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		APPLICABLE GROUP Mobile Liquid Crystal Display Group

DEVICE SPECIFICATION FOR

TFT-LCD Module

MODEL No.

LQ190E1LW41

英文仕様書確認印

モバイル液晶事業本部 第3設計センター 第2開発部

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副参事	副参事	副参事	主 事	主 事	主 事
					

ユーザー名：

備考：19.0型SXGAカラーモジュール

☐ CUSTOMER'S APPROVAL

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DEVICE SPECIFICATION

TFT-LCD Module

MODEL No.

LQ190E1LW41
(FLC48SXC8V-12F)

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1. APPLICATION

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

2. PRODUCT NAME AND MODEL NUMBER

2-1 Product Name : **LCD Module**

2-2 Model Name : LQ190E1LW41
(FLC48SXC8V-12F)

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.

This module includes Fast Response time Driving circuit.

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

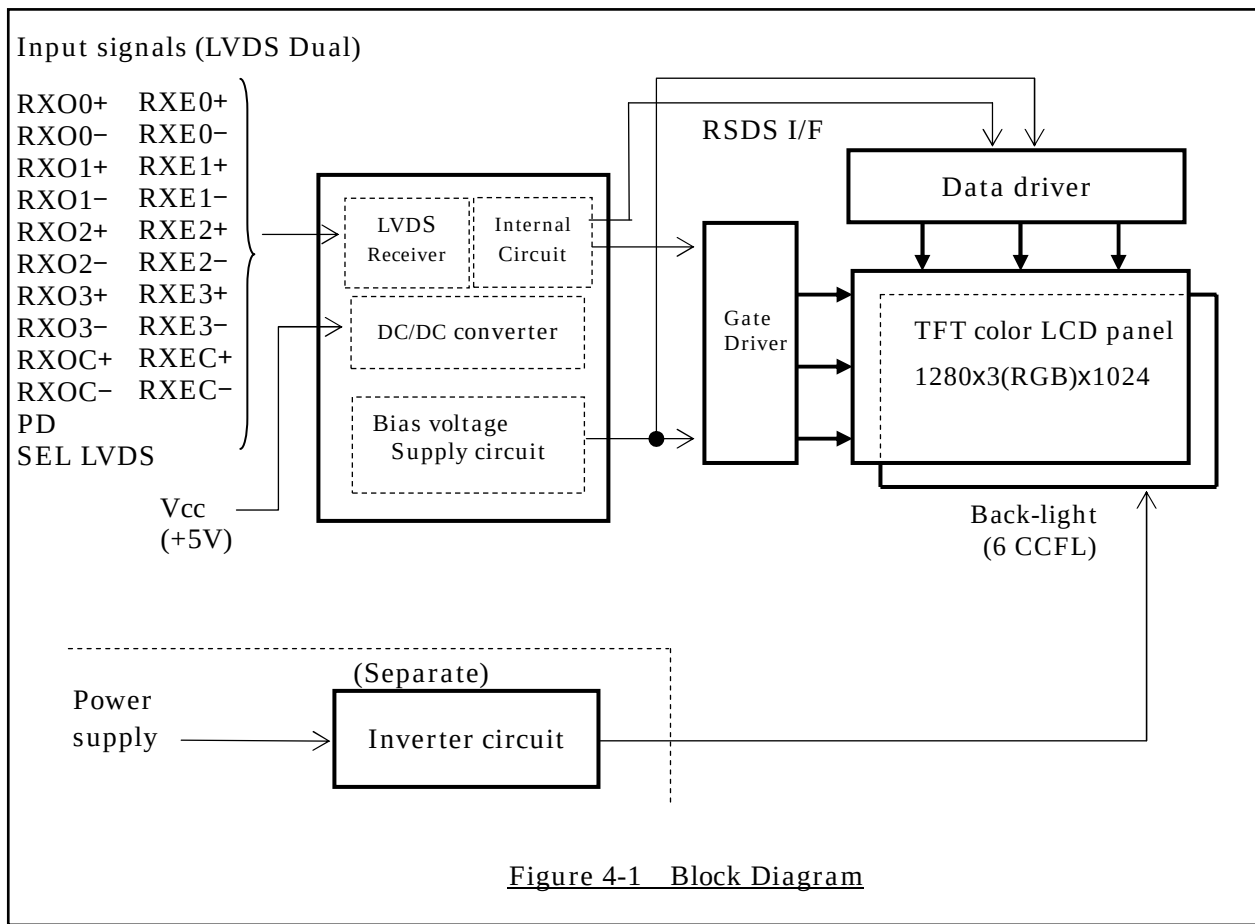
4. CONFIGURATION

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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The inverter for the back-light is not included. Figure 4-1 shows a block diagram of this LCD module.										
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5. MECHANICAL SPECIFICATIONS

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

Table 5-1 Mechanical Specifications

Item	Specifications	Unit	Remark
Dimensions	404.2x330x22(TYP.)	mm	Edge type back-light is used. (CCFLx6) Without inverter. For details on dimensions, see dimensional outline drawing. (Figure 20-1,2) 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	3,200 MAX.	g	
FG-SG	Short circuit	—	

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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 _{CC}	Ta=25°C	−0.3	—	6.0	V
Input Signal Voltage (LVDS signal, PD,SEL LVDS)	V _{IN}	Ta=25°C	−0.3	—	3.6	V

B

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 _{CC}	4.75	—	5.25	V
Ripple Voltage	V _{CC}	V _{RP}	—	—	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 <table><tr><th>Item</th><th>Symbol</th><th>Condition</th><th>MIN.</th><th>TYP.</th><th>MAX.</th><th>Unit</th><th>Remark</th></tr><tr><td>Differential-input Voltage (Hign)</td><td>V_{IH}</td><td rowspan="2">V_{CM}=+1.2V</td><td>—</td><td>—</td><td>100</td><td>mV</td><td></td></tr><tr><td>Differential-input Voltage (Low)</td><td>V_{IL}</td><td>−100</td><td>—</td><td>—</td><td>mV</td><td></td></tr><tr><td>Input Voltage (High)</td><td>V_{IH}</td><td rowspan="4">V_{CC}=+5.0±0.25V V_{SS}=0V DCLK=54MHz Ta=25° C</td><td>2.0</td><td>—</td><td>3.3</td><td>V</td><td>PD SEL LVDS</td></tr><tr><td>Input Voltage (Low)</td><td>V_{IL}</td><td>0</td><td>—</td><td>0.8</td><td>V</td><td></td></tr><tr><td>Supply Current</td><td>I_{CC}</td><td>—</td><td>1350</td><td>2500</td><td>mA</td><td>*1</td></tr><tr><td>Supply Rush Current</td><td>I_{SCC}</td><td>—</td><td>—</td><td>3.5 ③ 5.0</td><td>A</td><td rowspan="2">*2</td></tr><tr><td>Supply Rush Current Duration(1.5A excess)</td><td>T_{SCC}</td><td>—</td><td>—</td><td>1.0 ③ 0.5</td><td>ms</td><td></td></tr><tr><td rowspan="4">BACK LIGHT (*3)</td><td rowspan="2">CCFL Turn on Voltage</td><td>V_S</td><td>f_L=50kHz,Ta=25°C</td><td>—</td><td>1400</td><td>1600</td><td rowspan="2">V_{rms}</td><td></td></tr><tr><td></td><td>f_L=50kHz,Ta=0°C</td><td>—</td><td>1500</td><td>1600</td><td></td></tr><tr><td>Lighting Voltage</td><td>V_L</td><td>f_L=50kHz I_L=7mA</td><td>—</td><td>750</td><td>—</td><td>V_{rms}</td><td></td></tr><tr><td>Lighting Frequency</td><td>f_L</td><td>V_L=750V_{rms}</td><td>40</td><td>50</td><td>60</td><td>kHz</td><td></td></tr><tr><td></td><td>Tube Current</td><td>I_L</td><td>f_L=50kHz V_L=750V_{rms}</td><td>4</td><td>7</td><td>8</td><td>mArms</td><td>*4</td></tr></table> (*1) Typical current situation : Color bar pattern. V_{CC}=5.0V Maximum current situation : White pattern. V_{CC}=4.75V Without rush current. (*2) These items prescribe the rush current for starting internal DC/DC. Charging current to capacitors of V_{CC} is not prescribed. (*3) Back-light specifications are valid when using a suitable inverter such as the FLCV-16 ② (*4) Tube current (I_L) shows the value of the current that is consumed at one lamp. This LCD module has 46 lamps. Each 23 lamps are placed at upper side and lower side of the display. 23 lamps is connected in parallel. Each low voltage terminals are connected with separate cable to Back-light connector. <table><tr><td colspan="2">DATE</td><td colspan="2">DOCUMENT CONTROL SECTION</td><td colspan="2"></td><td colspan="2"></td></tr><tr><td colspan="2">03</td><td colspan="2">20050112</td><td colspan="2"></td><td colspan="2"></td></tr><tr><td colspan="2">02</td><td colspan="2">20040910</td><td colspan="2"></td><td colspan="2"></td></tr><tr><td colspan="2">EDIT</td><td colspan="2">DATE</td><td colspan="2">DESIG.</td><td colspan="2">CHECK</td></tr><tr><td colspan="2">DESIG.</td><td colspan="2"></td><td colspan="2">CHECK</td><td colspan="2"></td></tr></table> TITLELQ190E1LW41 (FLC48SXC8V-12F) DRAW. NO.LD17427 CUST. 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TYP.	MAX.	Unit	Remark	Differential-input Voltage (Hign)	V _{IH}	V _{CM} =+1.2V	—	—	100	mV		Differential-input Voltage (Low)	V _{IL}	−100	—	—	mV		Input Voltage (High)	V _{IH}	V _{CC} =+5.0±0.25V V _{SS} =0V DCLK=54MHz Ta=25° C	2.0	—	3.3	V	PD SEL LVDS	Input Voltage (Low)	V _{IL}	0	—	0.8	V		Supply Current	I _{CC}	—	1350	2500	mA	*1	Supply Rush Current	I _{SCC}	—	—	3.5 ③ 5.0	A	*2	Supply Rush Current Duration(1.5A excess)	T _{SCC}	—	—	1.0 ③ 0.5	ms		BACK LIGHT (*3)	CCFL Turn on Voltage	V _S	f _L =50kHz,Ta=25°C	—	1400	1600	V _{rms}			f _L =50kHz,Ta=0°C	—	1500	1600		Lighting Voltage	V _L	f _L =50kHz I _L =7mA	—	750	—	V _{rms}		Lighting Frequency	f _L	V _L =750V _{rms}	40	50	60	kHz			Tube Current	I _L	f _L =50kHz V _L =750V _{rms}	4	7	8	mArms	*4	DATE		DOCUMENT CONTROL SECTION						03		20050112						02		20040910						EDIT		DATE		DESIG.		CHECK		DESIG.				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Measurement circuit is based on Figure 8-1.

