
MODULE SPECIFICATION

OPTREX TYP. No. : DMF 608HE

CLIENT TYP. No. : _____



PREPERED BY OPTREX

APPROVED BY _____

~~AMPHI SECT (SADRI ELECTRIC AMERICA)~~

ISSUED DATE :

OPTREX CORPORATION

3-14-9, Yushima, Bunkyo-ku, Tokyo 113, Japan
telephone:(03)832-5357 Marketing Division
Telex:OPTREX J34323
Tele-Fax:(03)832-5350 (G III・G II)

1 Scope :

This specification covers the technical data of the undermentioned Liquid Crystal Display(LCD)Module which is delivered from Optrex Corporation to Messrs.

2 Name Product :

Dot Matrix Liquid Crystal Display (LCD) Module.

3 Type No. :

Client Type No. : _____

OPTREX Type No. : DMF 6 0 8 H E

4 Description of Product :

This module has a structure of dot matrix large panel LCD fixed by cramping with metal holder of SPCC on printed-circuit board on which the following Components are mounted:CMOS LSI and its peripheral discrete Resistors, Capacitors by means of soldering.

This module can display arbitrary characters and graphics on a 128 dots vertical by 160 dots horizontal LCD screen by means of driving signals which are given by external 1-bit 2-section serial data and the decoded inside the module.

As a back-light illumination ,Electric luminescent are installed inside of this module .

5 Outline Dimensions :

Refer to the attached outline dimensional drawing No. U E 3 1 3 5 9 .

6 Performances

6-1 Mechanical Data

I T E M	D I M E N S I O N S	U N I T
MODULE DIMENSIONS	1 2 9 (W) × 1 0 2 (H) × 1 1 . 2 M A X (D)	m m
Active Area	9 5 . 9 5 (W) × 7 6 . 7 5 (H)	m m
Viewing Area	1 0 1 (W) × 8 2 (H)	m m
Dot Pixels	1 6 0 (W) × 1 2 8 (H)	dots
Dot Size	0 . 5 5 (W) × 0 . 5 5 (H)	m m
Dot Pitch	0 . 6 (W) × 0 . 6 (H)	m m

6-2 Electrical Specifications

(1) Absolute Maximum Rating

ITEM	SYMBOL	CONDITION	MIN.	MAX.	UNIT
Logic Supply Voltage	$V_{CC}-V_{SS}$	—	- 0.3	7	V
LCD Driving Voltage	$V_{CC}-V_{EE}$	—	0	18	V
Input Voltage	V_I	—	- 0.3	V_{CC}	V
Operating Temp.	T_{opr}	—	- 10	+ 70	°C
Storage Temp.	T_{stg}	—	- 20	+ 75	°C

(2) Electrical Characteristics

ITEM	SYMBOL	CONDITION	MIN.	MAX.	UNIT
Logic Supply Voltage	$V_{CC}-V_{SS}$	—	4.75	5.25	V
LCD Supply Voltage	$V_{CC}-V_{EE}$	—	8.75	16	V
Power Supply	I_{CC}	$V_{CC}=5V; V_{EE}=-8V$	—	5	mA
	I_{EE}	—	—	15	mA
Input Voltage "H" Level	V_{IH}	"High" レベル	3.6	V_{CC}	V
Input Voltage "L" Level	V_{IL}	"Low" レベル	0	0.8	V
Clock Frequency	f_{cp}	Duty=50%	—	3.3	MHz

6-3 Optical Specification

(1) Optical Specification

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT
LCD Driving Voltage (1/64Duty)		V_{CC} $-V_{EE}$	$T_a = -10\text{ }^\circ\text{C}$		13.5	14.7	15.9	V
			$T_a = 25\text{ }^\circ\text{C}$		12.0	13.0	14.0	V
			$T_a = 70\text{ }^\circ\text{C}$		8.3	9.1	9.8	V
Contrast ratio		CR	$\theta = 30^\circ \quad \phi = 90^\circ$		—	4	—	—
Viewing Angle		$CR \geq 2$		θ	30	—	60	deg
				ϕ	60	—	120	deg
Responce Time	Rise	τ_r	Note 1	$T_a=25\text{ }^\circ\text{C}$	—	120	200	mS
	Decay	τ_d	Note 2	$T_a=25\text{ }^\circ\text{C}$	—	120	200	mS

