SHARP

LJ64H034

EL Display Module

(Model Number: LJ64H034)

Specifications

Spec No.: LA-05103F

Dated: Mar. 28. 2002

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- Automotive audio visual equipment

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- Gas leakage sensor breakers
- Alarm equipment
- Various safety devices etc.

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PREPARED BY: DATE	SHARP	SPEC No. LA-05103F
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		PAGE 25
	SPECIFICATION	APPLICABLE DIVISION
		☐ DUTY DEVELOPMENT CENTER ☐ TFT DEVELOPMENT CENTER ☐ LCD PRODUCTS DEBELOPMENT CENTER ■ PRODUCTION DEPT.(EL Gr)

SPECIFICATION FOR

EL Display Module

MODEL No. LJ64H034

☐ CUSTOMER'S APPROVAL

DATE _____

BY _____

PRESENTED

BY Masaaki Kawaguchi

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SHARP CORPORATION

SHARP

MODEL No. LJ64H034

DOC. FIRST ISSUE

IDENT. DATA No.

RECORDS OF REVISION

DATE	REF. PAGE PARAGRAPH DRAWING No.	REVISED No.	SUMMARY	CHECK & APPROVAL
May. 12.'93	Page 14	1	The content of a item 4 changed	T. Okba
Feb. 9.'94	Page 2, 4	2	Elimination of former units.	K. Kobayashi
	Page 1, 4, 12	3	According as the revised LCD group standards.	
	Page 8	4	Add Note 1) to item 7-3	
Sep. 21.'94	Page 7, 8	5	Addition of input signals timing characteristics.	K. Kobayashi
Dct. 7.'97	All pages	—	Change the word:unit→ module	M. Kawaguchi
	Page 1	6	Change Outline dimensions in Mechanical Specifications.	
	Page 1	7	Change Mass in Mechanical Specifications.	
	Page 10	8	Add Note 3)	
	Page 12	9	Change Outline of the module configuration.	
	Page 13	10	Change Cautions for Operation.	
	Page 16	11	Change of fuse model.	
	Page 19	12	Change Packing specification.	
	Page 20	13	Add Serial number.	
	———	14	Add the handling attention.	
	———	—	Old page 11 is deleted.	
	Page 4	15	Correct errors. (Shadowing characteristics 10→2)	
Apr.19.'99	Page 4,5	16	Add Note 4) Add the description about brightness measures.	M. Kawaguchi
	Page 12	17	To Omit the Bit Insert from Base plate.	
	Page 19	18	Add Barcode Label on a Packing case.	
	Page 20	19	Add the items about the serial number of EL module.	

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RECORDS OF REVISION

MODEL No. LJ64H034

DOC FIRST ISSUE

IDENT. DATA No.

DATE	REF. PAGE PARAGRAPH DRAWING No.	REVISED No.	SUMMARY	CHECK & APPROVAL
Jan.28.'02	Page 1	△20	Change Mass in Mechanical Specifications.	
	Page 7,8	△21	Add the High level S clock width(t SWH)	
	Page 7	△22	Add Note 1. Change Note to Note 2.	
	Page 12	△23	Change Outline of the module configuration.	
	Page 15	△24	Change of signal input block.	
	Page 16	△25	Change of fuse model.	
	Page 19	△26	Change the packing specification.	
	Page 20	△27	Add the items about the serial number of EL module.	M. Kawaguchi
	Page 20	△28	Change content of serial number.	
	———	———	Add the module details chart. △23 △24 △25 △27	
			Revisions by the change of the display control PWB.	

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[Notice] ⚠14

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1. Application

This data sheet is to introduce the specification of EL display module, LJ64H034.

2. Overview

The Sharp EL display module consists of a thin film EL panel, high voltage ICs for panel driving and a display control circuit. By supplying eleven input signals of CMOS level and two DC power supplies of +5 V and +12 V arbitrary graphs and characters can be displayed.

3. Mechanical Specifications △3

Parameter	Specification Width × Height × Depth	Unit	
Outline dimensions	246 × 175 × 19	mm	△6
Number of matrix electrodes	640 × 400	--	
Active area	191.9 × 119.9	mm	
Dot pitch	0.3 × 0.3	mm	
Dot pitch ratio	1 × 1	--	
Dot size	0.22 × 0.22	mm	
Mass	450 △20	g	△7

Note) Details of outline dimensions are shown at Page 12.

4. Absolute Maximum Ratings

4-1 Electrical absolute maximum ratings

(Ta=25 ℃)

Parameter	Symbol	Rating	Unit
Interface signal (Logic "H")	V_{IH}	V_L + 0.3	V
Interface signal (Logic "L")	V_{IL}	− 0.3	V
Supply voltage (Logic)	V_L	+ 7	V
Supply voltage (panel drive)	V_D	+ 14	V

4-2 Environmental conditions △2

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

Note 1) Survival : -20 ℃ to +65 ℃
No permanent damage will occur.

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

Note 3) 5 ～ 55 Hz Frequency range
Sweep time ; 15 min each axis
Dwell at resonance ; 10 min each resonance
Peak-to-peak
amplitude ; 3.17 mm over 5 ～ 10 Hz range
; 1.52 mm over 10 ～ 25 Hz range
; 0.38 mm over 25 ～ 55 Hz range
55 ～ 500 Hz Frequency range
Sweep time ; 120 min each axis
Dwell at resonance ; 30 min each resonance
Peak-to-peak
amplitude ; 30 m/s^2 peak acceleration

Note 4) Acceleration ; 491 m/s^2
Pulse width ; 11 ms
3 times for each direction of ±X/±Y/±Z.

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5. Electrical Characteristics

(Ta=25 ℃, Frame frequency=120 Hz)

Parameter	Symbol	Rating			Unit
		Min.	Typ.	Max.	
Supply voltage (Logic)	V_L	+ 4.75	+ 5.0	+ 5.25	V
Supply current (Logic, V_L =+5 V)	I_L	30	−	300	mA
Supply voltage (Panel drive)	V_D	+ 11.4	+12.0	+12.6	V
Supply current (Panel drive, V_D =+12 V)	I_D	(※1)	−	1300	mA
Total power (V_L =+5 V, V_D =+12 V)	P_T	−	11	−	W

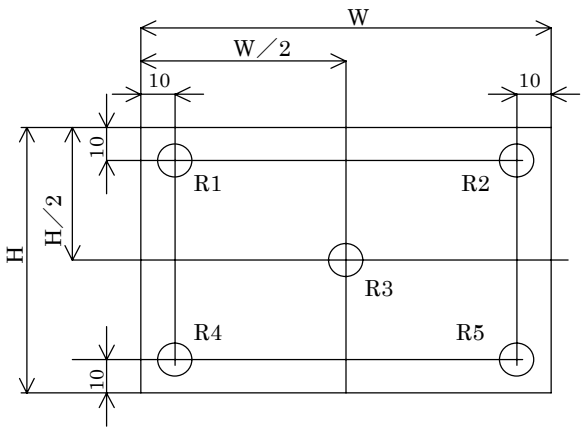
(※1) 10 mA in condition with no signals nor V_L supplying.

