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SPECIFICATION

DEVICE SPECIFICATION FOR

EL Display Unit

Model No. LJ64ZU52

☐ CUSTOMER'S APPROVAL

DATE

BY

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MODEL No. LJ64ZU52

DOC. FIRST ISSUE

[DENT. DATA No.

" RECORDS OF REVISION

DATE	REF. PAGE PARAGRAPH DRA WING No.	REVISED No	SUMMARY	CHECK & APPROVAL
Dec. 24.'92	Page 2	⚠	Add Note 1) : Survival temperature.	T. Ohba
	Page 2,3	⚠	Add the figure based on S[units.	
	Page 3,4	⚠	Change the symbol of luminance B → L	

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1. Application

This data sheet is to introduce the specification of EL display unit, LJ64ZU52.

2. Overview

The Sharp EL display unit consists of a thin film EL panel, high voltage driver ICS for panel driving and a display control circuit. By supplying eleven input signals of LS TTL level and two DC power supplies of +5V and +12V gray scale graphs and characters can be displayed.

3. Mechanical Specifications

Parameter		Specification Width x Height x Depth	Unit
Outline dimensions	Main unit	267 x 197** x 20 (36*)	mm
	DC-DC conv.	156 x 45 x 20	mm
Number of matrix electrodes		640 x 480	--
Effective display area		211.1 x 158.3 dia. 263.9 (10.4inchs)	mm
Dot pitch		0.33 X 0.33	mm
Dot pitch ratio		1 X 1	mm
Dot size		0.225x 0.225	mm
Weight	Main unit	700 (780*)	g
	DC-DC conv.	80	g

Note) * With mounted DC-DC converter board.

** Without bend of FPC. See page 11.

4. Absolute Maximum Ratings

4-1 Electrical absolute maximum ratings

(Ta=25℃)

Parameter	Symbol	Rating	Unit
Interface signal (Logic"H")	V_{IH}	+5.5	V
Interface signal (Logic"L")	V_{IL}	-0.5	V
Supply voltage (logic)	V_L	+ 7	V
Supply voltage (panel drive)	V_D	+14	V

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4 -2 Environmental conditions

Parameter	Tstg		Topr ⚠ Note 1)		Remark
	Min.	Max.	Min.	Max.	
Ambient temperature	-40℃	+80℃	-5℃	+55℃	
Humidity	Note 2)		Note 2)		No condensation
Vibration	Note 3)				No operating
Shock	Note 4)				No operating

⚠ Note 1) Survival temperature: -15℃ to +55℃
No permanent damage will occur.

Note 2) Ta ≦ 40℃ ····· 95% RN Max
Ta > 40℃ ····· Absolute humidity shal: be less than Ta=40℃/95% RH.

Note 3′ Frequency 10 ~ 55 Hz
Vibration width : 1.5 mm
Interval 10 Hz ~ 55 Hz ~10 Hz
(1 rein)
2 hours for each direction of X/Y/Z
(6 hours as total)

Note 4) Acceleration 491m/s² (50 G)
Pulse width : 9 ms
3 times for each direction of ±X/±Y/±Z.
(9.806 65 m/s² = 1G) ⚠

5 . Electrical Characteristics

(Ta=25℃)

Parameter	Symbol	Rating			Unit
		Min.	Typ .	Max.	
Supply voltage (Logic)	V_L	+ 4.75	+ 5.0	+ 5.25	v
Supply current (Logic, V_L=+5V)	I_L	100	–	350	mA
Supply voltage (Panel drive)	v“	+ 11.4	+ 12.0	+ 12.6	v
Supply current (Panel drive, V_D=+12V)	1_0	100	–	1800	mA
Total power (V_L=+5V, V_D=+12V)	P_T	–	22	–	W

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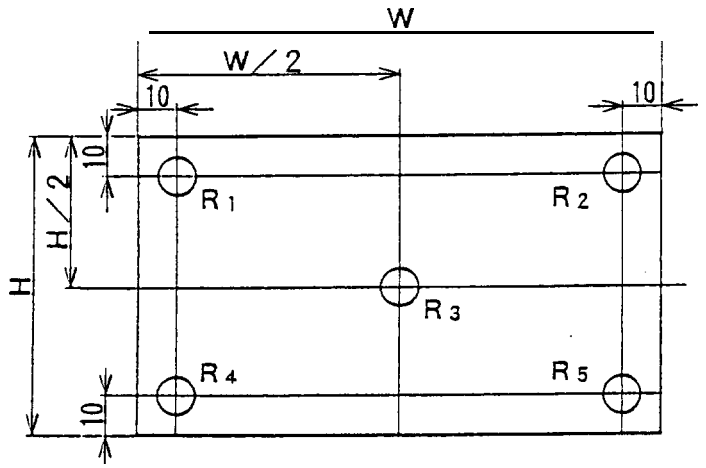
6 . Optical Characteristics

(Ta=25℃)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Luminance	L15	All dots lit	68.5 (20)	85 (25)	-	cd/m² (f-L)	
OFF luminance	L O	All dots turned off		—	3.4 (1. 0)	cd/m² (f-L)	Note 2)
Luminance distribution	ΔL_{DIS}	All dots lit at 1,15	—		35	%	Note 1)
Fill factor			—	0.46	-		
Viewing angle			-	160	-	"	

Note 1) Average luminance measured at the five circular windows (R_1~R_5) shown in Fig. 1 (Circular window diameter: ϕ 13mm)

(3.426 26 cd/m² = 1f-L) ⚠



H 158.3 Height of effective display area

W 211.1 : Width of effective display area

Unit mm

Tolerance ± 10%

Fig. 1

The following formula defines the luminance distribution:

$$\Delta L_{DIS} = (1 - \frac{Lmin}{Lmax}) \times 100\ (\%)_A$$

where Lmax is the maximum luminance and Lmin is the minimum luminance taken at the five locations in Fig.1.

Note 2) The luminance is average luminance of the five points (R_1~R_5).

