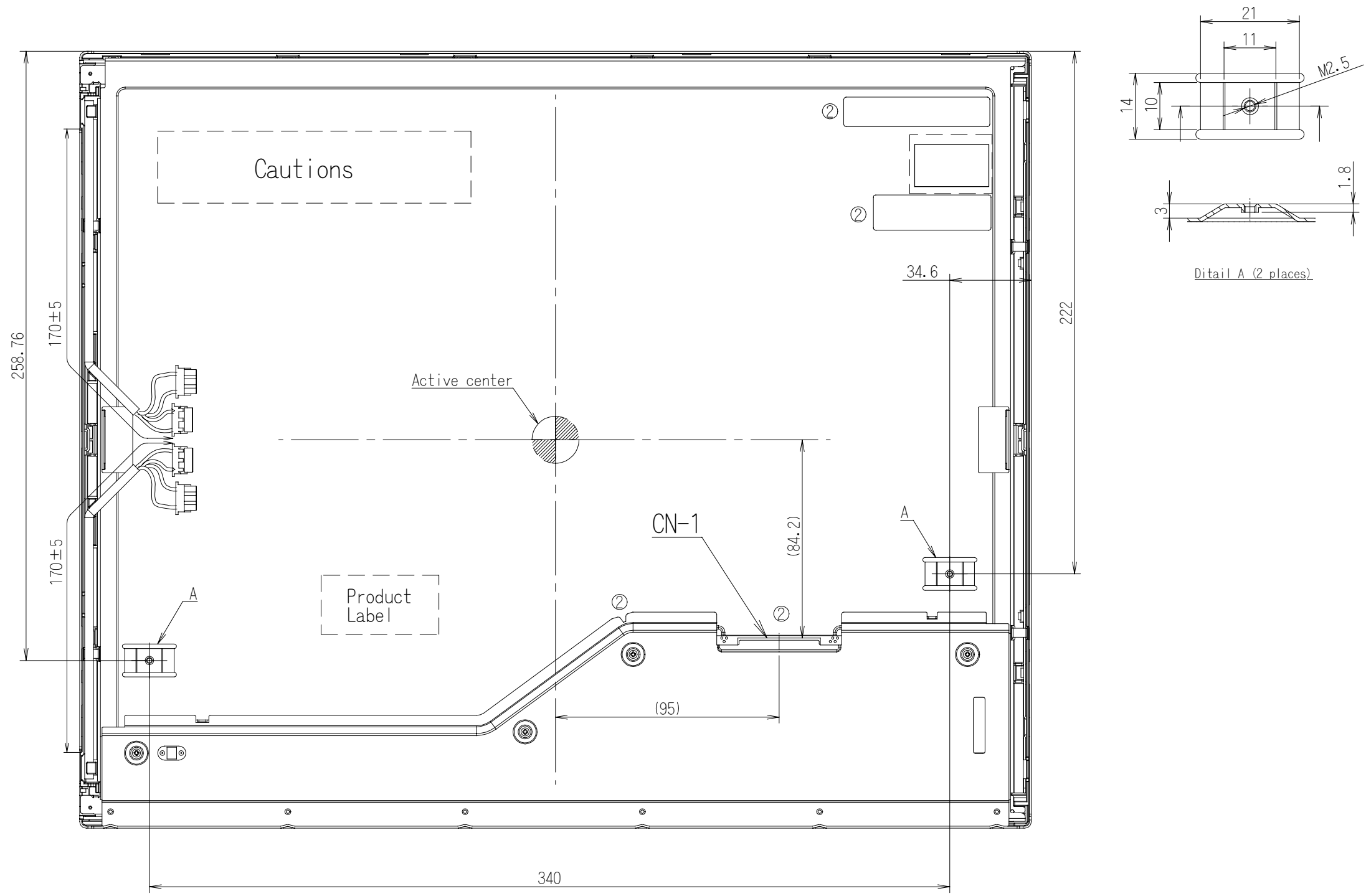


Figure 20-2 Module outline dimension (Rear)

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NOTE  
1) Unspecified tolerance to be  $\pm 0.5$

|        |          |        |       |   |  |  |  |
|--------|----------|--------|-------|---|--|--|--|
|        |          |        |       |   |  | TITLE FLC48SXC8V-11AA                    |  |
|        |          |        |       |   |  | DRAW. NO. Tech Bes LCD-00267             |  |
|        |          |        |       |   |  | CUST.                                    |  |
| 02     | 20040601 |        |       | A part of the shape was modified. Label addition. |  | FUJITSU DISPLAY TECHNOLOGIES CORPORATION |  |
| EDIT.  | DATE     | DESIG. | CHECK | DESCRIPTION                                       |  | 38/38                                    |  |
| DESIG. |          |        | CHECK | APPR.   |  |  |  |

1 2 3 4 5 6 7 8 93.04 F D N C - 3 5 0 1 3