6. Optical Characteristics △2 △3

(Ta=25 ℃, Frame frequency=120 Hz)

	Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
	Luminance	L_{ON}	All dots lit	137	200	−	cd/m²	
	OFF luminance	L_{OFF}	All dots turned off	−	−	3.4	cd/m²	Note 1)
△16	Luminance distribution	△ L_{DIS}	All dots lit	−	−	35	%	Note 4)
	Fill factor			−	0.54	−		Note 2)
△15	Shadowing characteristics	△ L_{SD}	fixed pattern	−	2	−	%	Note 3)
	Viewing angle			−	160	−	°	

Note 1) Average luminance measured at the five circular windows (R1～R5) shown in Fig.1 (Circular window diameter : ϕ 13 mm)



(Fig.1)

H 119.9 : Height of active area
W 191.9 : Width of active area
Unit : mm
Tolerance of luminance : ± 10%

The following formula defines the luminance distribution:

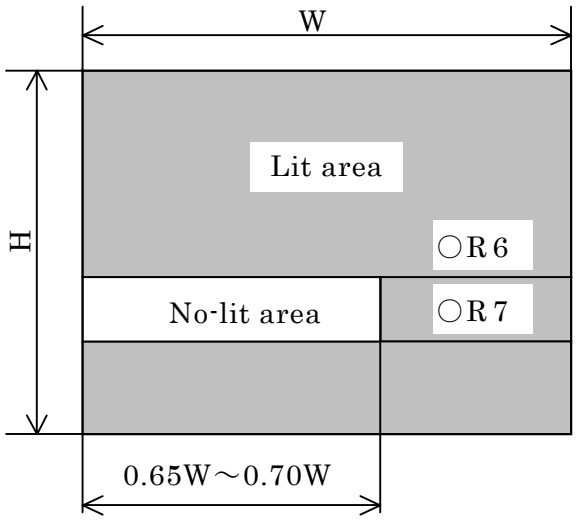
$$\Delta L_{DIS} = \left(1 - \frac{L_{min}}{L_{max}}\right) \times 100(\%)$$

where L_{max} is the maximum luminance and L_{min} is the minimum luminance taken at the five locations in Fig.1.

Note 2) The ratio of the emission area to the display area. …… SHARP's EL has comparatively high fill factor, and therefore, the visibility of display is excellent.

Note 3) Shadowing characteristics means the variation of luminance according to the number of dots lit on a scanning line.

Thanks to the addition of the shadowing compensation circuit, the display quality of SHARP's EL is improved.



(Fig.2)

The following formula defines the shadowing characteristics:

$$\Delta L_{SD} = \left(\frac{L_N}{L_L} - 1 \right) \times 100(\%)$$

where L_L is the luminance at R6, L_N at R7.

⚠16 Note 4) Brightness measures

We measure brightness using sharp's examination device that is proofread by standard-machine:BM-5A(TOPCON).

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7. Timing Characteristics

7-1 Input signals

This module is driven by line-at-a-time scanning method with following 11 CMOS level input signals.

Parameter	Symbol	Description	
Data input clock signal	CP2	Clock signal for inputting the display data into the EL module.	
Display data signal	UD0～3	Data signal for the upper part of display	The signals are sampled at every falling edge of the data input clock signal.
	LD0～3	Dare signal for the lower part of display	The display is "ON" while the logic is "H" and "OFF" while the logic is "L"
Input data latch signal	CP1	This signal controls the "timing of line-at-a- time scanning " and the "latch timing of the data side shift register on falling edge."	
Scan start-up signal	S	This signal controls frame frequency. And the contents of the display data signal are displayed on the first line by combination with this signal.	

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7-2 Input signals timing characteristics

(Ta＝25 ℃)

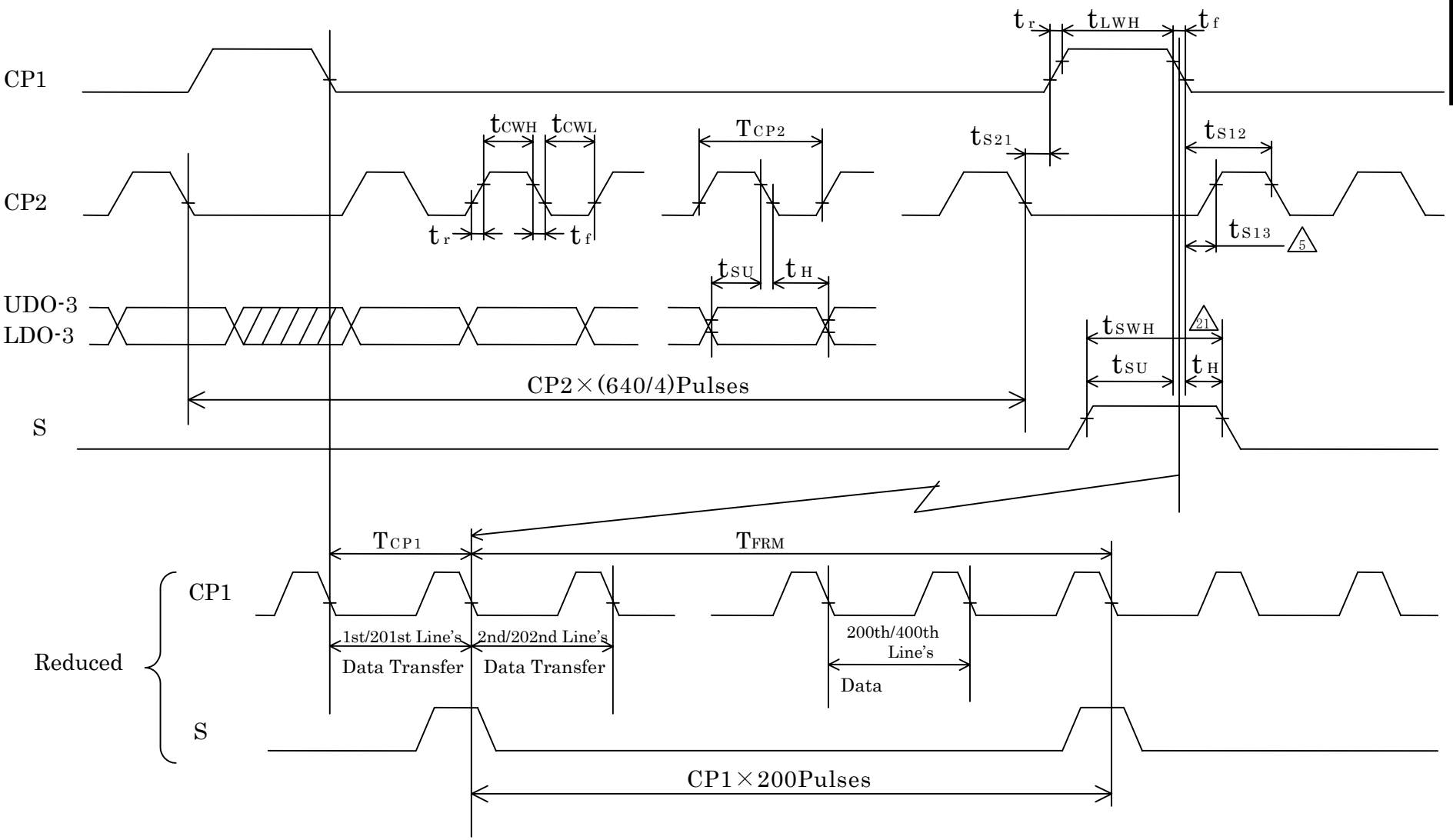
	Parameter	symbol	Min.	Typ.	Max.	Unit
	Frame frequency	$1/T_{FRM}$	60	－	120	Hz
	CP2 clock cycle	T_{CP2}	182	－	－	ns
	High level clock width	t_{CWH}	60	－	－	ns
	Low level clock width	t_{CWL}	60	－	－	ns
	CP1 clock cycle	T_{CP1}	40	－	－	μs
	High level latch clock width	t_{LWH}	60	－	－	ns
△21	High level S clock width	t_{SWH}	－	－	t_{CP1}	μs
	Data set up time	t_{SU}	50	－	－	ns
	Data hold time	t_H	40	－	－	ns
	CP1↑ clock allowance time from CP2↓	t_{S21}	0	－	－	ns
	CP2↓ clock allowance time from CP1↓	t_{S12}	200	－	－	ns
△5	CP2↑ clock allowance time from CP1↓	t_{S13}	100	－	－	ns
	Clock rise/fall time	t_r, t_f	－	－	t_{rf} *	ns