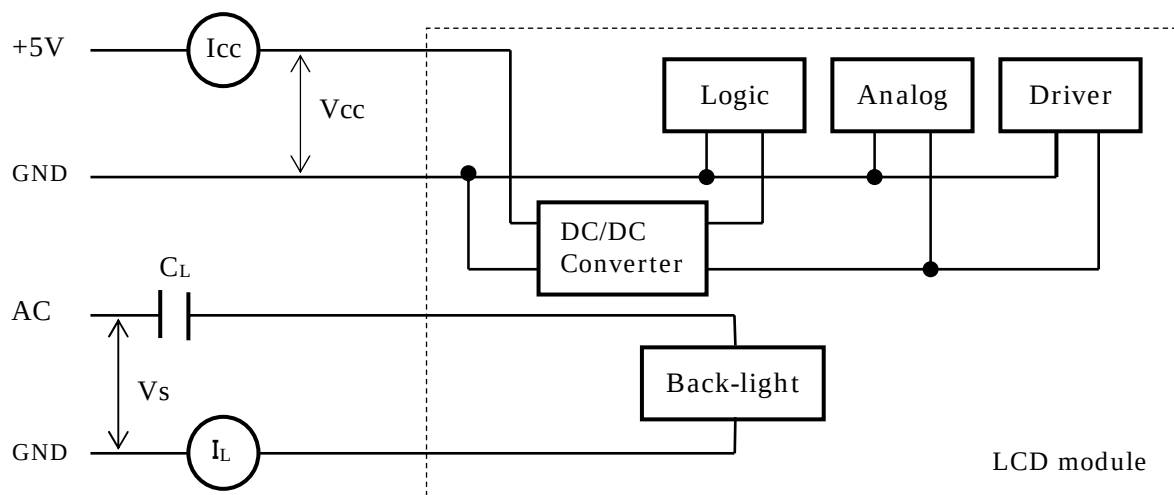


Figure 8-1 Measurement circuit

Input signals (LVDS Dual)

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

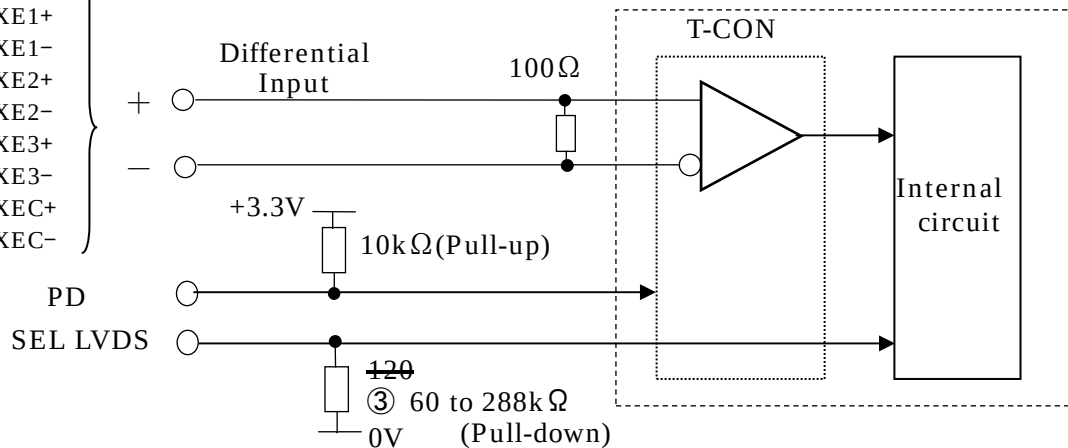


Figure 8-2(A) Equivalent circuit of logic signal Input

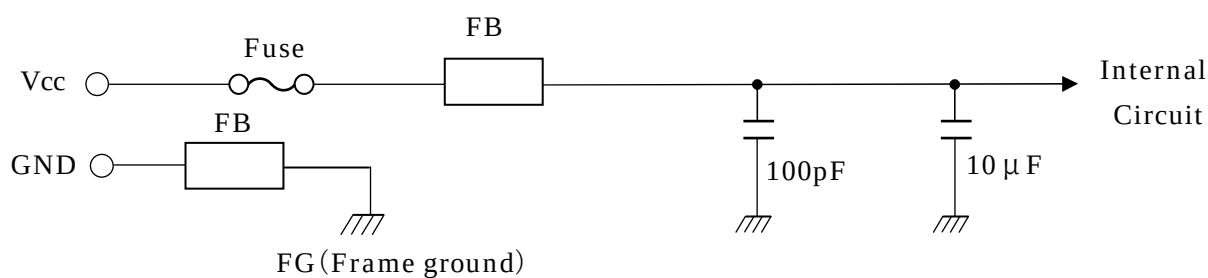


Figure 8-2(B) Equivalent circuit of power supply

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DATE

03	20050112				Modified pull down resistance
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DESIG.				CHECK	
					APPR.

TITLE	LQ190E1LW41 (FLC48SXC8V-12F)
DRAW. NO.	LD17427
CUST.	
SHARP CORPORATION	7/

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9. OPTICAL SPECIFICATIONS										
Table 9-1 shows the optical specifications of this LCD module.										
A		Table 9-1 Optical Specifications						Ta=25°C, Signal timing=Typ.		
Item		Symbol	Condition		Specifications			Unit	Remark	
					MIN.	TYP.	MAX.		Note	
Visual Angle	Horizontal	θ _{L, R}	CR≥10	θ _{U, D} =0°	85	89	—	deg		(1)(2)
	Vertical	θ _{U, D}		θ _{L, R} =0°	85	89	—	deg		(3)(5)
	All Direction	θ			—	80	—	deg		(6)
Contrast Ratio		CR	θ _{L, R, U, D} =0°		400	600 ③ 900	—	—	White/Black	(1)(2) (3)(5)
Response Time(Rise+Fall) (B→W→B)		τ _{rise} + τ _{fall}	θ _{L, R, U, D} =0°	Ta=25°C	—	12	—	ms	*2	(1) (4) (5)
				Ta=0°C	—	24	—	ms		
Response Time (Rise or Fall) (All gray scale)		τ _{avg}	θ _{L, R, U, D} =0°	Ta=25°C	—	8	—	ms	Average of Response Time, *2	
Brightness		I	θ _{L, R, U, D} =0° V _{CC} =5V I _L =7mA fL=50kHz R*,G*,B* Signal =All “H”		320	450	—	cd/m ²	White *1	(1)(5)
Brightness Uniformity		ΔI			70	—	—	%		(1)(5) (7)
Chromaticity	W	x			0.283	0.313	0.343	—		(1) (5)
		y			0.299	0.329	0.359	—		
	R G 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-Premium					
Optimum Viewing Angle					— (symmentry)				(6)	
Display Color					16,777,216 (8-bit color)					
Color of non-display area					Black					
Surface Treatment ②					Anti Glare (Haze value:(25%), 2H)					
(1) Value at 15~20 minutes after lighting on.										
③(2) Value at 2 hours after lighting on.										
(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 brightnenss if it's no set correctly.										
					TITLE LQ190E1LW41 (FLC48SXC8V-12F)					
					DRAW. NO. LD17427				CUST.	
03 20050112					Changed contrast ratio, added note2.					
02 20040910					Modified Surface treatment					
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION					
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Note 1) Definition of Viewing Angle (1)

Based on Figure 9-1.

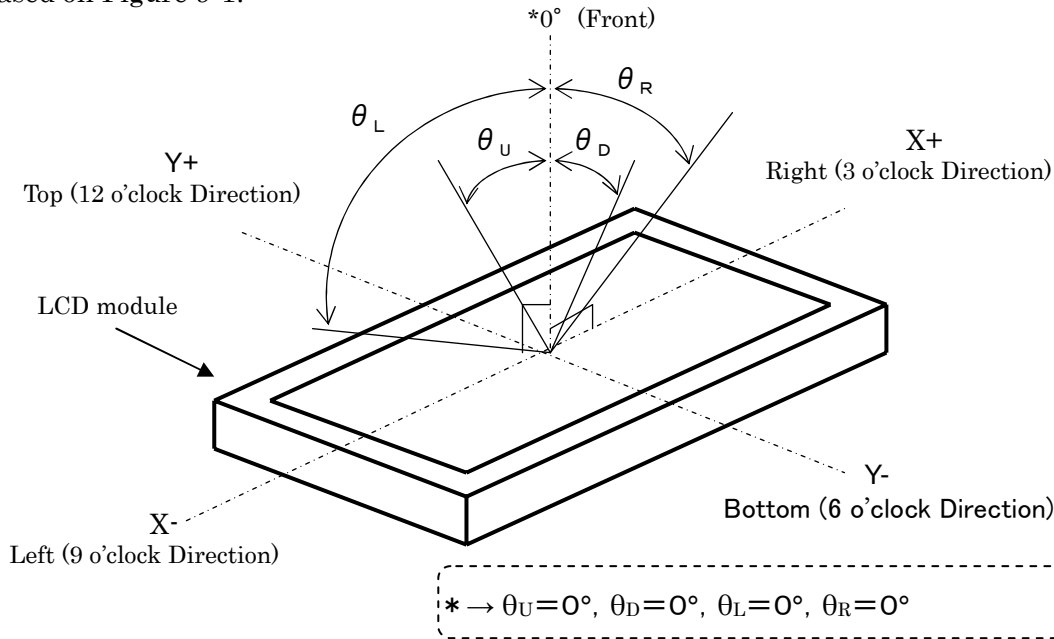


Figure 9-1 Definition of Viewing Angle (1)

Note 2) Definition of Viewing Angle (2)

Based on Figure 9-2.

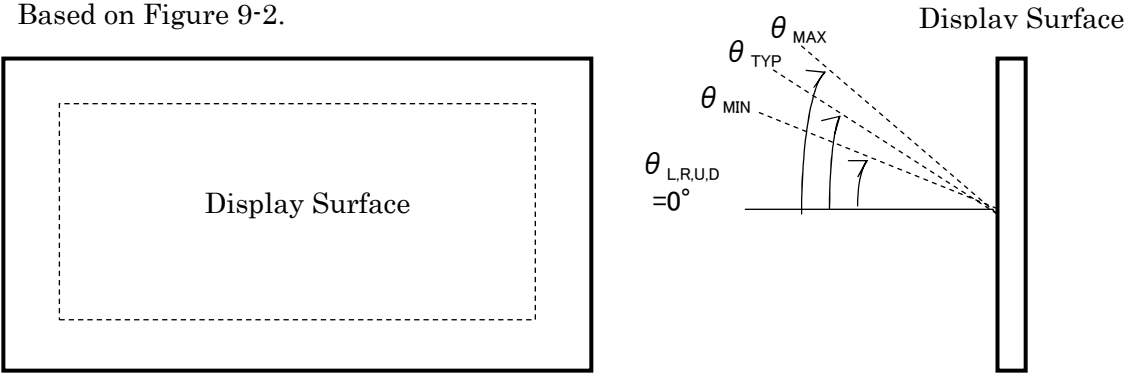


Figure 9-2 Definition of Viewing Angle (2)

Note 3) Definition of Contrast Ratio (CR)

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

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

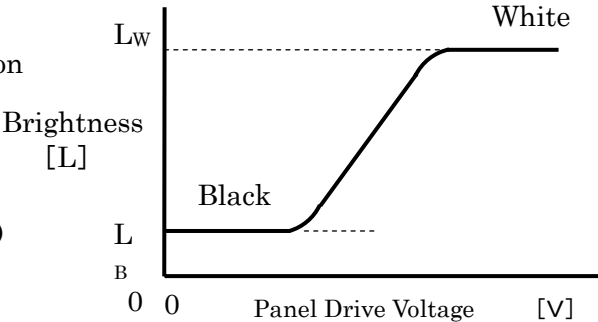
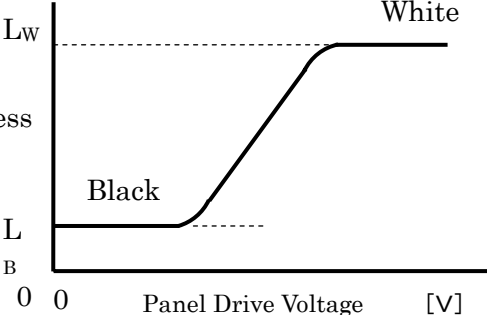


Figure 9-3 Voltage-Brightness Characteristics

DOCUMENT CONTROL SECTION	<u>Note 3) Definition of Contrast Ratio (CR)</u> Determined by Formula (1) based on Figure 9-3 Voltage-Brightness characteristics.										
	$= \frac{L_W \text{ (Brightness at white)}}{L_B \text{ (Brightness at black)}} \dots\dots(1)$										
	<u>Figure 9-3 Voltage-Brightness Characteristics</u>										
DATE						TITLE LQ190E1LW41 (FLC48SXC8V-12F)					
						DRAW. NO. LD17427				CUST.	
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION					SHARP CORPORATION	9 /
DESIG.				CHECK				APPR.			