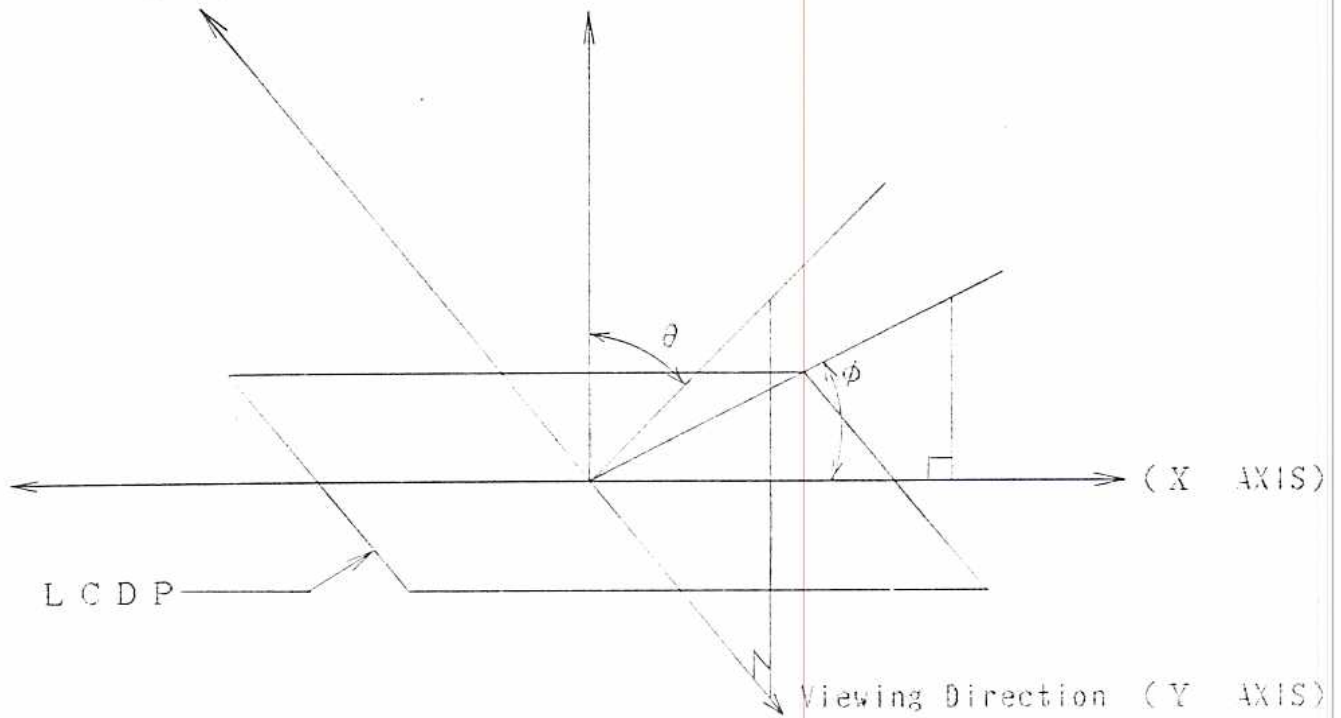
Note 1: The time required which the blacking ratio of segment from 0% to becomes 90% when waveform is switched to selected one from nonselected one.

Note 2: The time required which the blacking ratio of segment from 100% to becomes 10% when waveform is switched to selected one from nonselected one.