＊ t_{rf} $(T_{CP2}-t_{CWH}-t_{CWL})/2 \leqq 30$ns

△22 Note 1) The High level S clock width must make it into TCP1 or less in any cases.

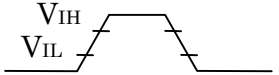
Note 2) The vertical blanking time ($T_{FRM}-T_{CP1}\times 200$) shall be minimized to avoid the flickering lines around the center of the display. (around 200th and 201th horizontal lines)

7-3 Input signals timing chart. △4



Note 1) CP1×200 pulses shall kept.

V_{IH}=3.5V(Min.)
V_{IL}=1.5V(Max.)



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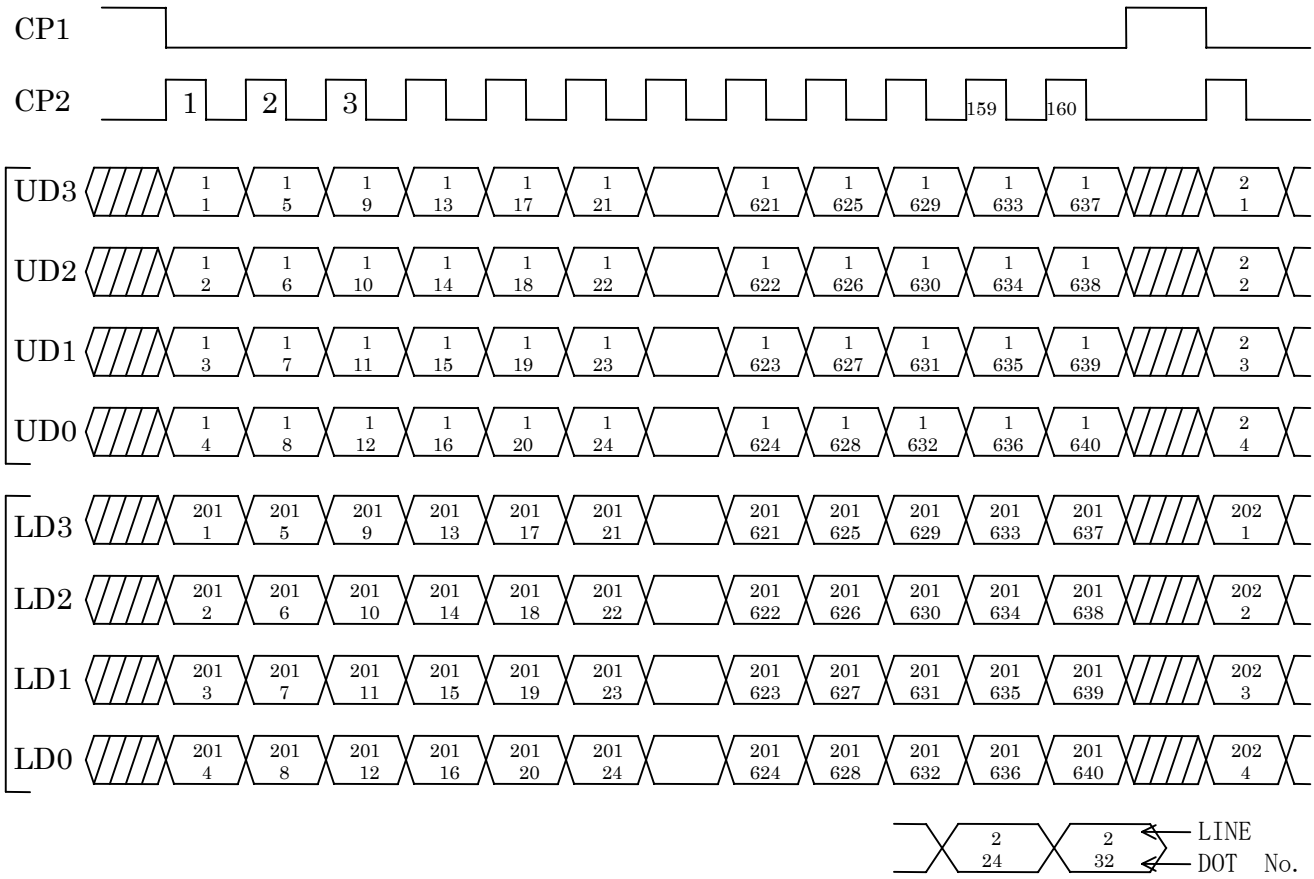
7-4 Data transmission timing.



7-5 Transmission data and relative position on panel.