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7. Timing Characteristics

7-1 Input signal

This unit is driven by line-at-a-time scanning method with the following 11 input signals fed at LS TTL level.

Parameter	Symbol	Description
Data transfer clock	CK_n	The signal control sampling and transferring data signal.
Data signal	Note 1) D_{00}, D_{01} D_{02}, D_{03} D_{10}, D_{11}, D_{12}, D_{13}	The signal are sampled at every rising edge of data transfer clock and are transferred in the direction of sequential row from the right end *to* left end.
Horizontal sync. signal	$\overline{H.D}$	The signal control the timing of line-at-a-time scanning. The display data remain in effect while the logic is "H" and blanking while the logic is "L"
Vertical sync. signal	$\overline{V.D}$	The signal controls frame frequency. Typ. 60Hz Frame starts when the logic rises to "H" from "L"

Note1) $\overline{D_{0N}}$: Data Signal for Oaa' 'column

D_{1N} : Data signal for even column

Gray scale input signal

gray code	D_{03}, D_{13}	D_{02}, D_{12}	D_{01}, D_{11}	D_{00}, D_{10}	
L15	1	1	1	1	ON
L14	1	1	1	0	bright
L13	1	1	0	1	A
L12	1	1	0	0	
L11	1	0	1	1	
L10	1	0	1	0	
L 9	1	0	0	1	
L 8	1	0	0	0	
L 7	0	1	1	1	
L 6	0	1	1	0	
L 5	0	1	0	1	
L 4	0	1	0	0	
L 3	0	0	1	1	
L 2	0	0	1	0	V
L 1	0	0	0	1	dark
LO	0	0	0	0	oFF

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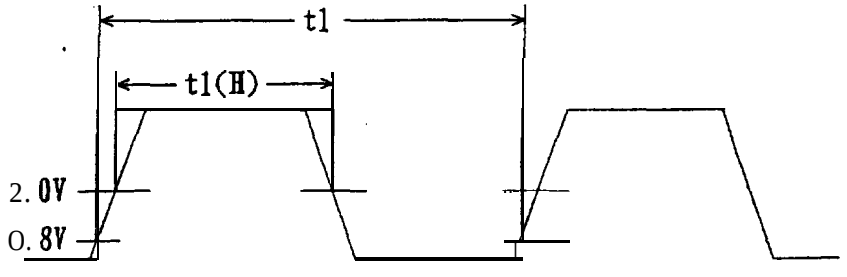
7-2 Input signals timing characteristics

(Ta = 25℃)

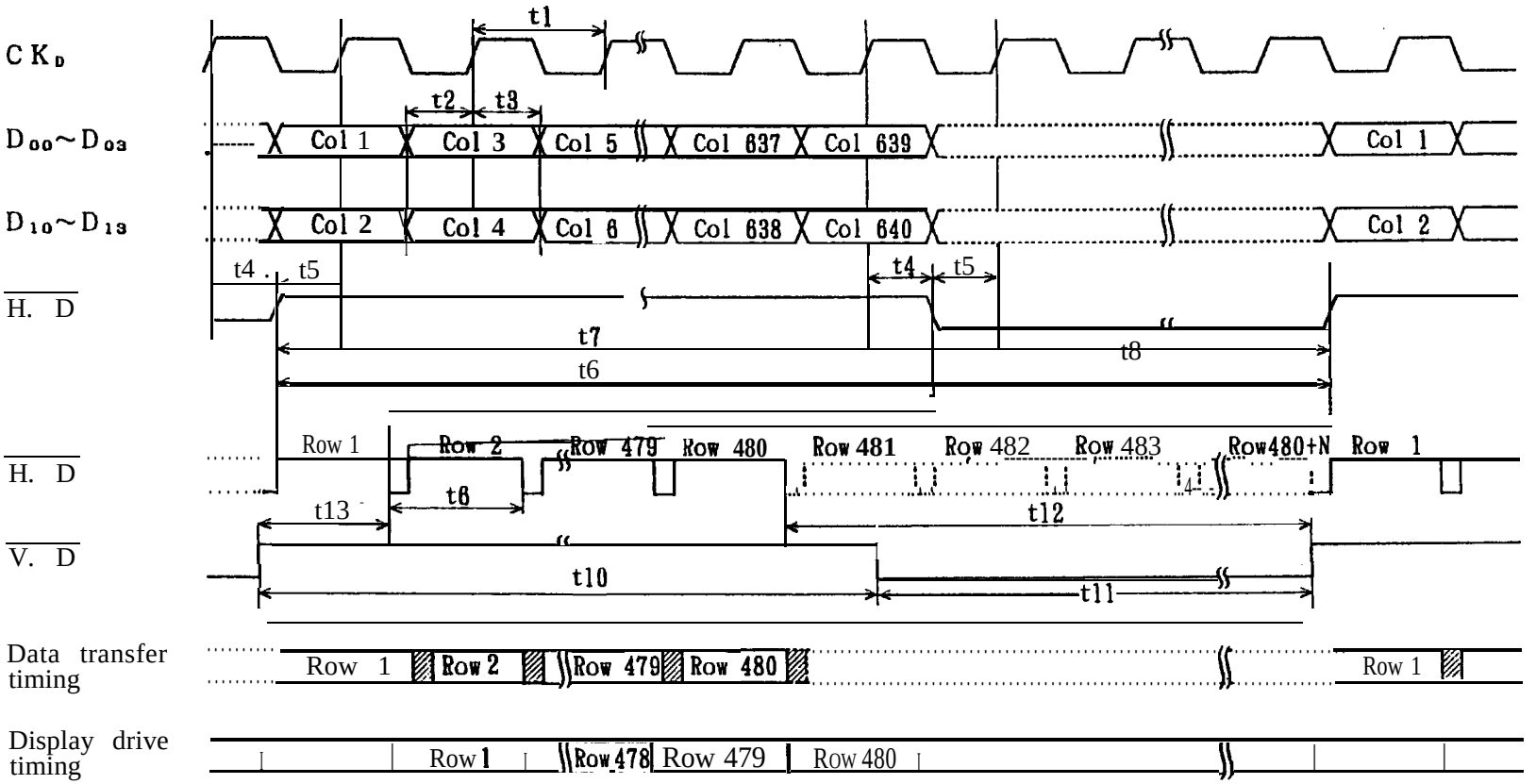
Parameter	symbol	Min.	Typ.	Max.	unit
Clock frequency	1/t1	8	–	13	MHz
Clock duty Note 1)	t1(H)/t1 x 100	45	–	55	%
Data set up time	t2	10	–	–	nsec
Data hold time	t3	10	–	–	nsec
$\overline{H.D}$ hold time	t4	10	–	–	nsec
$\overline{H.D}$ set up time	t5	10	–	–	nsec
Horizontal sync. signal cycle time	t6	31	–	41.3	μsec
Horizontal sync. signal valid time (Valid time of display data)	t7	320xt1			μsec
Horizontal sync. signal blanking time (Invalid time of display data)	t8	1.3	–	–	μsec
Frame Frequency	1/t9	50	–	60	Hz
Vertical sync. signal valid time	t10	t6	480x t6	–	μsec
Vertical sync. signal blanking time	t11	1	–	t9-t6	μsec
Vertical sync. signal rise wait time	t12	4X31	–	–	μsec
Vertical sync. rise timing	t13	31	–	t7+26	μsec