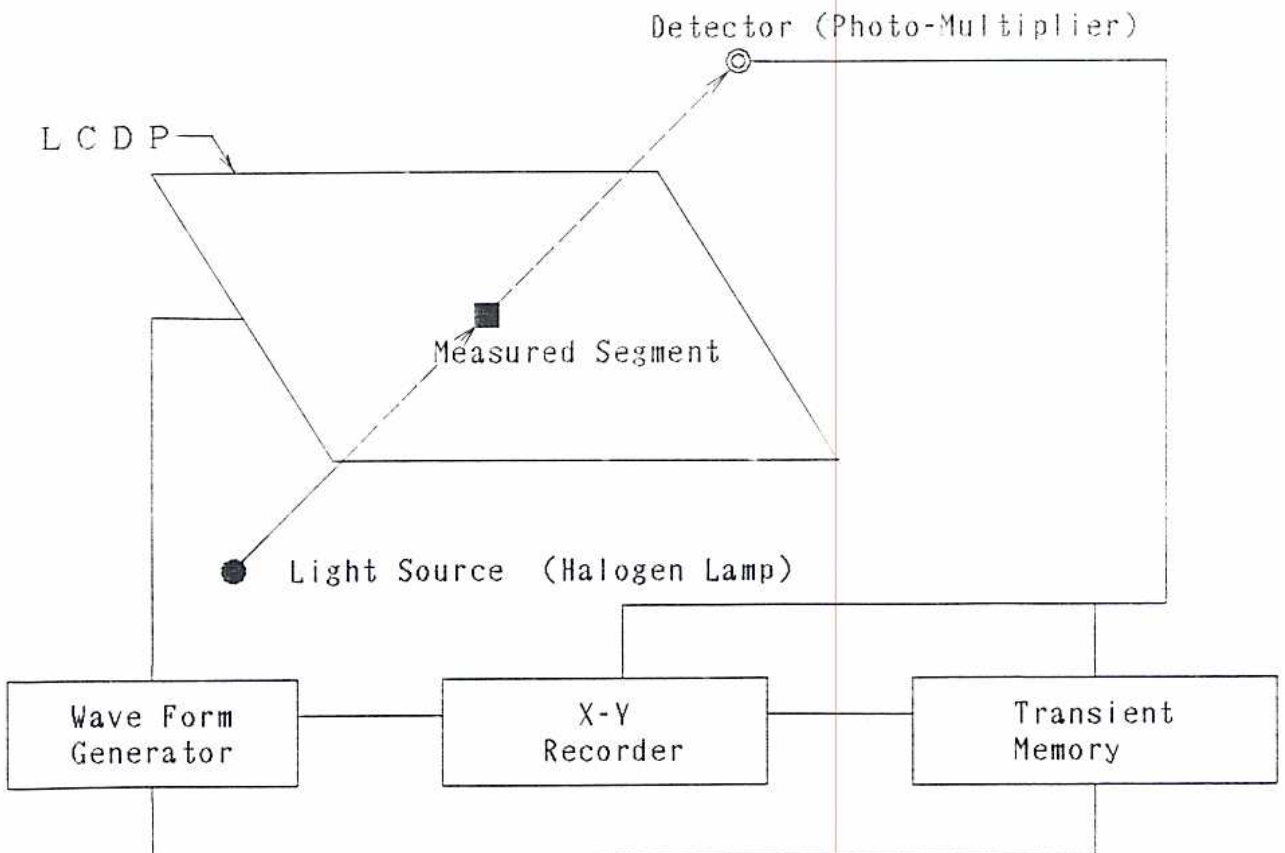
(2) Electro-Optical Characteristic Measuring Method

-1 Definition of Viewing angle

Viewing Opposite Direction (Z AXIS)

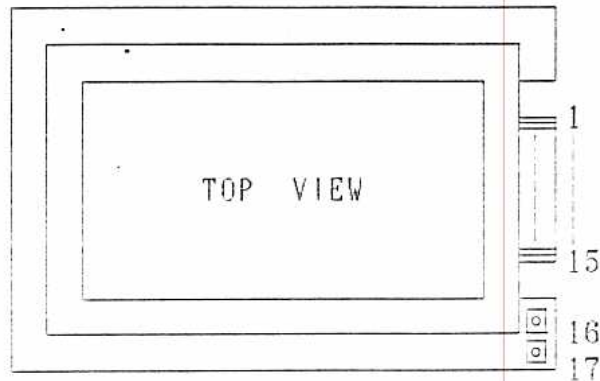


-2 Apparatus



7 I/O Terminals

(1) Pin No. Layout



(2) Pin Assignment

Pin No	SYMBOL	LEVEL	FUNCTION
1	N C	—	No Connection
2	N C	—	No Connection
3	N C	—	No Connection
4	DATA 2	H/L	Display Data(Lower) H:ON ,L:OFF
5	DATA 1	H/L	Display Data(Upper) H:ON ,L:OFF
6	F R	H→L	Frame Signal
7	D F	H/L	Alternate Signal for LCD Driving
8	L O	H→L	Data Latch Signal
9	C P	H→L	Clock Signal for Shifting Serial Data
10	V _{CC}	—	Power Supply for Logic
11	V _{SS}	—	Power Supply (GND)
12	V _{EE}	—	Power Supply for LCD Driving
13	N C	—	No Connection
14	N C	—	No Connection
15	N C	—	No Connection
16	EL 1	—	Electric Luminescent Terminal
17	EL 2	—	Electric Luminescent Terminal