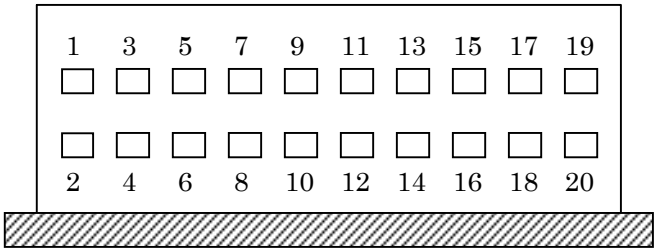
LINE ↓ / DOT →	1	2	3		639	640
1	1−1	1−2	1−3		1−639	1−640
2	2−1	2−2	2−3		2−639	2−640
3	3−1	3−2	3−3		3−639	3−640
UD ・ ・ ・						
199	199−1	199−2	199−3		199−639	199−640
200	200−1	200−2	200−3		200−639	200−640
201	201−1	201−2	201−3		201−639	201−640
202	202−1	202−2	202−3		202−639	202−640
203	203−1	203−2	203−3		203−639	203−640
LD ・ ・ ・						
399	399−1	399−2	399−3		399−639	399−640
400	400−1	400−2	400−3		400−639	400−640

8. Interface signals and power supply connectors

Assignment of pins of connector CN5

No.	SIGNAL	No.	SIGNAL
1	UD1	2	UD0
3	UD3	4	UD2
5	LD1	6	LD0
7	LD3	8	LD2
9	CP2	10	GND
11	CP1	12	GND
13	S	14	GND
15	GND	16	GND
17	+ 5 V	18	+ 5 V
19	+12V	20	+12V

Arrangement of pins of connector CN5



(Fig.3)

Connectors

	Model No.	Maker
Module-side pin header	DF11-20DP-2DS or equivalents	HIROSE ELECTRIC CO.
Fitting socket (crimp contact)	DF11-20DS-2C or equivalents (DF11-2428SC)	HIROSE ELECTRIC CO.

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

Note 2) This module is not supplied with the fitting socket and the cable.

Note 3) Please connect all of each terminal of the above-mentioned input signal, △8 supply voltage, and GND.

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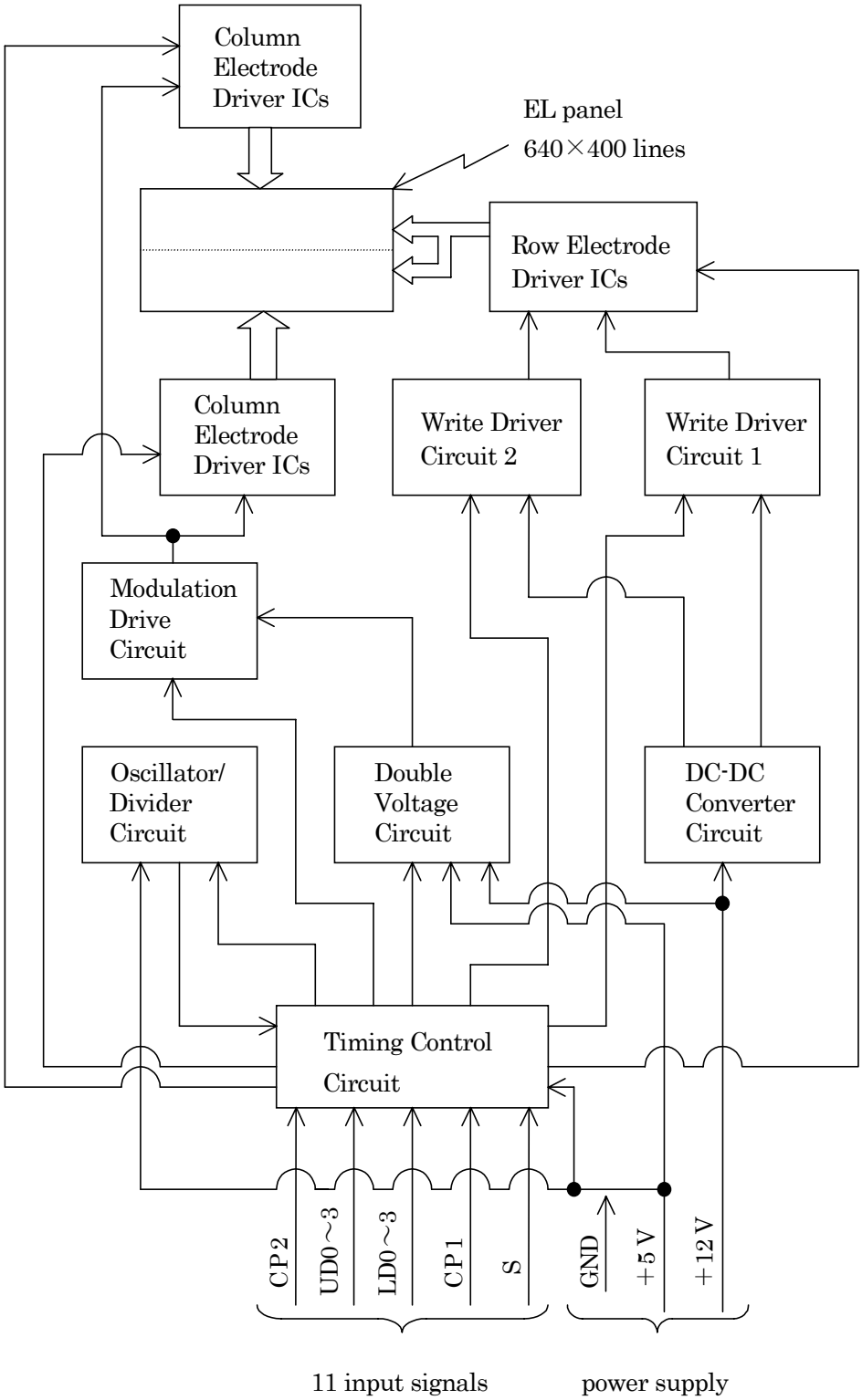
9. Functional Block Diagram