Note 1)



8 . Timing chart

Interface timing and **dispiay** drive timing



Note 1) Logic level is not necessary to be specified in dotted line portion.

Note 2) N ≥ 4 shall be kept.

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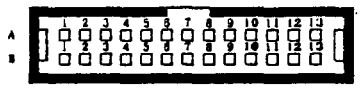
9. Input Connectors

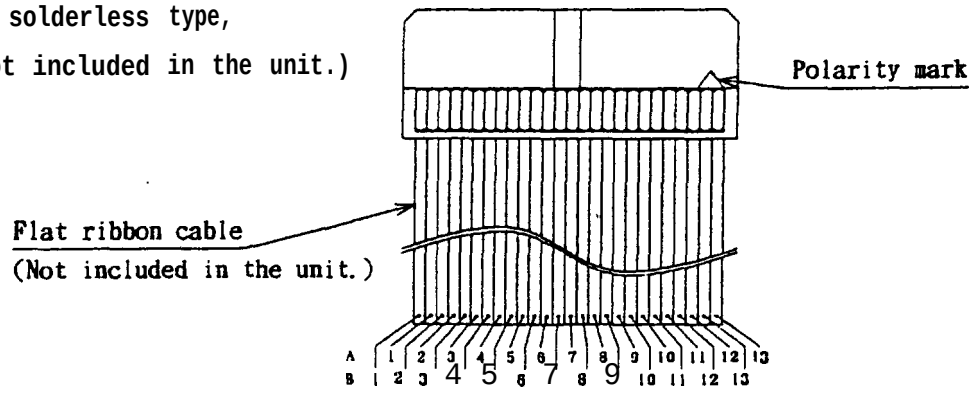
9-1 Interface Signals and Power Supply Connectors

Terminal No.	signal name or supply voltage	Terminal No.	signal name or supply voltage
A- 1	NC	B- 1	NC
A- 2	D_{11} (Data signal)	B- 2	D_{10} (Data signal)
A- 3	D_{13} (Data signal)	B- 3	D_{12} (Data signal)
A- 4	D_{01} (Data signal)	B- 4	D_{00} (Data signal)
A- 5	D_{03} (Data signal)	B- 5	D_{02} (Data signal)
A- 6	NC	B- 6	NC
A- 7	CK_D (Data transfer clock)	B- 7	GND
A- 8	$\overline{H.D}$ (Horizontal sync. signal)	B- 8	GND
A- 9	$\overline{V.D}$ (Vertical sync. signal)	B- 9	GND
A-10	GND	B-10	GND
A-11	NC	B- n	NC
A-12	V_L (+ 5V)	B-12	V_L (+ 5v)
A-13	V_D (+12V)	B-13	V_D (+12V)

Unit-side pin.header
(26-pin board)



Fitting socket
(26-pin solderless type,
it's not included in the unit.)



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Connectors

	Model No.	Maker
Unit-side pin header	HIF3FC-26PA-2.54DS or equivalents	HIROSE ELECTRIC CO.
Fitting socket	HIF3BA-26D-2.54R or equivalents	-ditto-

Note 1) The length of the cable shall not exceed 50 cm.

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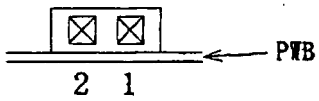
9 – 2 Brightness Control Connector (CN 8)

By attaching the external potentiometer to CN8, the brightness of the unit becomes controllable.