Note 6) Definition of Optimum Viewing Angle

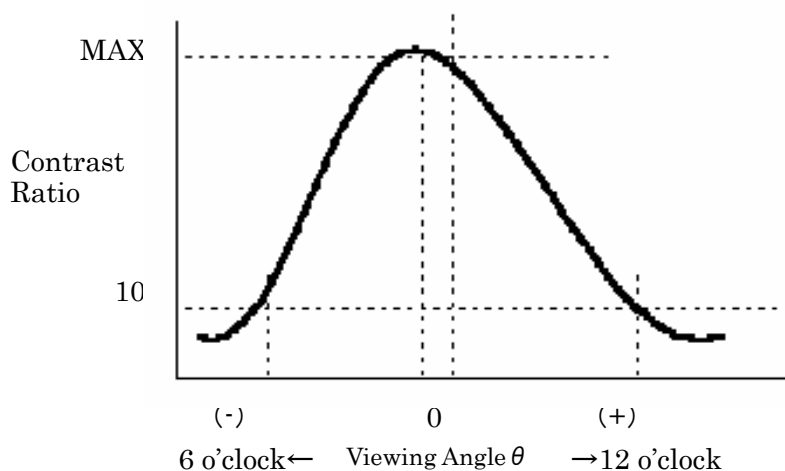


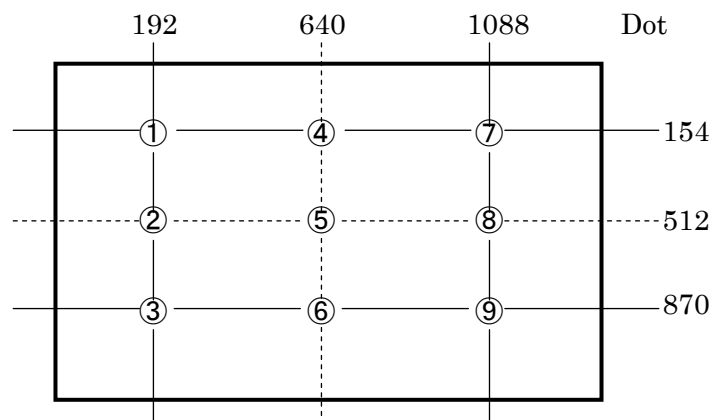
Figure 9-6 Definition of Viewing Angle

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.

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



Note) Each measurement point (①-⑨) defines the center spot of view of Brightness Meter.
The tolerance of measurement position is $\pm 3\text{mm}$.

Figure 9-7 Measurement Points

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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)																																																																																																																																			
<table><tr><td>Pin No.</td><td>Symbol</td><td>I/O</td><td>Function</td></tr><tr><td>1</td><td>RxO0-</td><td>I</td><td>Negative differential input</td></tr><tr><td>2</td><td>RxO0+</td><td>I</td><td>Positive differential input</td></tr><tr><td>3</td><td>RxO1-</td><td>I</td><td>Negative differential input</td></tr><tr><td>4</td><td>RxO1+</td><td>I</td><td>Positive differential input</td></tr><tr><td>5</td><td>RxO2-</td><td>I</td><td>Negative differential input</td></tr><tr><td>6</td><td>RxO2+</td><td>I</td><td>Positive differential input</td></tr><tr><td>7</td><td>GND</td><td>—</td><td>Ground</td></tr><tr><td>8</td><td>RxOC-</td><td>I</td><td>Negative differential input</td></tr><tr><td>9</td><td>RxOC+</td><td>I</td><td>Positive differential input</td></tr><tr><td>10</td><td>RxO3-</td><td>I</td><td>Negative differential input</td></tr><tr><td>11</td><td>RxO3+</td><td>I</td><td>Positive differential input</td></tr><tr><td>12</td><td>RxE0-</td><td>I</td><td>Negative differential input</td></tr><tr><td>13</td><td>RxE0+</td><td>I</td><td>Positive differential input</td></tr><tr><td>14</td><td>GND</td><td>—</td><td>Ground</td></tr><tr><td>15</td><td>RxE1-</td><td>I</td><td>Negative differential input</td></tr><tr><td>16</td><td>RxE1+</td><td>I</td><td>Positive differential input</td></tr><tr><td>17</td><td>GND</td><td>—</td><td>Ground</td></tr><tr><td>18</td><td>RxE2-</td><td>I</td><td>Negative differential input</td></tr><tr><td>19</td><td>RxE2+</td><td>I</td><td>Positive differential input</td></tr><tr><td>20</td><td>RxEC-</td><td>I</td><td>Negative differential input</td></tr><tr><td>21</td><td>RxEC+</td><td>I</td><td>Positive differential input</td></tr><tr><td>22</td><td>RxE3-</td><td>I</td><td>Negative differential input</td></tr><tr><td>23</td><td>RxE3+</td><td>I</td><td>Positive differential input</td></tr><tr><td>24</td><td>GND</td><td>—</td><td>Ground</td></tr><tr><td>25</td><td>SEL LVDS</td><td>I</td><td>Select LVDS Mapping</td></tr><tr><td>26</td><td>PD</td><td>—</td><td>LVDS Core Power Down</td></tr><tr><td>27</td><td>TST</td><td>—</td><td>Test pin *1</td></tr><tr><td>28</td><td>Vcc</td><td>—</td><td>+5V power supply</td></tr><tr><td>29</td><td>Vcc</td><td>—</td><td>+5V power supply</td></tr><tr><td>30</td><td>Vcc</td><td>—</td><td>+5V power supply</td></tr></table>								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
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.																																																																																																																																			
<table><tr><td>EDIT</td><td>DATE</td><td>DESIG.</td><td>CHECK</td><td>APPR.</td><td>DESCRIPTION</td></tr><tr><td>DESIG.</td><td></td><td></td><td>CHECK</td><td></td><td>APPR.</td></tr></table>						EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION	DESIG.			CHECK		APPR.	<table><tr><td>TITLE</td><td>LQ190E1LW41 (FLC48SXC8V-12F)</td></tr><tr><td>DRAW. NO.</td><td>LD17427</td></tr><tr><td>CUST.</td><td></td></tr></table>		TITLE	LQ190E1LW41 (FLC48SXC8V-12F)	DRAW. NO.	LD17427	CUST.																																																																																																											
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION																																																																																																																														
DESIG.			CHECK		APPR.																																																																																																																														
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SHARP CORPORATION						12/																																																																																																																													