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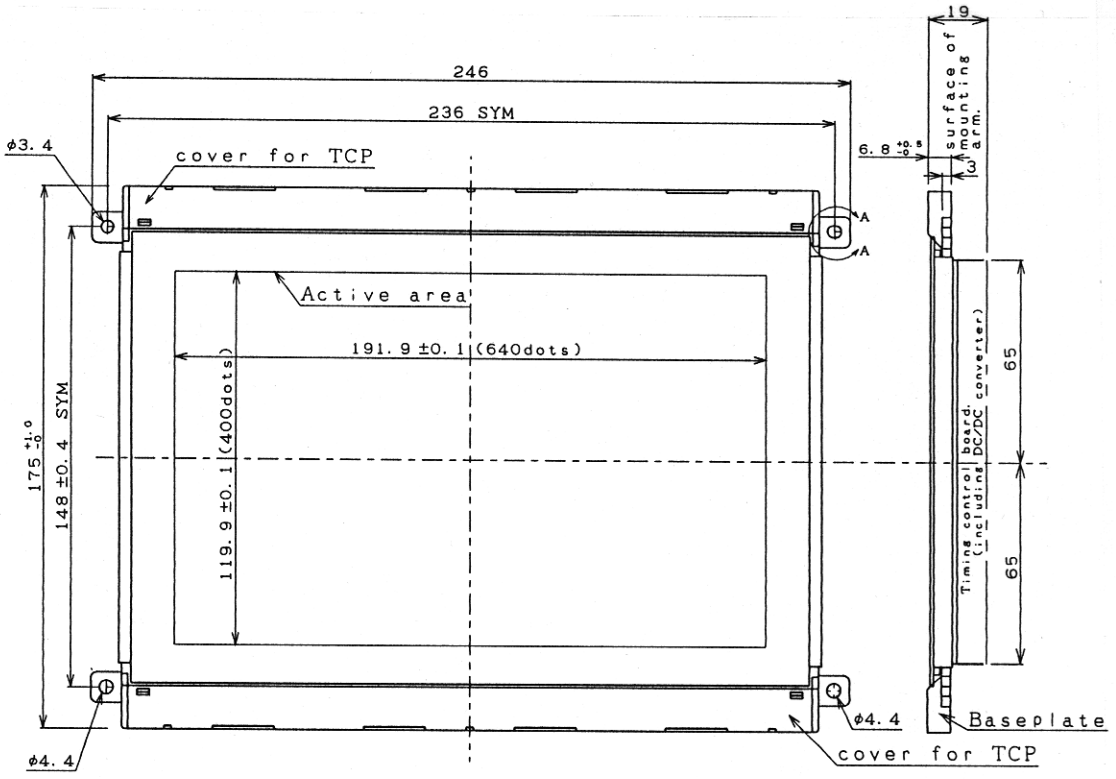
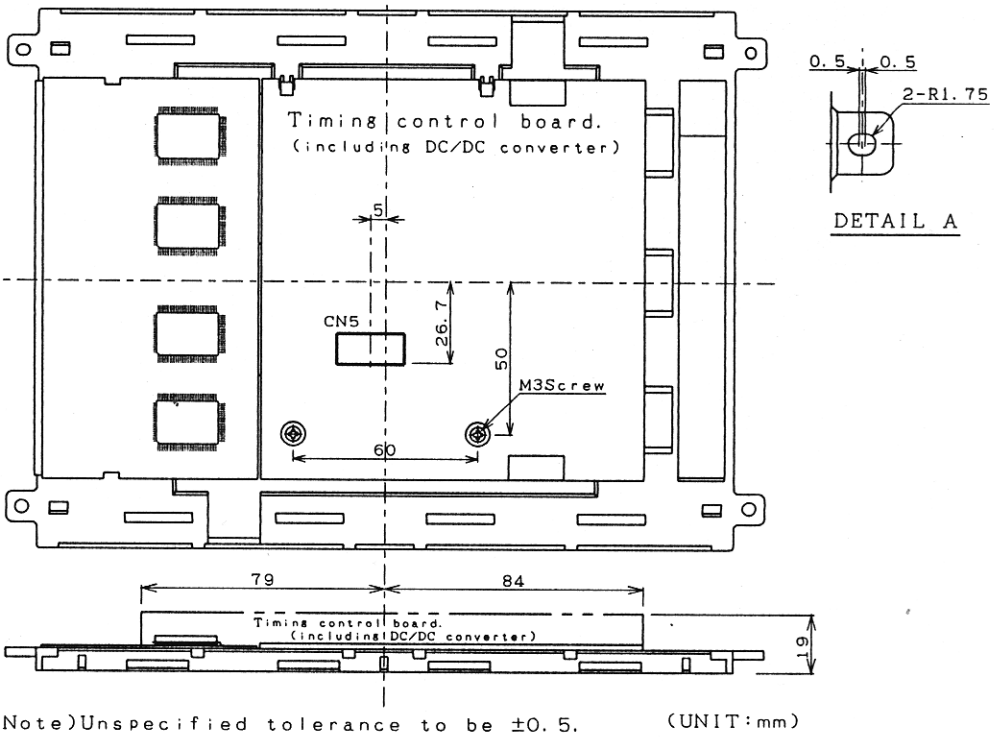
10. Outline of the module configuration △3 △9 ~~△17~~ △23

This module is shipped with the form drawing below.





Note) Unspecified tolerance to be ±0.5. (UNIT: mm)

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11. Handling Instructions and Cautions for Operation ⚠10

1. Handle the module with care of ESD, The operator and the place around him must be guard against ESD. Especially, please note that the module might be destroyed by ESD when you directly touch the IC or the wiring pattern in the EL display module. Hold the mounting arms of 4 corners (of the module) when you handle it to protect you from electric shock prevention etc.
2. Since the EL panel is made of glass, care shall be taken to avoid the breakage caused by dropping or bumping it.
3. Please avoid detaching and decomposing the display control board or the flat cable because these cause the breakdown.
4. Do not insert nor extract the input cable when the power is supplied.
5. Do not touch the display control PWB on the rear side of the module while in operation. There is risk of electric shock, because it generates AC pulses of about 200V. And even after the power off, do not touch components on the PWB because high voltage might be contained in circuits.
6. Please use the module within the rated operational voltage and temperature specified in this literature, because the breakdown is caused by using which exceeds regulated operation voltage and temperature. The operation temperature is specified by ambient temperature. Test carefully the inner temperate of your product (module ambient temperature), and decide operational temperature of your products.
7. Please avoid the operation in water dew because if water dew covers connectors or circuits even a little, if may cause mis-operation and sometimes it breaks the module.
8. If your product is used in dusty air, or covered by oil dew, or by acid/alkaline mist, protect PWB of the module by filter etc.
9. Do not use the module in corrosive gas. Do not use packing that contains sulfur, or spacer that contains sulfur rubber for mounting filter.
10. To avoid the image retention caused by the luminance change due to time lapse, and to extend the panel life, please pay attention to the design of display, so that a fixed pattern may not be displayed as possible as you can, and by using all parts of the viewing area evenly. Also, we would recommend to use the module at the ambient temperature as low as you can because the temperature is one of the causes of acceleration of the luminance change due to time lapse.

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11. To prevent smoke or fire in abnormal status, this module installs the fuses. But the fuses may not be melt down, and the temperature of the parts can rise, depending on the conditions of the usage, characteristic of power supply's current capacity, or defect mode. Therefore, take care that combustibles shall be set away from the module.
12. When you return the module to us, and you are forced to pack it in different manner with our specification, use enough amount of packing cushion to prevent stress to the panel.
13. Please observe the notes for usual electronic components strictly.