CN 8

Terminal No.	Signal name
1	BC 1
2	BC 2

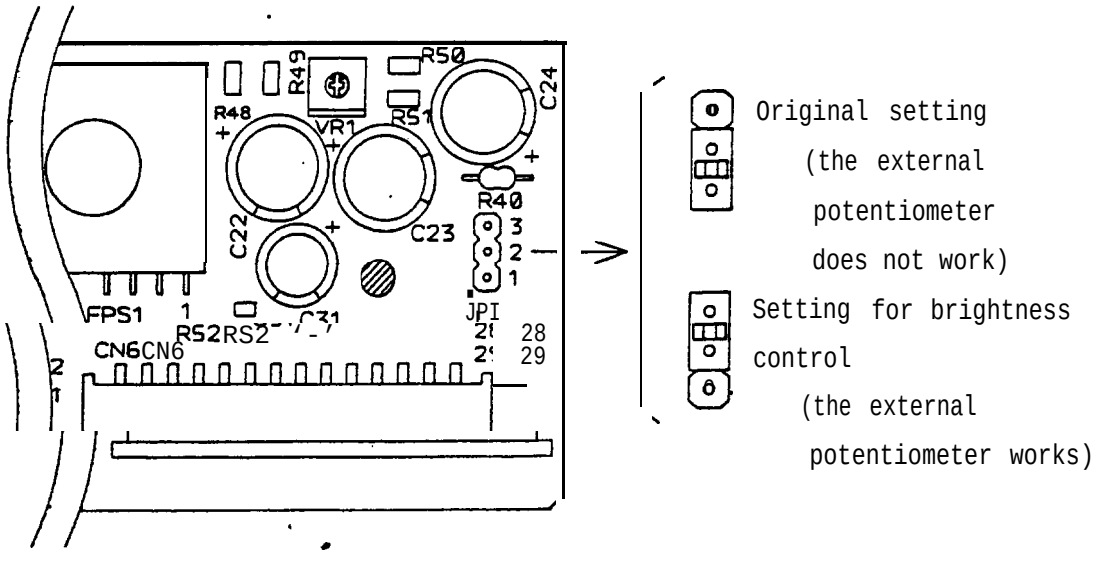
Unit-side pin header
: DF1B-2P-2.5DS/HIROSE ELECTRIC CO.
or equivalents



The value. of the potentiometer : 5kΩ

The range of the brightness control : 100Z(0Ω) - about 70%(5kΩ)

Note : The jumper plug which is attached to JP on DC-DC CONVERTER BOARD should be relocated as shown below, before the brightness control is carried out.



Caution : Never put on or remove the connector and/or plug during the EL unit is under operation.
Otherwise, the fuse might be melted down.

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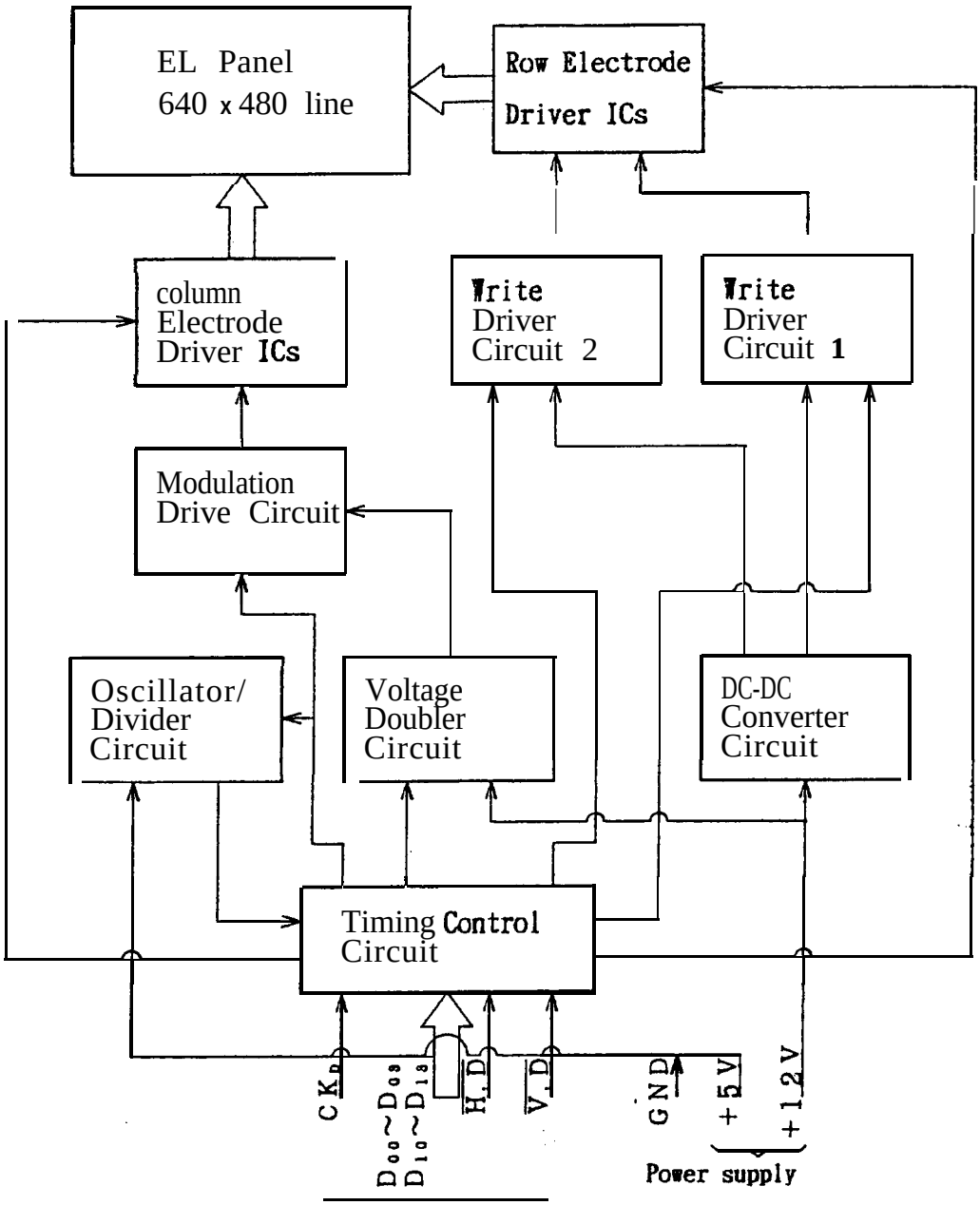
10. Functional block diagram