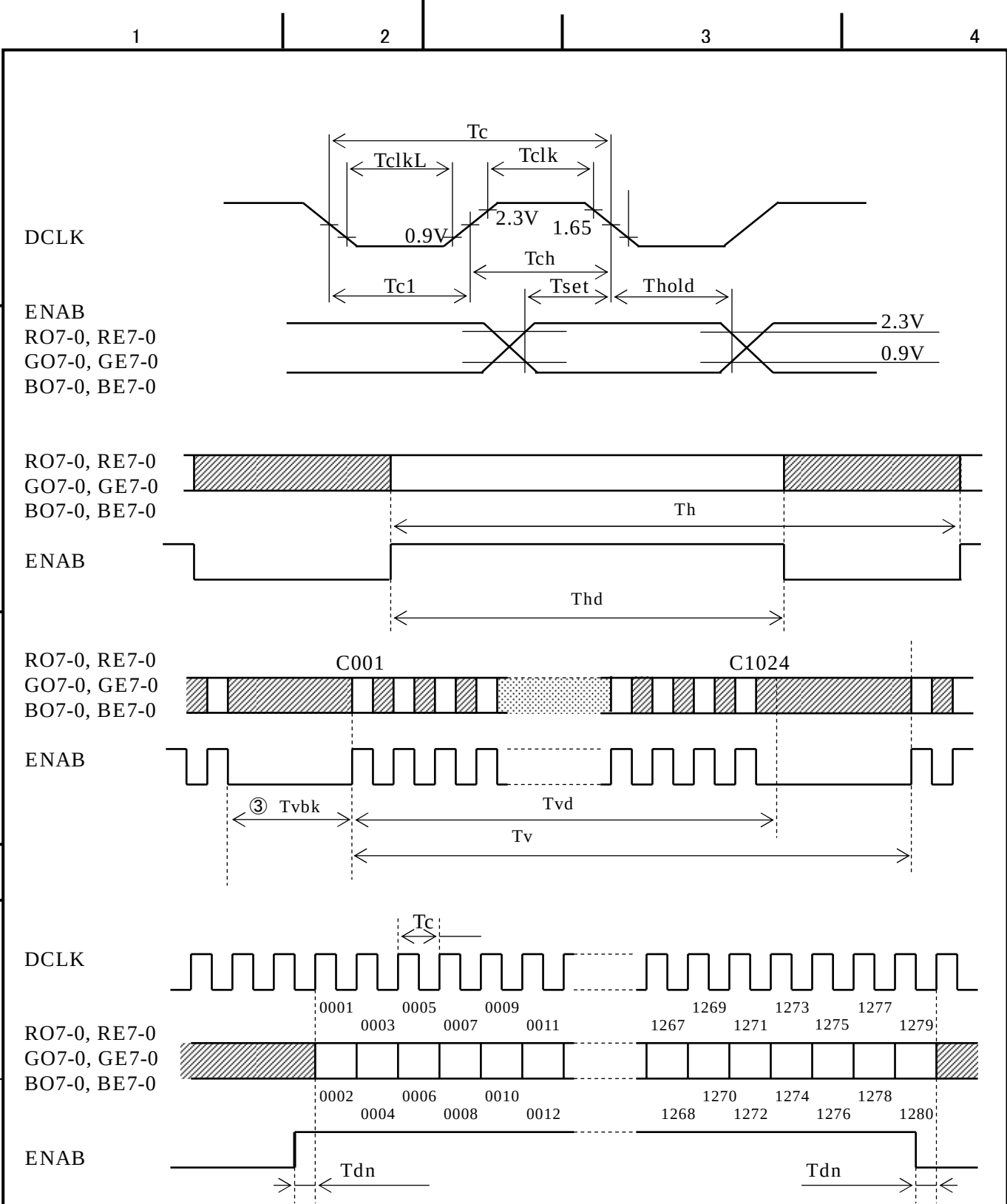
DOCUMENT CONTROL SECTION

DATE

1		2		3		4						
10-2 LVDS Data Assignment												
Table 10-2A,10-2B show the LVDS Data Assignment.												
Table 10-2A LVDS Data Assignment(SEL LVDS=L)												
A	Input signal *1		Transmitter DS90CF383,C385		Interface connector		Receiver DS90CF386 THC63LVDF84		LCD Control input			
			pin	INPUT	System side	LCD module pin	pin	OUTPUT				
B	LVDS 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	Tx OUT0-	1	RxO0-	33	RxOUT4	RO6		
		RO7	3	TxIN6				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	46				RxOUT14	GO7			
BO2		15	TxIN15	Tx OUT1-	3	RxO1-	47	RxOUT15	BO2			
BO3		19	TxIN18				51	RxOUT18	BO3			
BO4		20	TxIN19				53	RxOUT19	BO4			
BO5		22	TxIN20				54	RxOUT20	BO5			
BO6		23	TxIN21	Tx OUT2+	6	RxO2+	55	RxOUT21	BO6			
BO7		24	TxIN22				1	RxOUT22	BO7			
RSVD		27	TxIN24				Tx OUT2-	5	RxO2-	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				49	RxOUT16	BO0				
BO1	18	TxIN17	Tx OUT3-	10	RxO3-	50	RxOUT17	BO1				
RSVD	25	TxIN23				2	RxOUT23	Not use				
C	DCLK	31	TxCLK IN	TxCLK OUT+	9	RxCLK IN+	26	RxCLK OUT	DCLK			
				TxCLK OUT-	8	RxCLK IN-						
	LVDS Even	RE2	51	TxIN0	Tx OUT0+	13	RxEO+	27	RxOUT0	RE2		
		RE3	52	TxIN1				29	RxOUT1	RE3		
		RE4	54	TxIN2				30	RxOUT2	RE4		
		RE5	55	TxIN3				32	RxOUT3	RE5		
		RE6	56	TxIN4	Tx OUT0-	12	RxEO-	33	RxOUT4	RE6		
		RE7	3	TxIN6				35	RxOUT6	RE7		
		GE2	4	TxIN7				37	RxOUT7	GE2		
		GE3	6	TxIN8				38	RxOUT8	GE3		
GE4		7	TxIN9	Tx OUT1+	16	RxE1+	39	RxOUT9	GE4			
GE5		11	TxIN12				43	RxOUT12	GE5			
GE6		12	TxIN13				45	RxOUT13	GE6			
GE7		14	TxIN14				46	RxOUT14	GE7			
BE2		15	TxIN15	Tx OUT1-	15	RxE1-	47	RxOUT15	BE2			
BE3		19	TxIN18				51	RxOUT18	BE3			
BE4		20	TxIN19				53	RxOUT19	BE4			
BE5		22	TxIN20				54	RxOUT20	BE5			
BE6		23	TxIN21	Tx OUT2+	19	RxE2+	55	RxOUT21	BE6			
BE7		24	TxIN22				1	RxOUT22	BE7			
RSVD		27	TxIN24				Tx OUT2-	18	RxE2-	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				49	RxOUT16	BE0				
BE1	18	TxIN17	Tx OUT3-	22	RxE3-	50	RxOUT17	BE1				
RSVD	25	TxIN23				2	RxOUT23	Not use				
D	DCLK	31	TxCLK IN	TxCLK OUT+	21	RxCLK IN+	26	RxCLK OUT	Not use			
				TxCLK OUT-	20	RxCLK IN-						
	RE2	51	TxIN0	Tx OUT0+	13	RxEO+	27	RxOUT0	RE2			
	RE3	52	TxIN1				29	RxOUT1	RE3			
	RE4	54	TxIN2				30	RxOUT2	RE4			
	RE5	55	TxIN3				32	RxOUT3	RE5			
	RE6	56	TxIN4	Tx OUT0-	12	RxEO-	33	RxOUT4	RE6			
	RE7	3	TxIN6				35	RxOUT6	RE7			
	GE2	4	TxIN7				37	RxOUT7	GE2			
	GE3	6	TxIN8				38	RxOUT8	GE3			
GE4	7	TxIN9	Tx OUT1+	16	RxE1+	39	RxOUT9	GE4				
GE5	11	TxIN12				43	RxOUT12	GE5				
GE6	12	TxIN13				45	RxOUT13	GE6				
GE7	14	TxIN14				46	RxOUT14	GE7				
BE2	15	TxIN15	Tx OUT1-	15	RxE1-	47	RxOUT15	BE2				
BE3	19	TxIN18				51	RxOUT18	BE3				
BE4	20	TxIN19				53	RxOUT19	BE4				
BE5	22	TxIN20				54	RxOUT20	BE5				
BE6	23	TxIN21	Tx OUT2+	19	RxE2+	55	RxOUT21	BE6				
BE7	24	TxIN22				1	RxOUT22	BE7				
RSVD	27	TxIN24				Tx OUT2-	18	RxE2-	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				49	RxOUT16	BE0				
BE1	18	TxIN17	Tx OUT3-	22	RxE3-	50	RxOUT17	BE1				
RSVD	25	TxIN23				2	RxOUT23	Not use				
E	DCLK	31	TxCLK IN	TxCLK OUT+	21	RxCLK IN+	26	RxCLK OUT	Not use			
				TxCLK OUT-	20	RxCLK IN-						
	RE2	51	TxIN0	Tx OUT0+	13	RxEO+	27	RxOUT0	RE2			
	RE3	52	TxIN1				29	RxOUT1	RE3			
	RE4	54	TxIN2				30	RxOUT2	RE4			
	RE5	55	TxIN3				32	RxOUT3	RE5			
	RE6	56	TxIN4	Tx OUT0-	12	RxEO-	33	RxOUT4	RE6			
	RE7	3	TxIN6				35	RxOUT6	RE7			
	GE2	4	TxIN7				37	RxOUT7	GE2			
	GE3	6	TxIN8				38	RxOUT8	GE3			
GE4	7	TxIN9	Tx OUT1+	16	RxE1+	39	RxOUT9	GE4				
GE5	11	TxIN12				43	RxOUT12	GE5				
GE6	12	TxIN13				45	RxOUT13	GE6				
GE7	14	TxIN14				46	RxOUT14	GE7				
BE2	15	TxIN15	Tx OUT1-	15	RxE1-	47	RxOUT15	BE2				
BE3	19	TxIN18				51	RxOUT18	BE3				
BE4	20	TxIN19				53	RxOUT19	BE4				
BE5	22	TxIN20				54	RxOUT20	BE5				
BE6	23	TxIN21	Tx OUT2+	19	RxE2+	55	RxOUT21	BE6				
BE7	24	TxIN22				1	RxOUT22	BE7				
RSVD	27	TxIN24				Tx OUT2-	18	RxE2-	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				49	RxOUT16	BE0				
BE1	18	TxIN17	Tx OUT3-	22	RxE3-	50	RxOUT17	BE1				
RSVD	25	TxIN23				2	RxOUT23	Not use				
F	DCLK	31	TxCLK IN	TxCLK OUT+	21	RxCLK IN+	26	RxCLK OUT	Not use			
				TxCLK OUT-	20	RxCLK IN-						
	RE2	51	TxIN0	Tx OUT0+	13	RxEO+	27	RxOUT0	RE2			
	RE3	52	TxIN1				29	RxOUT1	RE3			
	RE4	54	TxIN2				30	RxOUT2	RE4			
	RE5	55	TxIN3				32	RxOUT3	RE5			
	RE6	56	TxIN4	Tx OUT0-	12	RxEO-	33	RxOUT4	RE6			
	RE7	3	TxIN6				35	RxOUT6	RE7			
	GE2	4	TxIN7				37	RxOUT7	GE2			
	GE3	6	TxIN8				38	RxOUT8	GE3			
GE4	7	TxIN9	Tx OUT1+	16	RxE1+	39	RxOUT9	GE4				
GE5	11	TxIN12				43	RxOUT12	GE5				
GE6	12	TxIN13				45	RxOUT13	GE6				
GE7	14	TxIN14				46	RxOUT14	GE7				
BE2	15	TxIN15	Tx OUT1-	15	RxE1-	47	RxOUT15	BE2				
BE3	19	TxIN18				51	RxOUT18	BE3				
BE4	20	TxIN19				53	RxOUT19	BE4				
BE5	22	TxIN20				54	RxOUT20	BE5				
BE6	23	TxIN21	Tx OUT2+	19	RxE2+	55	RxOUT21	BE6				
BE7	24	TxIN22				1	RxOUT22	BE7				
RSVD	27	TxIN24				Tx OUT2-	18	RxE2-	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				49	RxOUT16	BE0				
BE1	18	TxIN17	Tx OUT3-	22	RxE3-	50	RxOUT17	BE1				
RSVD	25	TxIN23				2	RxOUT23	Not use				
*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.												
TITLE						LQ190E1LW41						
DRAW. NO.						(FLC48SXC8V-12F)						
LD17427						CUST.						
SHARP CORPORATION						13/						
DATE						DESIGN						
DESIGN						CHECK						
1												