Others

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

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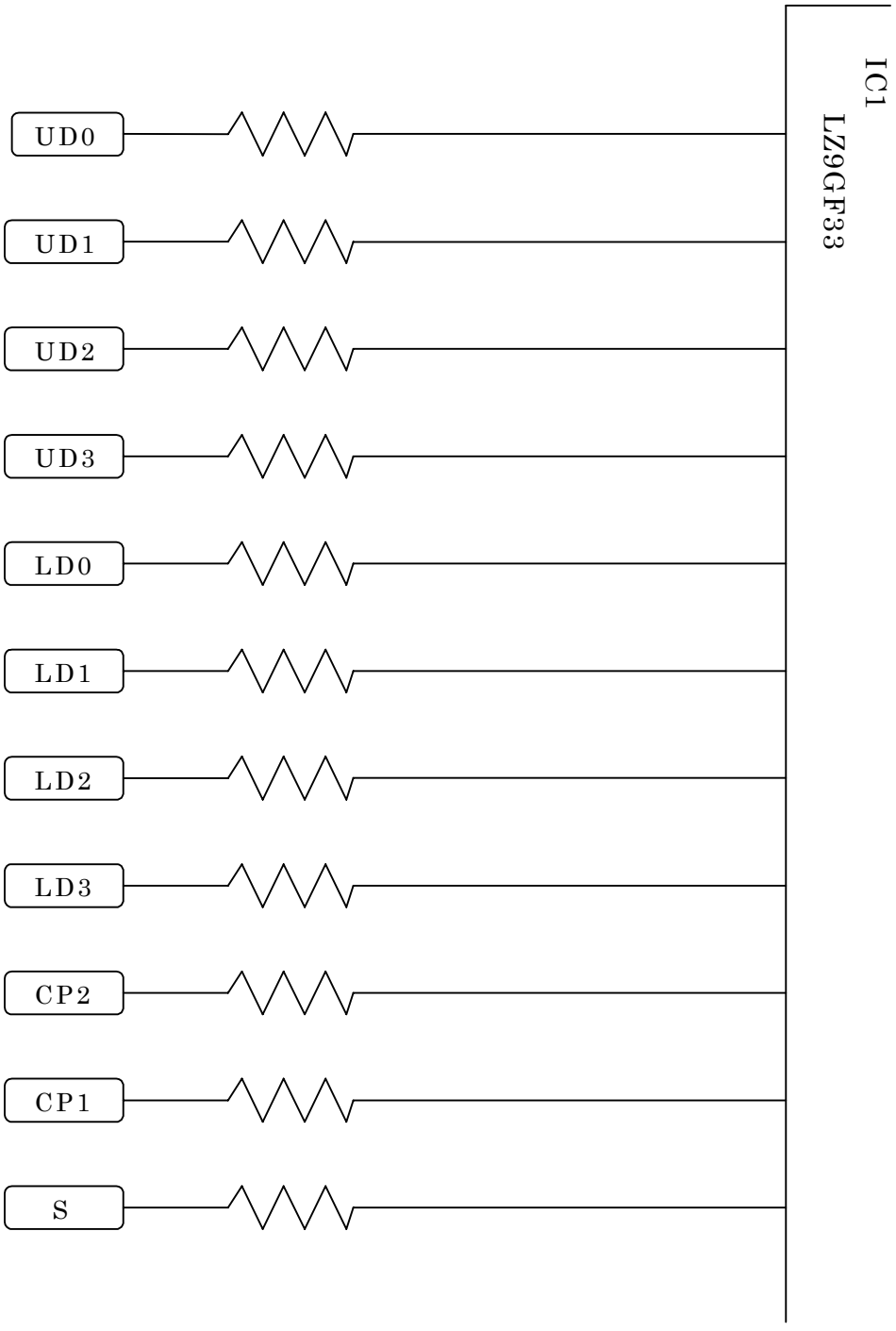
12. Circuit scheme of the signal input block ⚠24



390Ω×11

13. Power supply input circuit

(a) Over current protection

This module 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.

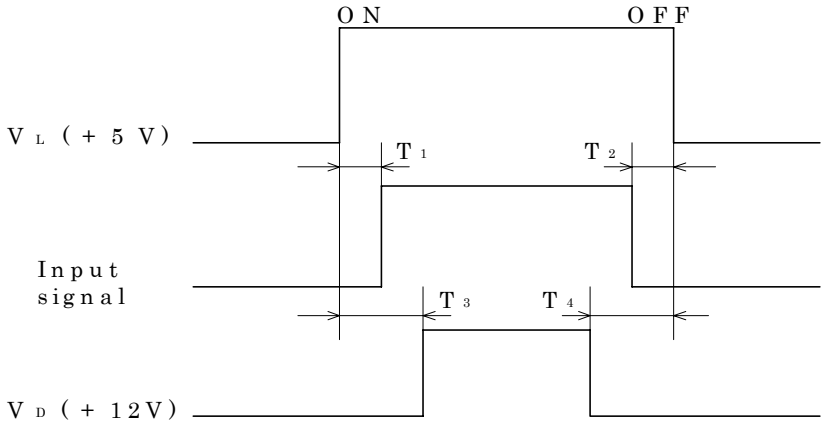
Fuse specifications △11 △25

Parts No.	Model No.	Ratings	Melt type	Authorization Standard
F 1	MMCT	800 mA	slow	UL.CSA
F 2	MMCT	1.6 A	slow	〃
F 3	MMCT	1.6 A	slow	〃

Maker : S.O.C

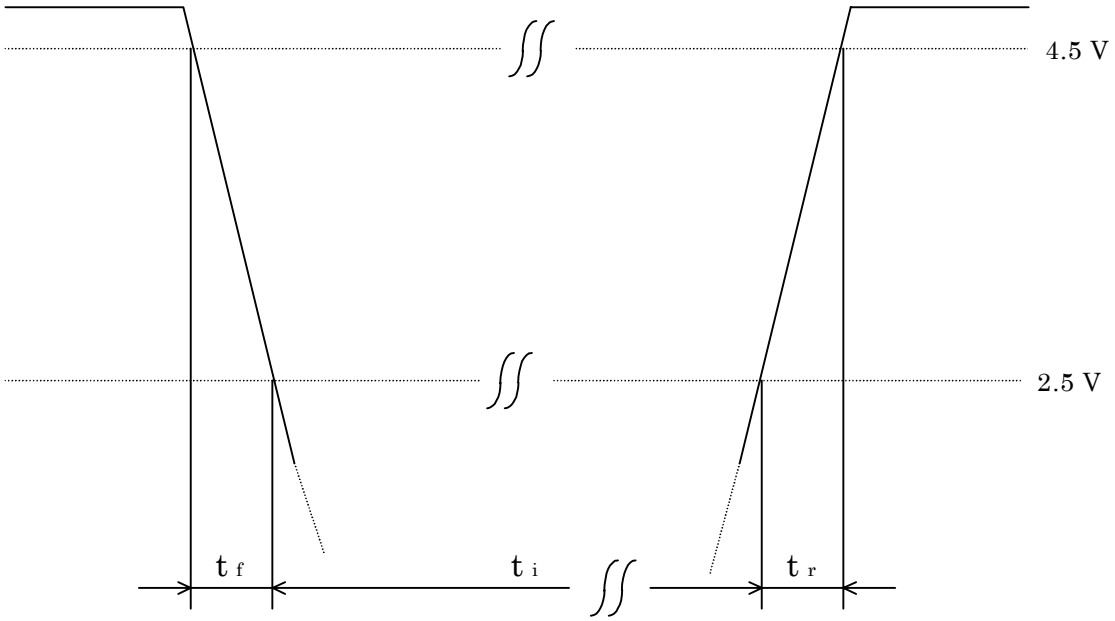
Note) Fuses is not open in the case current capacity of power supply is small. On the other hand fuses is open by surge current in case of current capacity of power supply is big or supply power to the module using relays. In consequence please you thoroughly investigate the module.

(b) Power on/off sequence



Note) $T_{1 \sim 4} \geqq 0$ shall be kept.

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



t_f = falling down time t_r = rising up time

(1) t_f, t_r ≦ 100 ms is better to be kept.
(2) t_i ≧ 1 ms shall be kept.