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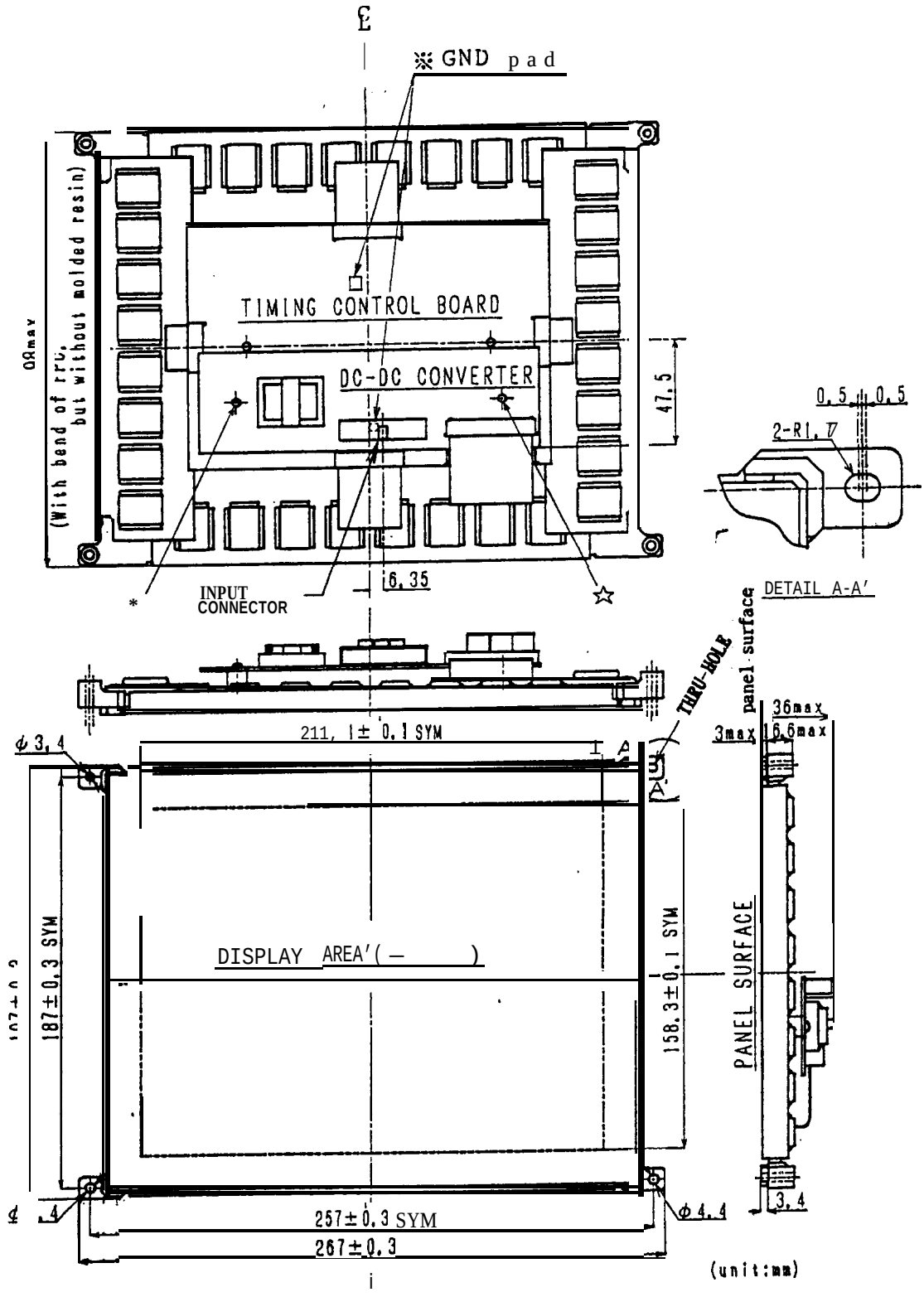
11 • Outline of the unit configuration

This unit is shipped with the form drawing below.



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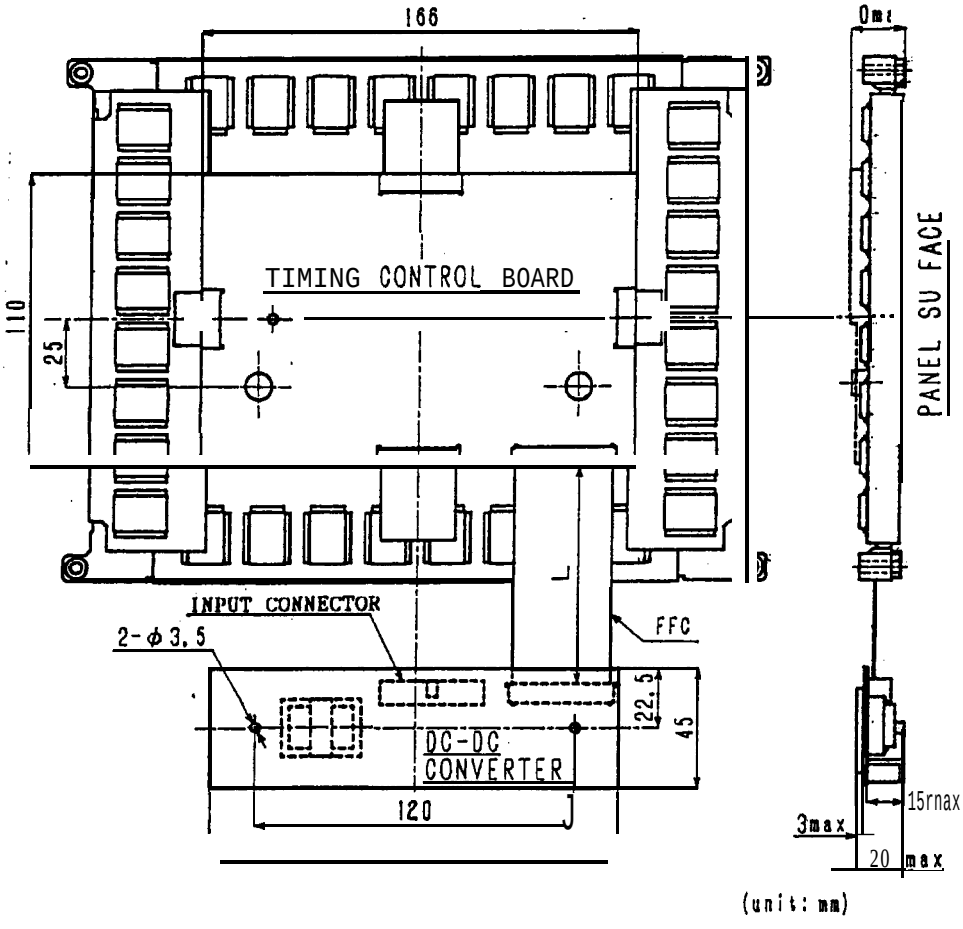
And, if you want the unit to be thinner, take off two screws indicated by ☆ in the figure in P.11, and you can divide the DC-DC converter board from the unit. In this case, the outline of the unit configuration is drawn below.