1		2		3		4				
Table 10-2B LVDS Data Assignment(SEL LVDS=H)										
A	Input signal *1		Transmitter DS90CF383,C385		Interface connector		Receiver DS90CF386 THC63LVDF84		LCD Control input	
			pin	INPUT	System side	LCD module pin	pin	OUTPUT		
B	LVDS 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	Tx OUT0-	1	RxO0-	33	RxOUT4	RO4
		RO5	3	TxIN6				35	RxOUT6	RO5
		GO0	4	TxIN7				37	RxOUT7	GO0
		GO1	6	TxIN8				38	RxOUT8	GO1
		GO2	7	TxIN9	Tx OUT1+	4	RxO1+	39	RxOUT9	GO2
		GO3	11	TxIN12				43	RxOUT12	GO3
		GO4	12	TxIN13				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	Tx OUT2+	6	RxO2+	55	RxOUT21	BO4
		BO5	24	TxIN22				1	RxOUT22	BO5
		RSVD	27	TxIN24				3	RxOUT24	Not use
		RSVD	28	TxIN25				5	RxOUT25	Not use
		ENAB	30	TxIN26	Tx OUT2-	5	RxO2-	6	RxOUT26	ENAB
		RO6	50	TxIN27				7	RxOUT27	RO6
		RO7	2	TxIN5				34	RxOUT5	RO7
		GO6	8	TxIN10				41	RxOUT10	GO6
		GO7	10	TxIN11	Tx OUT3+	11	RxO3+	42	RxOUT11	GO7
BO6	16	TxIN16	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-				
D	LVDS Even	RE0	51	TxIN0	Tx OUT0+	13	RxEO+	27	RxOUT0	RE0
		RE1	52	TxIN1				29	RxOUT1	RE1
		RE2	54	TxIN2				30	RxOUT2	RE2
		RE3	55	TxIN3				32	RxOUT3	RE3
		RE4	56	TxIN4	Tx OUT0-	12	RxEO-	33	RxOUT4	RE4
		RE5	3	TxIN6				35	RxOUT6	RE5
		GE0	4	TxIN7				37	RxOUT7	GE0
		GE1	6	TxIN8				38	RxOUT8	GE1
		GE2	7	TxIN9	Tx OUT1+	16	RxE1+	39	RxOUT9	GE2
		GE3	11	TxIN12				43	RxOUT12	GE3
		GE4	12	TxIN13				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	Tx OUT2+	19	RxE2+	55	RxOUT21	BE4
		BE5	24	TxIN22				1	RxOUT22	BE5
		RSVD	27	TxIN24				3	RxOUT24	Not use
		RSVD	28	TxIN25				5	RxOUT25	Not use
		RSVD	30	TxIN26	Tx OUT2-	18	RxE2-	6	RxOUT26	Not use
		RE6	50	TxIN27				7	RxOUT27	RE6
		RE7	2	TxIN5				34	RxOUT5	RE7
		GE6	8	TxIN10				41	RxOUT10	GE6
		GE7	10	TxIN11	Tx OUT3+	23	RxE3+	42	RxOUT11	GE7
BE6	16	TxIN16	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.										
					TITLE LQ190E1LW41 (FLC48SXC8V-12F)					
					DRAW. NO.				CUST.	
					LD 17427					
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION SHARP CORPORATION					Sheet 14/
DESIG.				CHECK			APPR.			
1										

		1		2		3		4																				
		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	0	1	1	1	1	1	1	1	1
		Green		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Cyan		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
		Red		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
		Magenta		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	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	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	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	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	
		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	1	0	0	0	0	0	0	0	0	
		↑		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
		:		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
		↓		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
		Brighter		253	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0
		↓		254	0	0	0	0	0	0	0	0	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	0	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	1		
		↑		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
		:		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
		↓		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
		Brighter		253	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	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	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.																										



						TITLE LQ190E1LW41 (FLC48SXC8V-12F)					
						DRAW. NO. LD17427			CUST.		
03	20050112				Added Tvbk						
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	DESIG.			CHECK			APPR.				

10-5 Correspondence between Data and Display Position

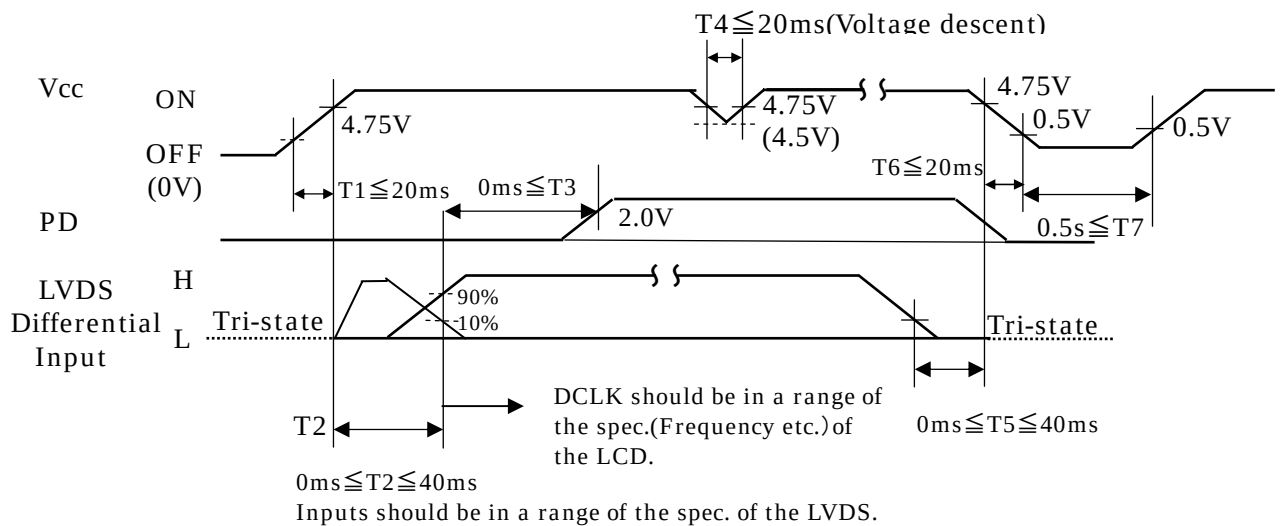
Figure 10-2 shows the Correspondence between Data and Display Position.

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

Figure 10-2 Correspondence Data and Display Position

10-6 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

						TITLE					LQ190E1LW41 (FLC48SXC8V-12F)		
						DRAW. NO.					CUST.		
											LD17427		
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION					SHARP CORPORATION		Sheet	18 /
DESIG.			CHECK				APPR.						

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 F) for the Back-light of this LCD module.

Table 11-1 Pin Assignment of CN-A to CN-F

Pin No.	Signal						Function	Cable color
	CN-A	CN-B	CN-C	CN-D	CN-E	CN-F		
1	V _{L1}	V _{L2}	V _{L3}	V _{L4}	V _{L5}	V _{L6}	Power supply	Pink, Red, Orange
2	—	—	—	—	—	—	—	—
3	GND	GND	GND	GND	GND	GND	Ground	Aqua, White, Black

Connector	:	Housing	:	BDBR-03(4.0)V-S
		Contact	:	SBH-001T-P0.5
User's Connector	:	Post with base:		SM02(8.0)B-BDBS-1
				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

- ①Ambient temperature: $25 \pm 5^{\circ}\text{C}$
②Tube current (I_L) : 7mA or less

(2) Definition of life

- ①Brightness becomes 50% or less than the minimum brightness value shown in Table 9-1.
- ②The lamp cannot be lit by the minimum value of the breakdown voltage(1760Vrms) shown in Table 8-1.
- ③Flashing.

11-3 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 : LQ0DDB5468 (FLCL-40)

Minimum order qty. unit : 20 pcs.

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12-1 Appearance

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

1

A

B

B

C

C

D

D

E

F

14. INDICATIONS

This module has the following indications.

- (1) Product name : **LCD unit**
- (2) SHARP Model Number : LQ190E1LW41
- (3) Model Number : FLC48SXC8V-12F
- (4) Manufacturing Number : **5 6 0 0 0 1**

Serial number
(To be reset every month on 1st.)

Manufacturing month
(Oct. = X, Nov. =Y, Dec. =Z)

Last digit of manufacturing year.

- (5) Version number : **01A** (Example)
-1st 2 digits "01" means operational version.
-3rd alphabet means functional version.

- (6) Manufacturer Country Name :

- (7) Company Name : SHARP CORPORATION

- (8) Disposal method of cold-cathode tubes.

- (9) Caution when changing cold-cathode tubes.

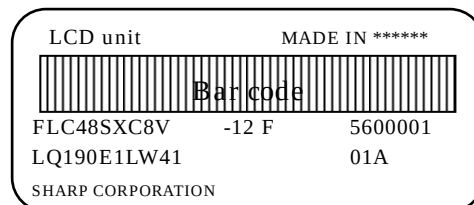


Figure 14-1 Product Label (Example)

15. PACKAGING

15-1 Packing specifications

- (1) 5 LCD modules/1package.
- (2) Weight : approximately 16kg /1package.
- (3) Outline dimensions: 499mm (W)x 250mm (D)x 464mm (H)

15-2 Packing method

Figure 15-2 show the packing method.

DOCUMENT CONTROL SECTION

DATE

						TITLE					LQ190E1LW41 (FLC48SXC8V-12F)			
						DRAW. NO.					CUST.			
											LD17427			
04	20050420				Model name and Company Name was changed.									
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION					SHARP CORPORATION			SHEET	23 /
	DESIG.			CHECK				APPR.						

1

2

3

4

A

B

C

D

A

B

C

D

E

F

DOCUMENT CONTROL SECTION	
DATE	

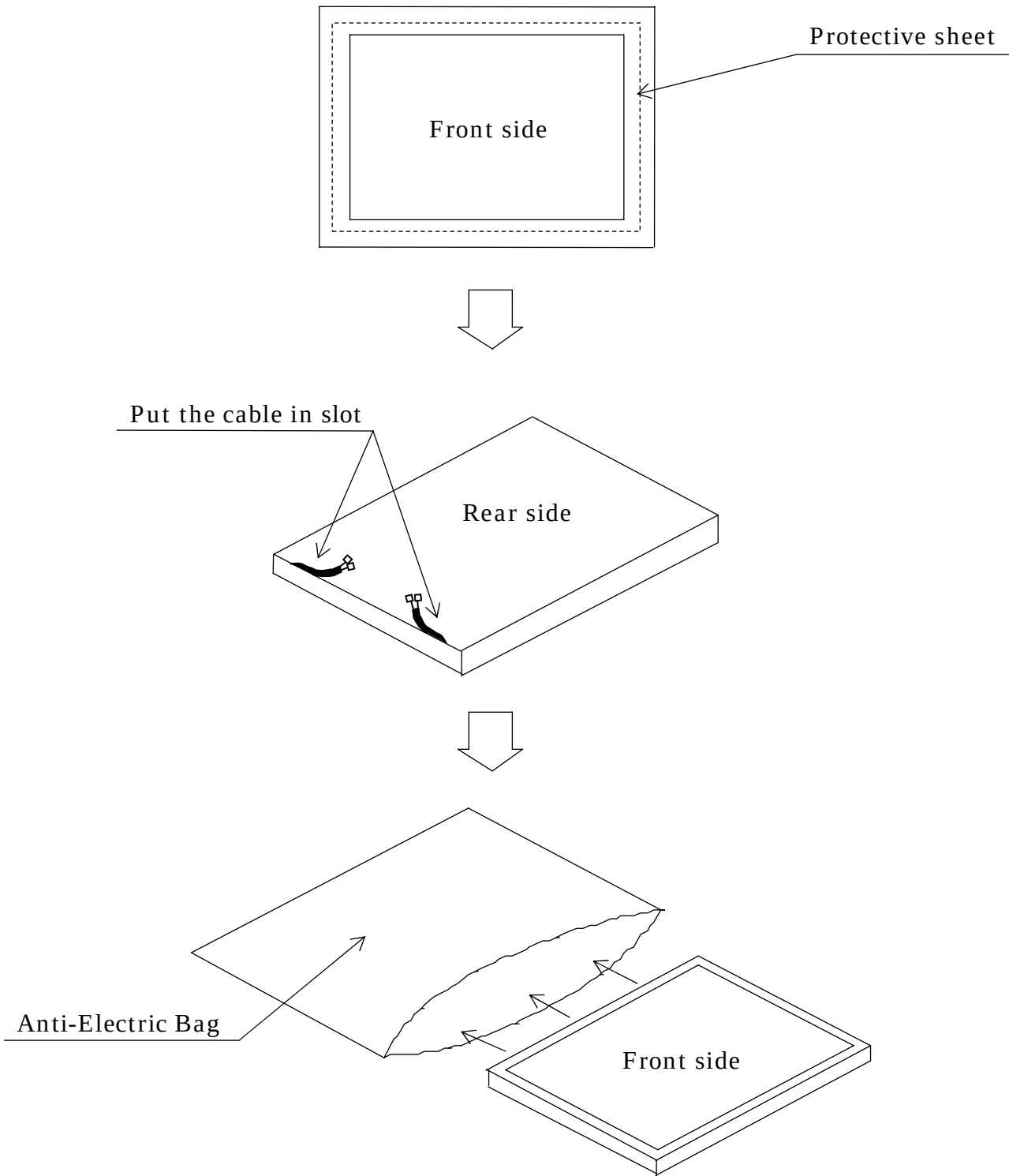


Fig.15-2 (a) Packaging Method

						TITLE		LQ190E1LW41 (FLC48SXC8V-12F)	
						DRAW. NO.		LD 17427	
								CUST.	
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION		SHARP CORPORATION		24 /
DESIG.				CHECK		APPR.			