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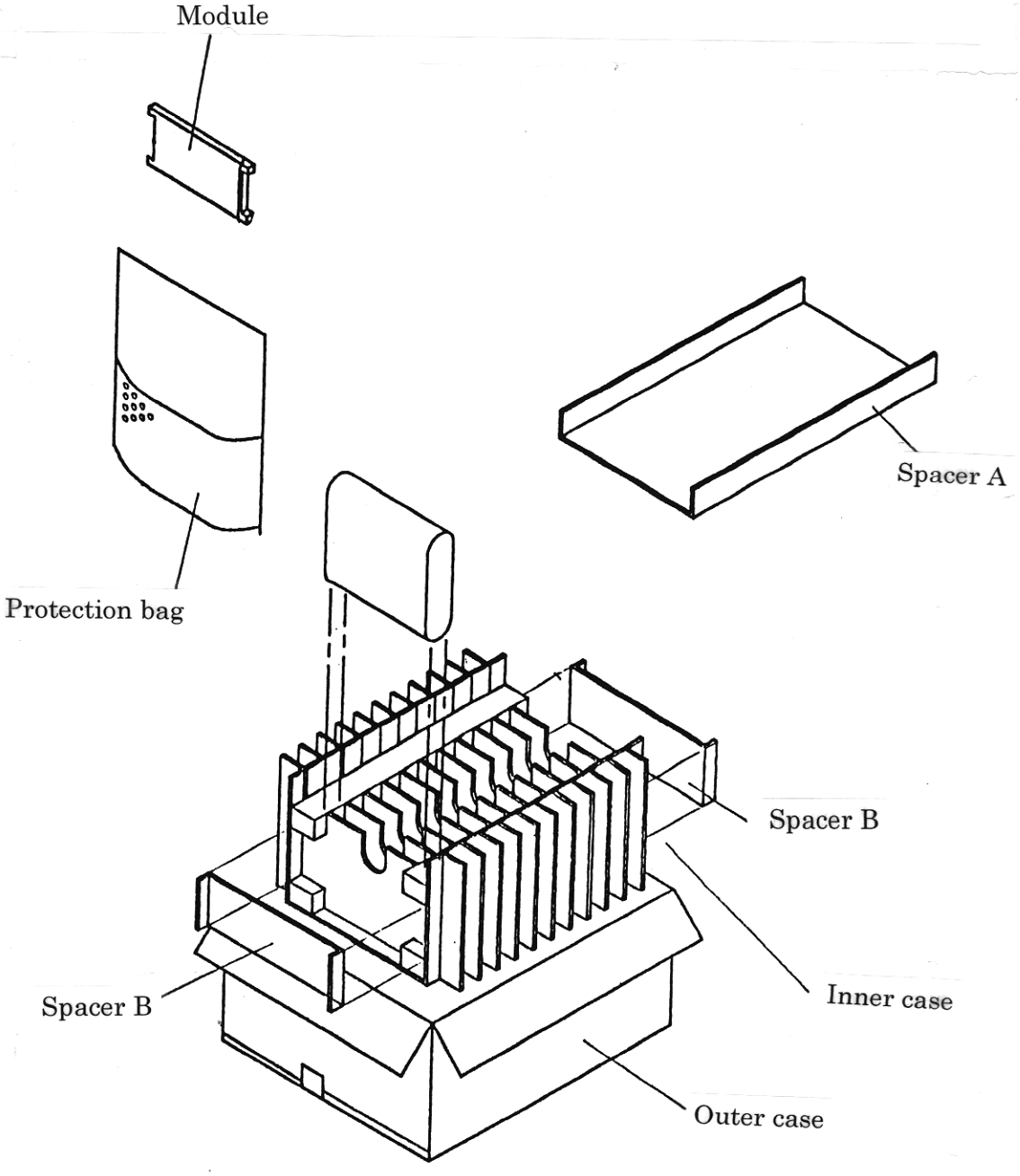
14. Packing Specification

10pcs./packing



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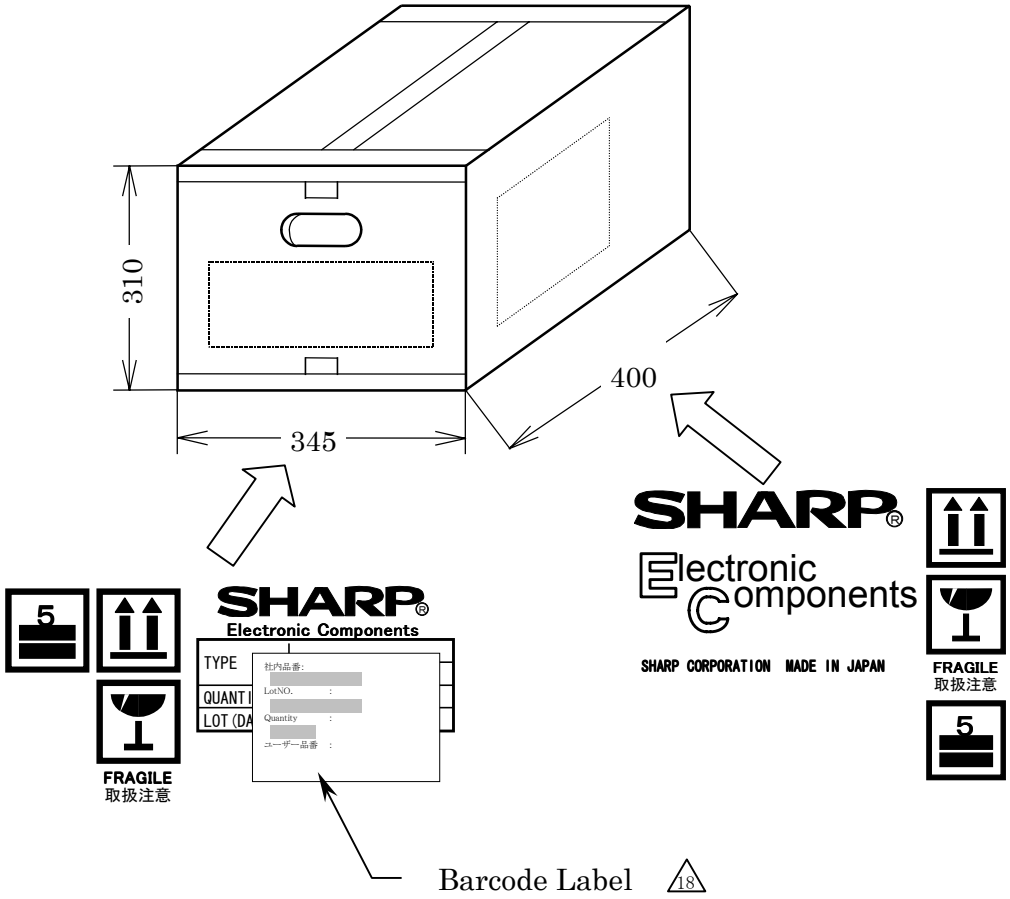
Outline △12 △26