(Cautions)

1. Be careful against the ESD when yoa take off the DC-DC converter.
2. The DC-DC converter outpats +250VDC and -200VDC. Pay attention this when you build it in year system.
3. Length allowance of the FFC connecting the DC-DC conventer board to the timing control board is up to 150mm (5.9inches). Use the FFC listing below or equivalents.

Sumicard® SMCD-29xL-ADx15-P1 .25-S6.0 (L≦150mm)

Maker SUMITOMO ELECTRIC INDUSTRIES



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12. Handling Instructions and Cautions for Operation

Handling Instructions

1. Handle the unit with care of ESD, The operater and the place around him must be guard against ESD.
   Hold the mounting arms of 4 corners of the anit when you handle it.
2. Since the EL panel is made of glass, care shall be taken to avoid the breakage caused by dropping or bumping it.
3. The display control board or the frame of the anit shall not be removed nor the unit shall be disassembled. ICS mounted on the unit shall never be touched by finger/hands to prevent the breakage due to static electricity.

Cautions for Operation

1. The anit shall be operted within the rated operating conditions specified in this literature.
   When you meant the unit on your product, design your product making the anit breathable.
2. Operation of the unit at high temperature with high humidity shall be strictly avoided.
   Dew on the connector or on the circaits will cause ❑alfunction, which can lead damage to the unit.
3. Cable for the interface and power supplies shall be flat ribbon cable of 26 wires of 1.27mm pitch (conductor AWG #28) or it's equivalent.
4. The display control board on the rear side of the unit shall never be touched while in operation. It generates AC pulse of approx. 200V.
5. When the same pattern is continuously displayed for a long time, luminance variation may be noticed in the low luminance area.
6. This anit may occur the visible noise in case you set up it in a metal case. It is caused by the capacitance coupling between panel electrodes and a metal case.
   In such a case, you should connect the wire from unit's GND with a metal case.

Others

If any problem should arise from this specification, the supplier and user should work oat a mutually acceptable solution.

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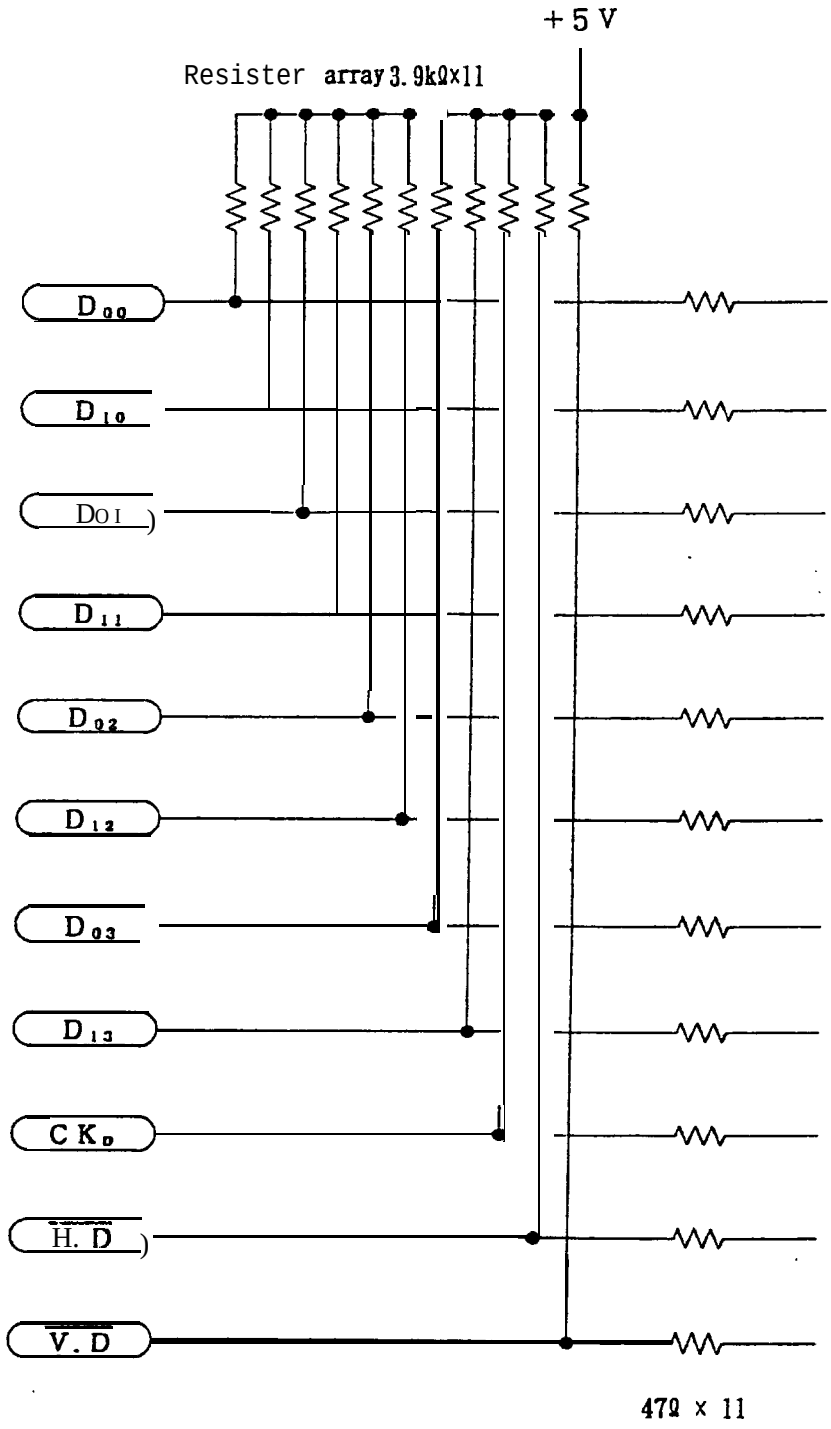
13. Circuit scheme of the signal input block