1

1

2

3

4

A

B

C

D

A

B

C

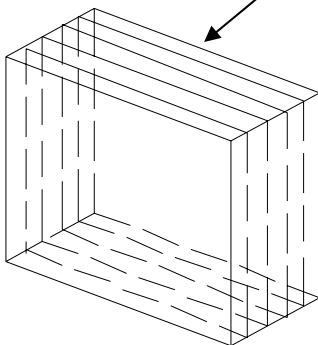
D

E

F

①

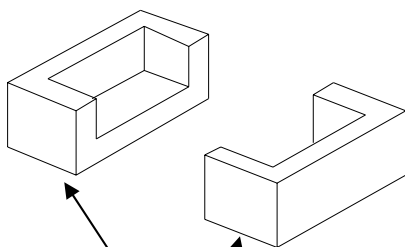
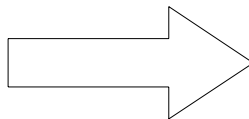
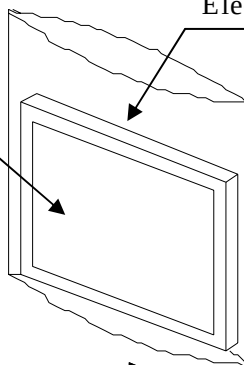
Partition Box



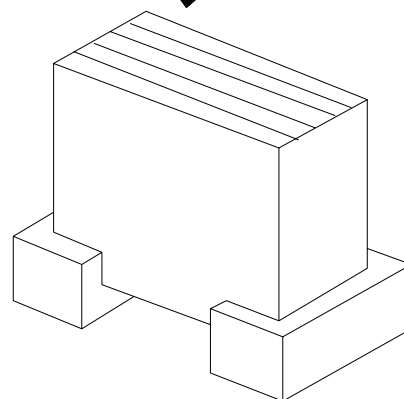
②

Anti-
Electrostatic bag

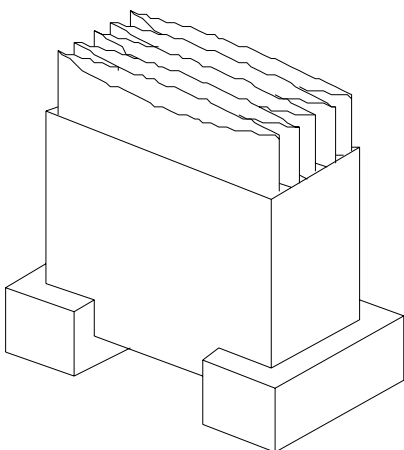
LCD Unit



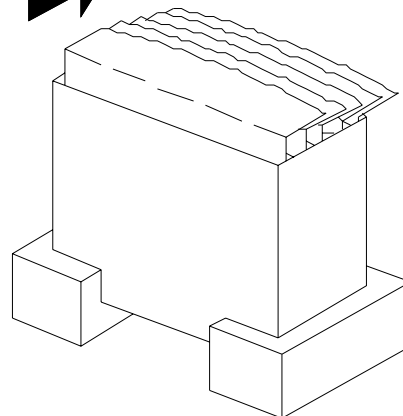
Holder



③



④



●Cautious●

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

The bending direction should
be arranged.

DOCUMENT CONTROL SECTION

DATE

EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION
DESIG.			CHECK		APPR.

TITLE LQ190E1LW41
(FLC48SXC8V-12F)

DRAW. NO.

LD 17427

CUST.

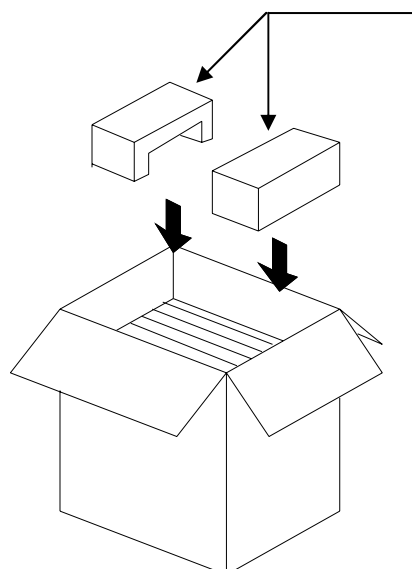
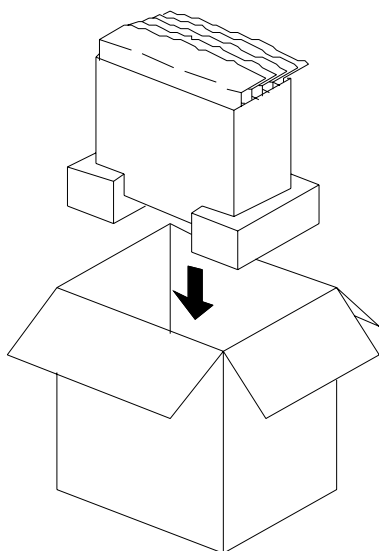
SHARP CORPORATION

DATE

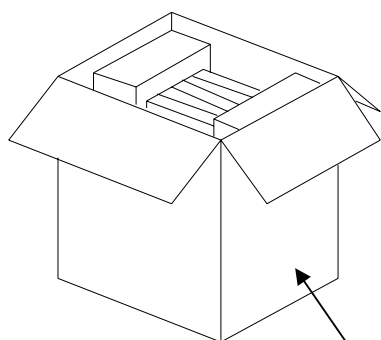
25 /

1

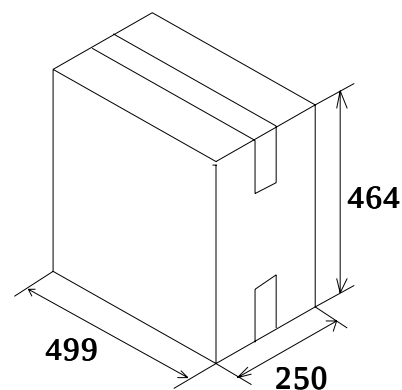
⑥



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



Carton Box



Sample of carton label

型 格 (TYPE) FLC48SXC8V -12F 数 量 (QTY.) 5
 図 番(DRG. No.) LQ190E1LW41 版 数(Rev. No.) 01A

5600001
5600002
5600003
5600004
5600005

Bar code

Fig.15-2 (b) Packaging Method

DOCUMENT CONTROL SECTION

DATE

Sample of carton label

型 格 (TYPE) FLC48SXC8V -12F

数 量 (QTY.) 5

図 番(DRG. No.) LQ190E1LW41

版 数(Rev. No.) 01A

5600001

5600002

5600003

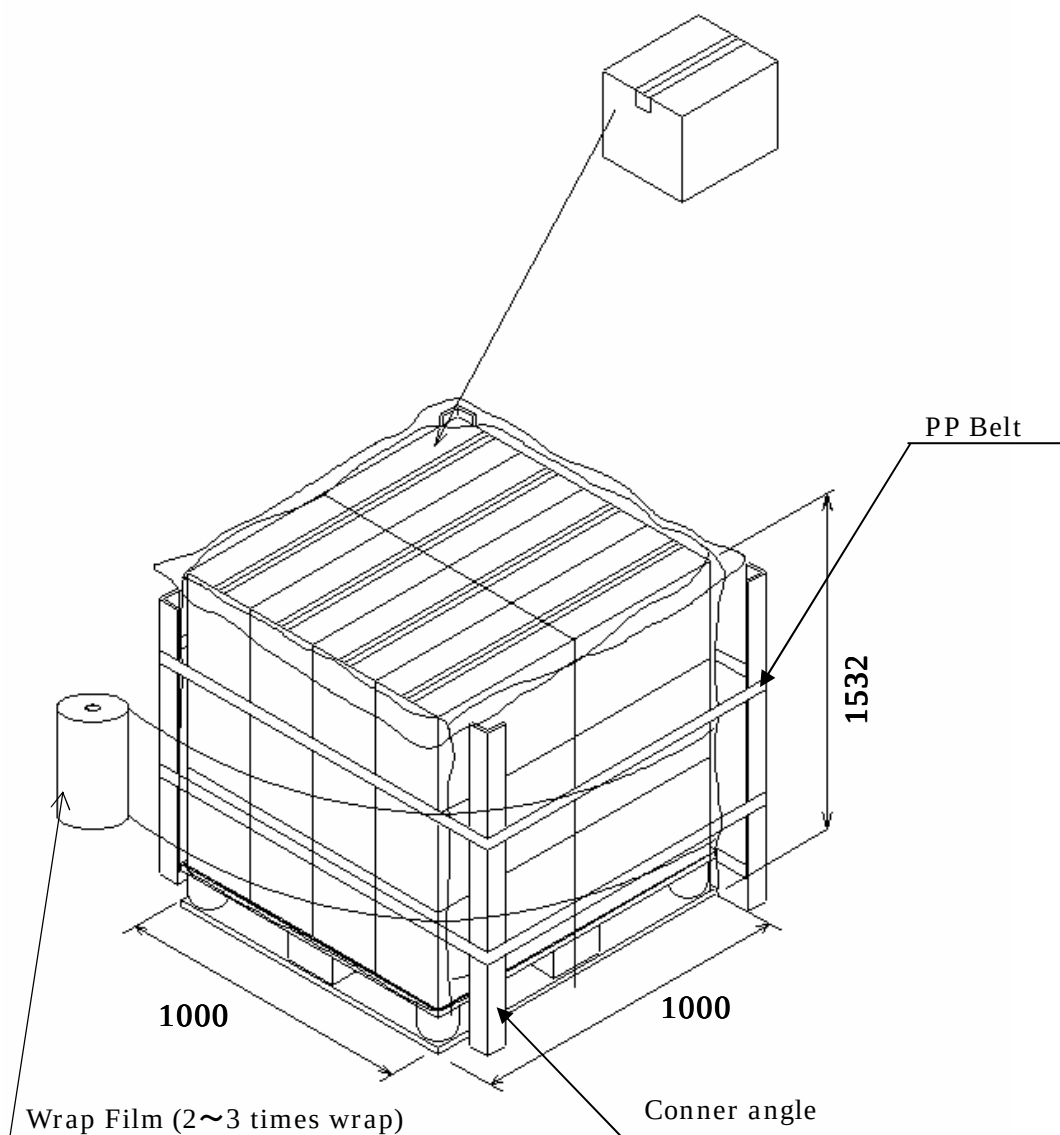
5600004

5600005

Bar code

Fig.15-2 (b) Packaging Method

						TITLE LQ190E1LW41 (FLC48SXC8V-12F)			
						DRAW. NO.			CUST.
04	20050420				Model name was changed.		LD17427		
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION				
DESIG.			CHECK			APPR.		SHARP CORPORATION	26 /



Carton Qty./ pallet : 8 boxes $\times$ 3 layers (maximum 24 boxes)

Fig.15-2 (c) Packaging Method

DATE	DOCUMENT CONTROL SECTION

						TITLE					LQ190E1LW41 (FLC48SXC8V-12F)			
						DRAW. NO.					LD17427			CUST.
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION					SHARP CORPORATION			Sheet	27 /
	DESIG.			CHECK			APPR.							