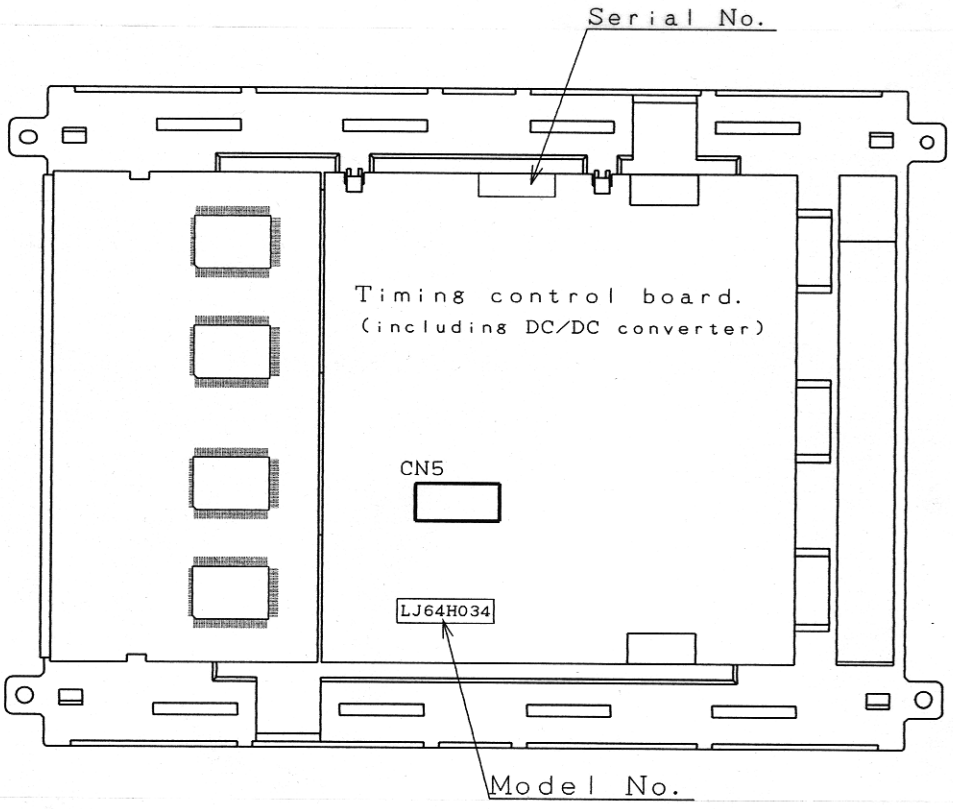


Barcode Label △18

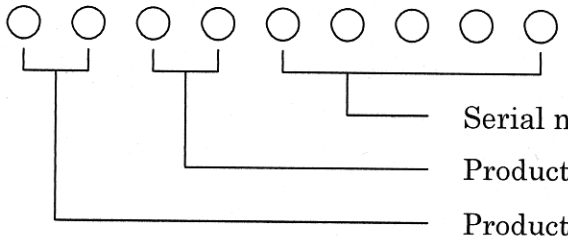
(Unit : mm)

15. Serial number ⚠19

⚠27 (1) Position



⚠28 (2) Content



Serial number of all models.

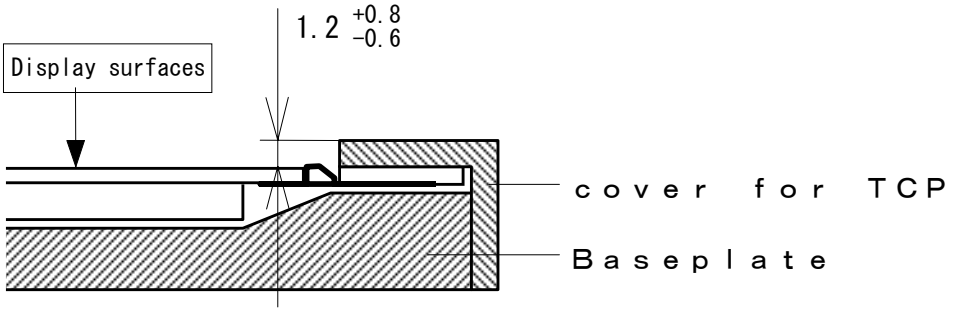
Production month (Jan.→01,Feb.→02·····Dec.→12)

Production year (Two last digit writing at A.D.)

Attachment material 1

Ｍｏｄｕｌｅ　ｄｅｔａｉｌｓ　ｃｈａｒｔ　（Ｕｎｉｔ：mm）

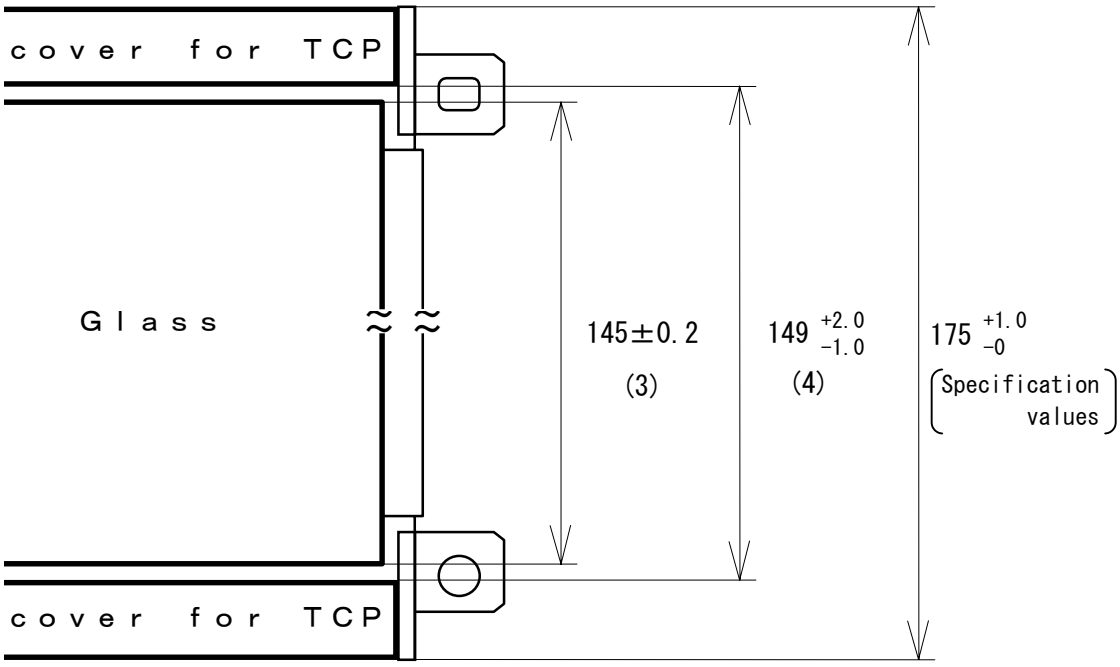
（１）The bumps of display surfaces and cover for TCP ： $1.2^{+0.8}_{-0.6}$ mm



（２）The width of cover for TCP ： １３±０．５mm

（３）height measurements of the glass ： １４５±０．２mm

（４）The intervals of the upper part cover for TCP and the lower part cover for TCP ： $149^{+2.0}_{-1.0}$ mm



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