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14. Power supply input circuit

(a) Over current protection

This nnit equips fuses in power supply input circuit protecting fire accident rising from over current in internal circuit, so the fuse may melt down when the specifications are not kept or in case of short circuit.

① Don't use the mechanical contact switch in DC outlet of user's power supply. It may lead the trouble by inrush current.

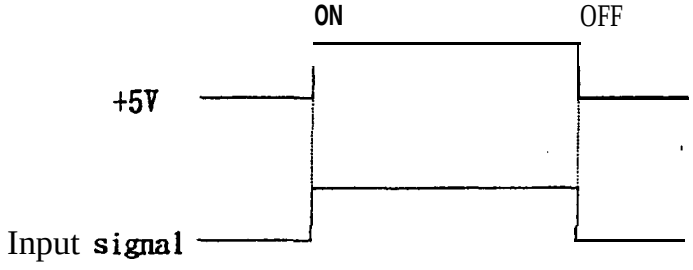
② User's power supply required 1.5~2 times peak current capacity of rating current for immediate fusing in case of trouble.

Fuse specifications

Parts No.	Model No.	Ratings	Melt type	Authorizaition
F 1	TR-5 19374*	500mA	slow	UL, CSA
F 2	TR-5 19374*	3.15A	slow	UL, CSA
F 3	TR-5 19374*	1. 25A	slow	UL, CSA

* : or equivalents Maker : Wickmann

(b) Recommendation : Power ON/OFF sequence



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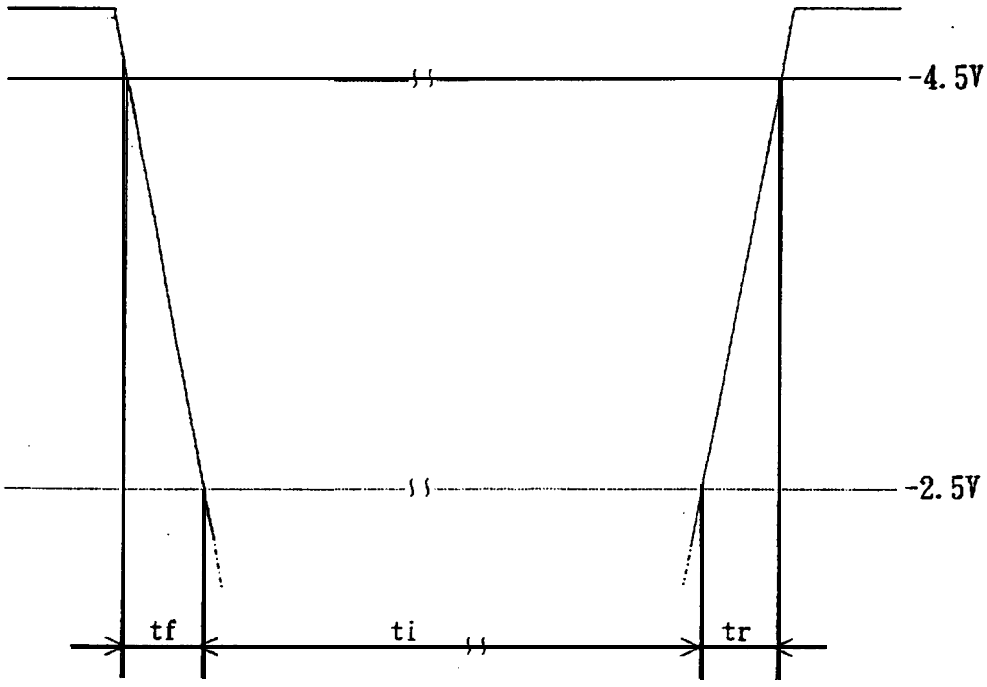
(c) Take account of the scheme below for 5VDC input rising up time and falling down time of 5VDC



tf = falling down time tr = rising up time

(1) tf, tr ≤ 100 ms is better to be kept.

(2) ti ≥ 1 ms shall be kept.