A

A

Cushioning materialCorrugated carton (A)
with LCD modules

B

B

602
(580)Corrugated fiberboard shipping container (B)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

DATE

E

F

						TITLE		LQ190E1LW41	
								(FLC48SXC8V-12F)	
						DRAW. NO.		L D 17 4 2 7	
								CUST.	
EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION		SHARP CORPORATION		28 /
DESIG.				CHECK			APPR.		

		1		2		3		4																																																							
A	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.																																																														
B	(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 ① 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.																																																														
C	② 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 ² , the problem don't return to normal condition.																																																														
	① Ununiformity of color ② Disorder of orientation of liquid crystal Problem ① returns to normal condition after a while. Problem ② returns to normal condition by turning the power off and turning on again. However these operations should be avoided to insure reliability.																																																														
D	③ 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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F	<table border="1"> <tr> <td colspan="6"></td> <td colspan="3">TITLE LQ190E1LW41 (FLC48SXC8V-12F)</td> </tr> <tr> <td colspan="6"></td> <td colspan="3">DRAW. NO. LD17427</td> </tr> <tr> <td colspan="6"></td> <td colspan="3">CUST.</td> </tr> <tr> <td colspan="6"></td> <td colspan="3"></td> </tr> <tr> <td>EDIT</td> <td>DATE</td> <td>DESIG.</td> <td>CHECK</td> <td>APPR.</td> <td colspan="4">DESCRIPTION</td> </tr> <tr> <td colspan="2">DESIG.</td> <td colspan="2"></td> <td>CHECK</td> <td colspan="2"></td> <td>APPR.</td> <td></td> </tr> </table>															TITLE LQ190E1LW41 (FLC48SXC8V-12F)									DRAW. NO. LD17427									CUST.												EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION				DESIG.				CHECK			APPR.	
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DATE DOCUMENT CONTROL SECTION

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

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

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

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.

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(4) Precautions in regards of operating the LCD module

① 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.

② 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.

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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.

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DOCUMENT CONTROL SECTION

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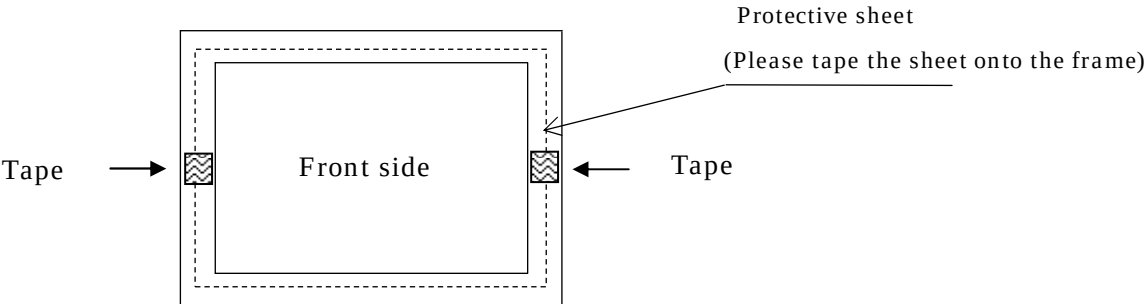
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A	③ The LCD module is recommended to be stored in humidity controlled, cool and dark locations. Recommended storage environment •Place : Dark (avoid direct sunlight) •Temperature : 10~35°C •Humidity : 50~60%RH Note) If the module is left in an environment of 60°C and above for a long period of time, optical characteristics may deteriorate.									A																																																														
B	(7) Disposal Method ① 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. ② Package All the packages are made of recyclable papers except the anti-ESD bag.									B																																																														
C	(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. ① 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.									C																																																														
D	② 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.									D																																																														
E	③ 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.									E																																																														
F	<table border="1"> <tr> <td colspan="2">DATE</td> <td colspan="2">DOCUMENT CONTROL SECTION</td> <td colspan="2"></td> <td colspan="2">TITLE</td> <td colspan="2">LQ190E1LW41 (FLC48SXC8V-12F)</td> </tr> <tr> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2">DRAW. NO.</td> <td colspan="2">LD17427</td> </tr> <tr> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2">CUST.</td> </tr> <tr> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <td>EDIT</td> <td>DATE</td> <td>DESIG.</td> <td>CHECK</td> <td>APPR.</td> <td colspan="5">DESCRIPTION</td> <td rowspan="2">SHARP CORPORATION</td> <td rowspan="2">32 /</td> </tr> <tr> <td>DESIG.</td> <td></td> <td></td> <td></td> <td>CHECK</td> <td></td> <td></td> <td>APPR.</td> <td></td> <td></td> </tr> </table>									DATE		DOCUMENT CONTROL SECTION				TITLE		LQ190E1LW41 (FLC48SXC8V-12F)								DRAW. NO.		LD17427										CUST.												EDIT	DATE	DESIG.	CHECK	APPR.	DESCRIPTION					SHARP CORPORATION	32 /	DESIG.				CHECK			APPR.			F
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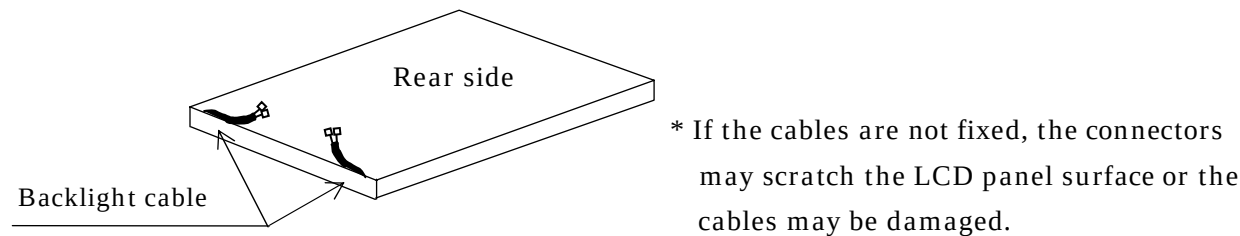
(8) Return method of the LCD module requested for repair or analysis of the problem

- 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, SHARP 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)

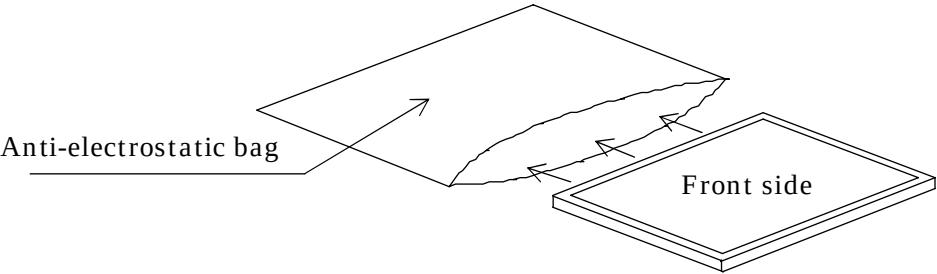
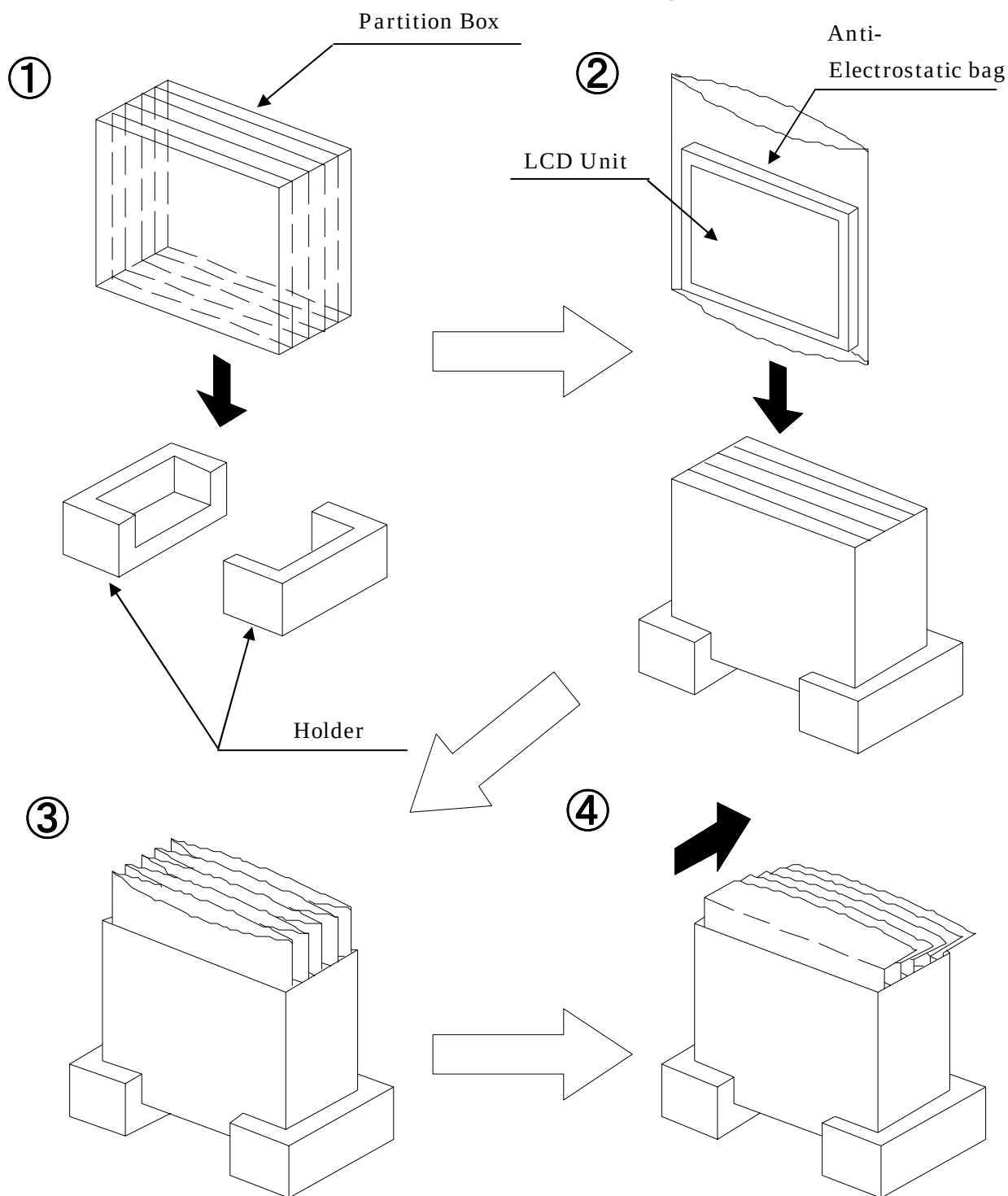


Fig. 17-1(a) Packaging method

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(4) Storage into the carton box

- When using the carton box manufactured by SHARP
(Please use carton boxes and arrowheads that are not collapsed)



●Cautious●

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

The bending direction should
be arranged.