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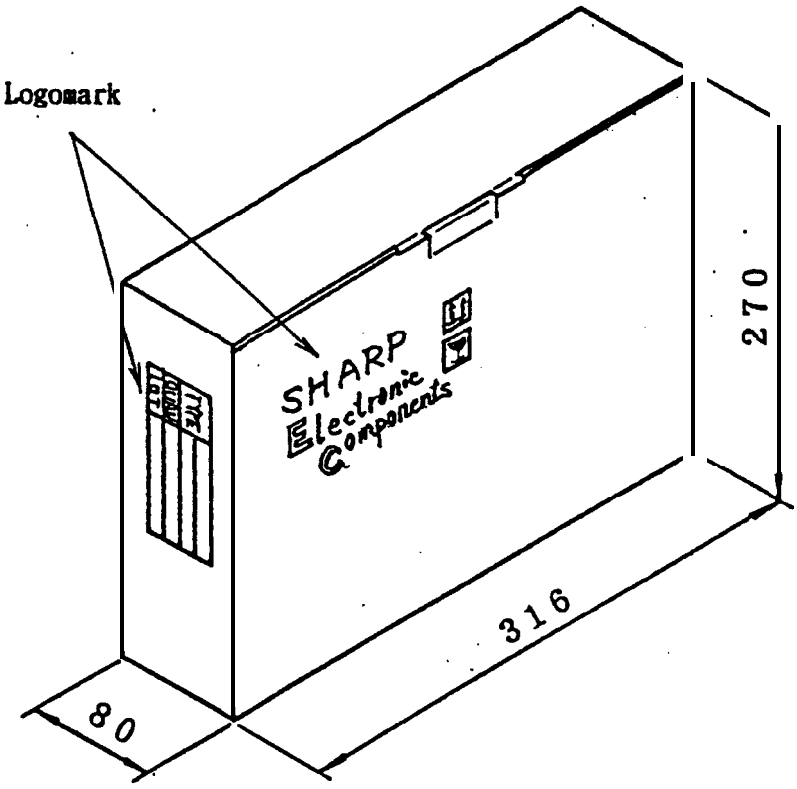
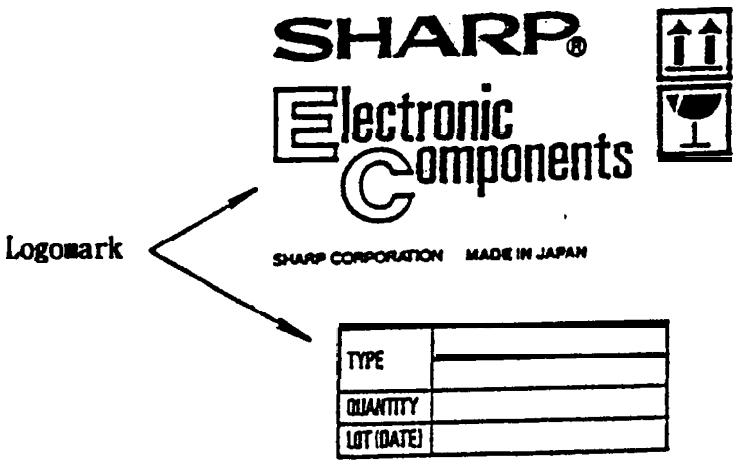
15. Packing specification.



(unit:mm)



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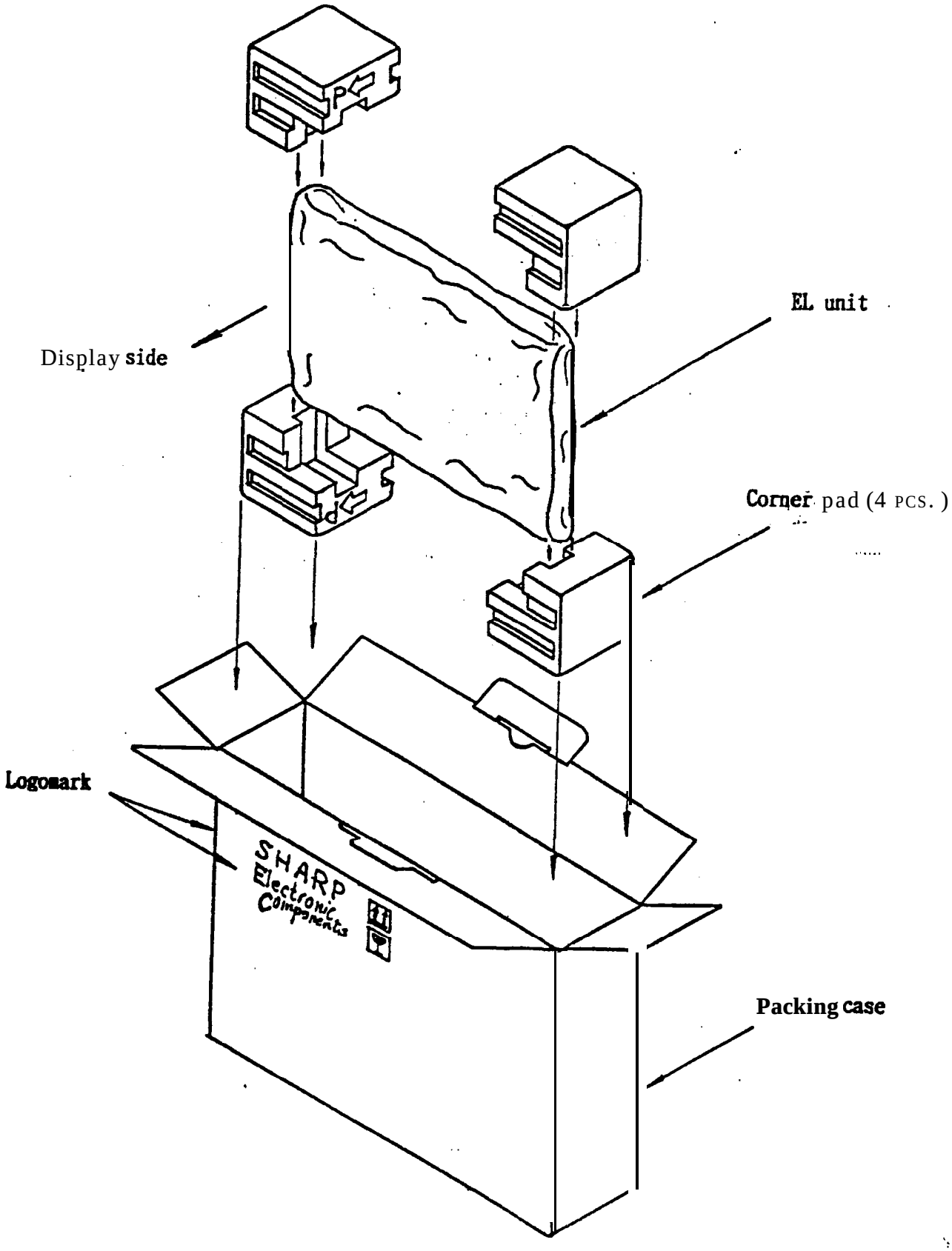
Display side
EL unit
Corner pad (4 PCS.)
Logomark
SHARP
Electronic
Components
Packing case