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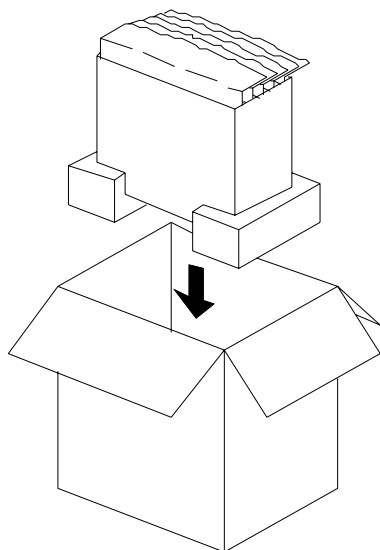
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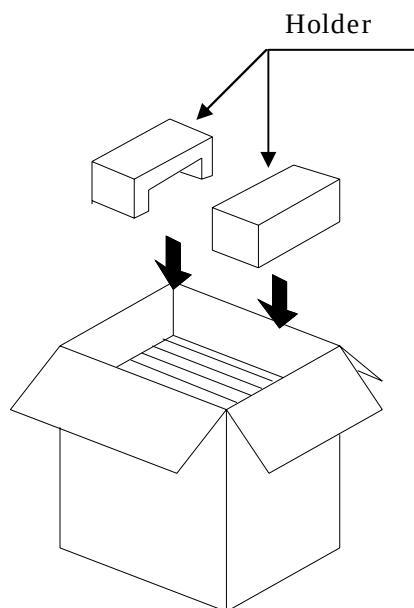
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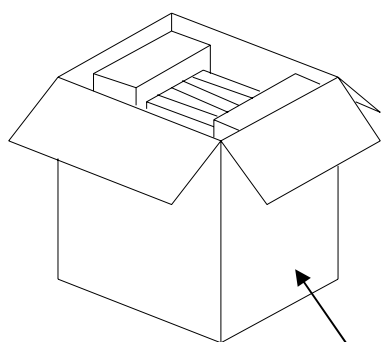
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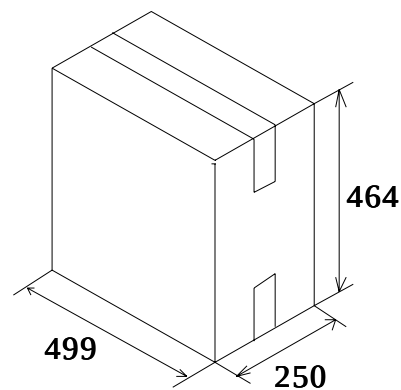
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The Front side of LCD units
should be faced to the direction of
the making on carton box.

⑦



⑧



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C

D

D

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

Fig. 17-1(b) Packaging method

- When not using the carton box manufactured by SHARP

Please pack the LCD modules one by one and make sure not to damage the LCD modules when transporting.

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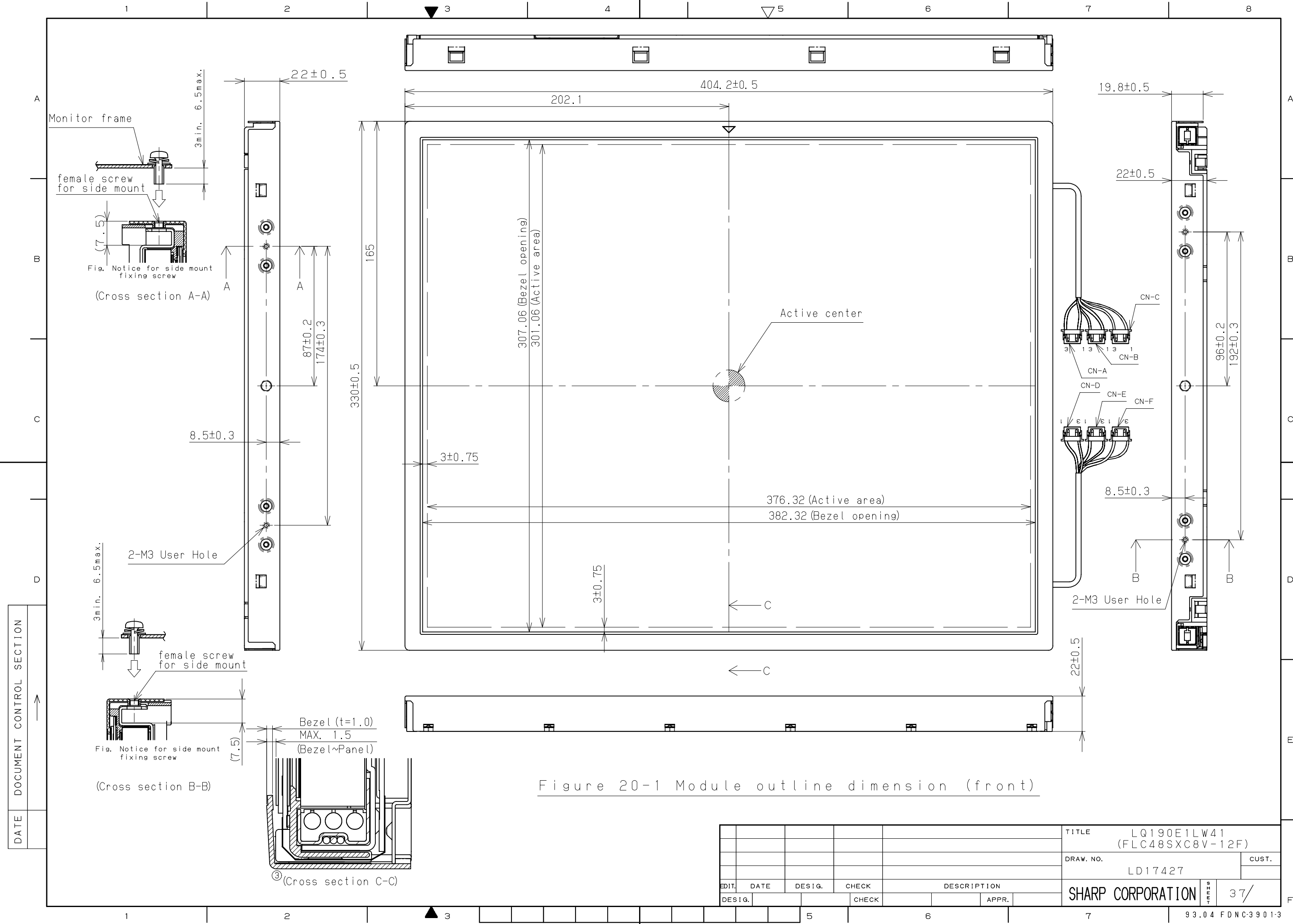
If the liquid crystal adhere to the body or cloths, wash it off with soap immediately. Follow regular precautions for electronic components.

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

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, SHARP 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.

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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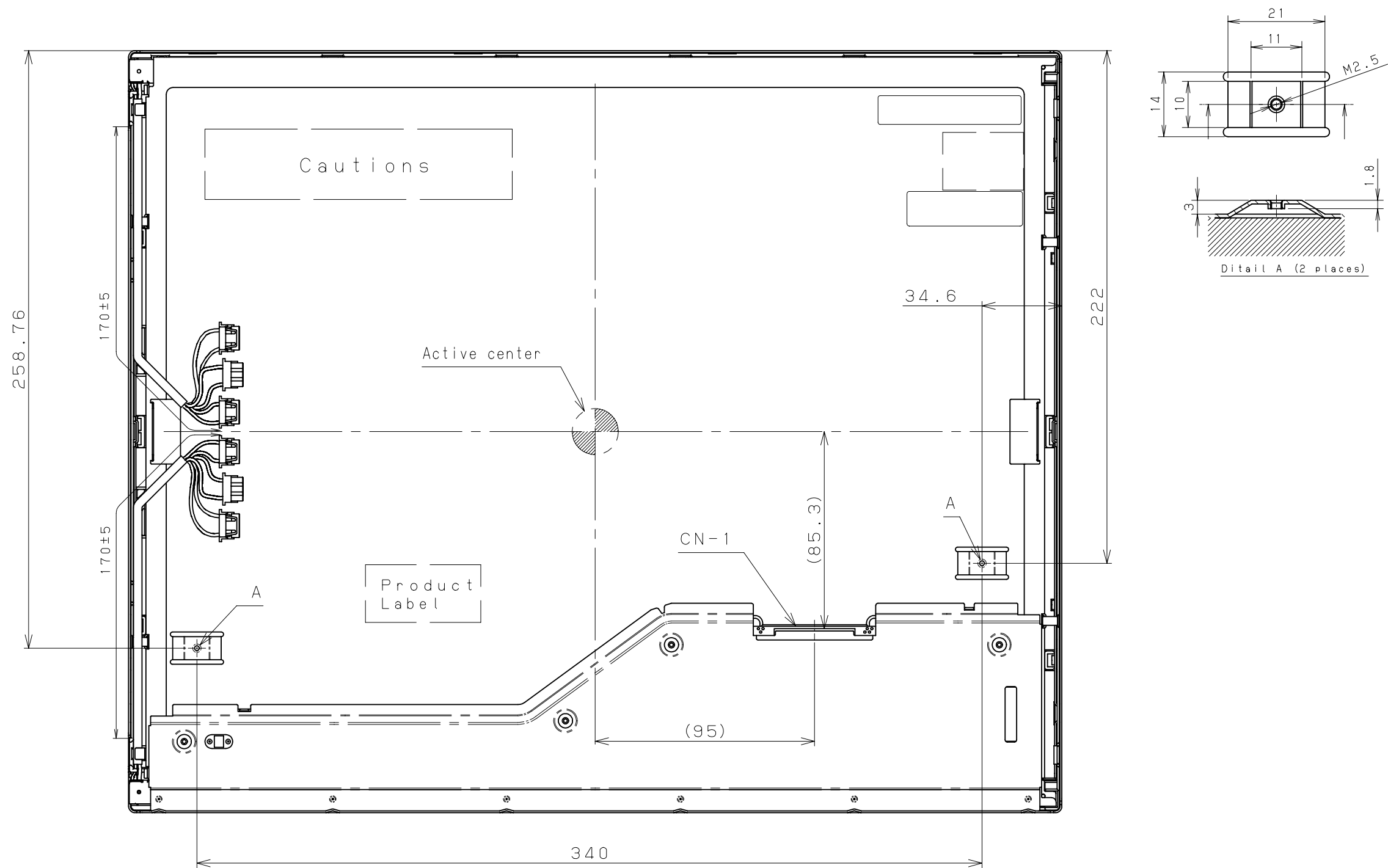


Figure 20-2 Module outline dimension (Rear)

NOTE
1) Unspecified tolerance to be ± 0.5

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