8 E L

(1) Absolute Maximum Rating

Input Voltage. AC 150 V r m s

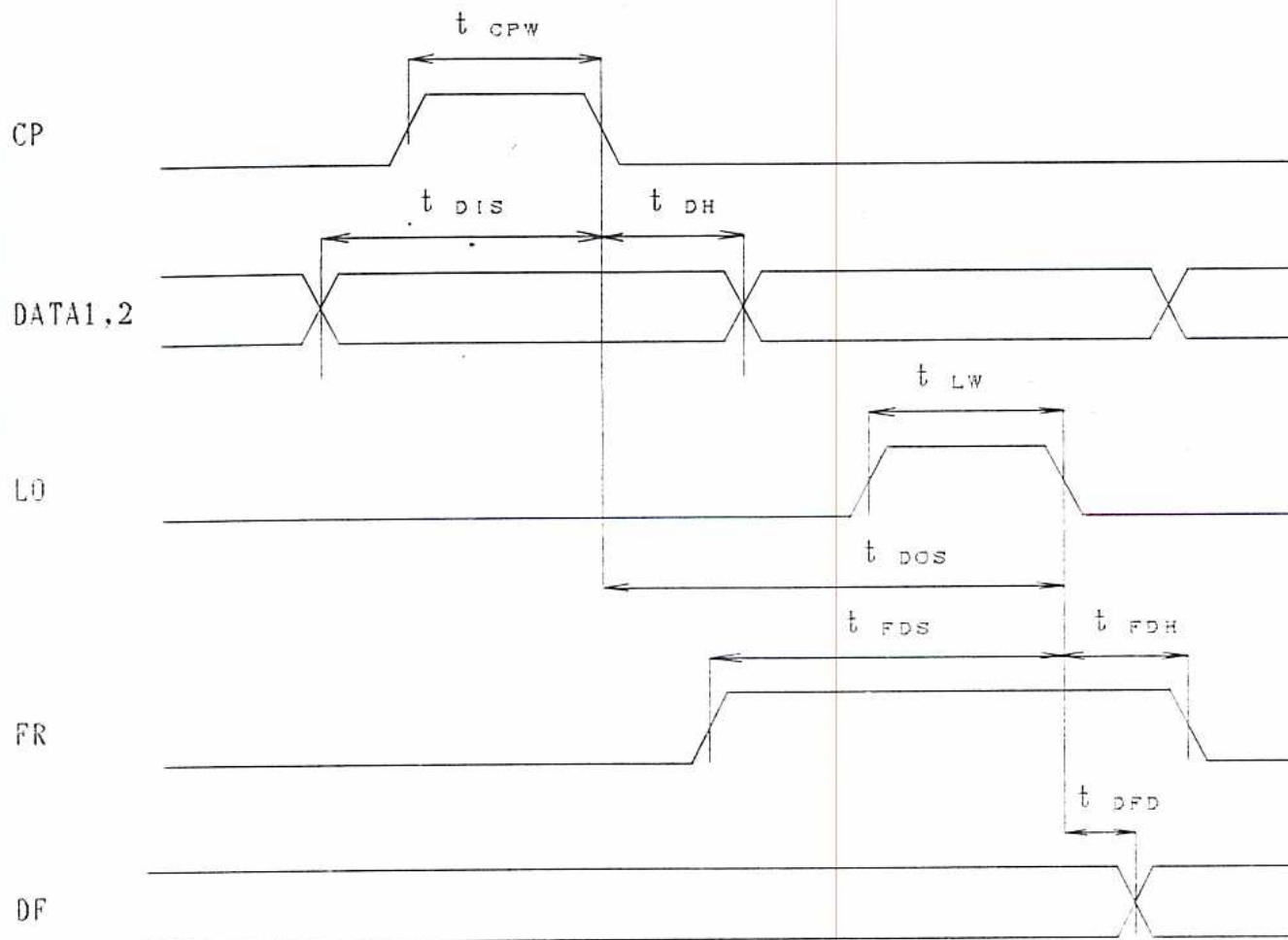
Input Frequency 1 K H z m a x

(2) Operating Characteristics

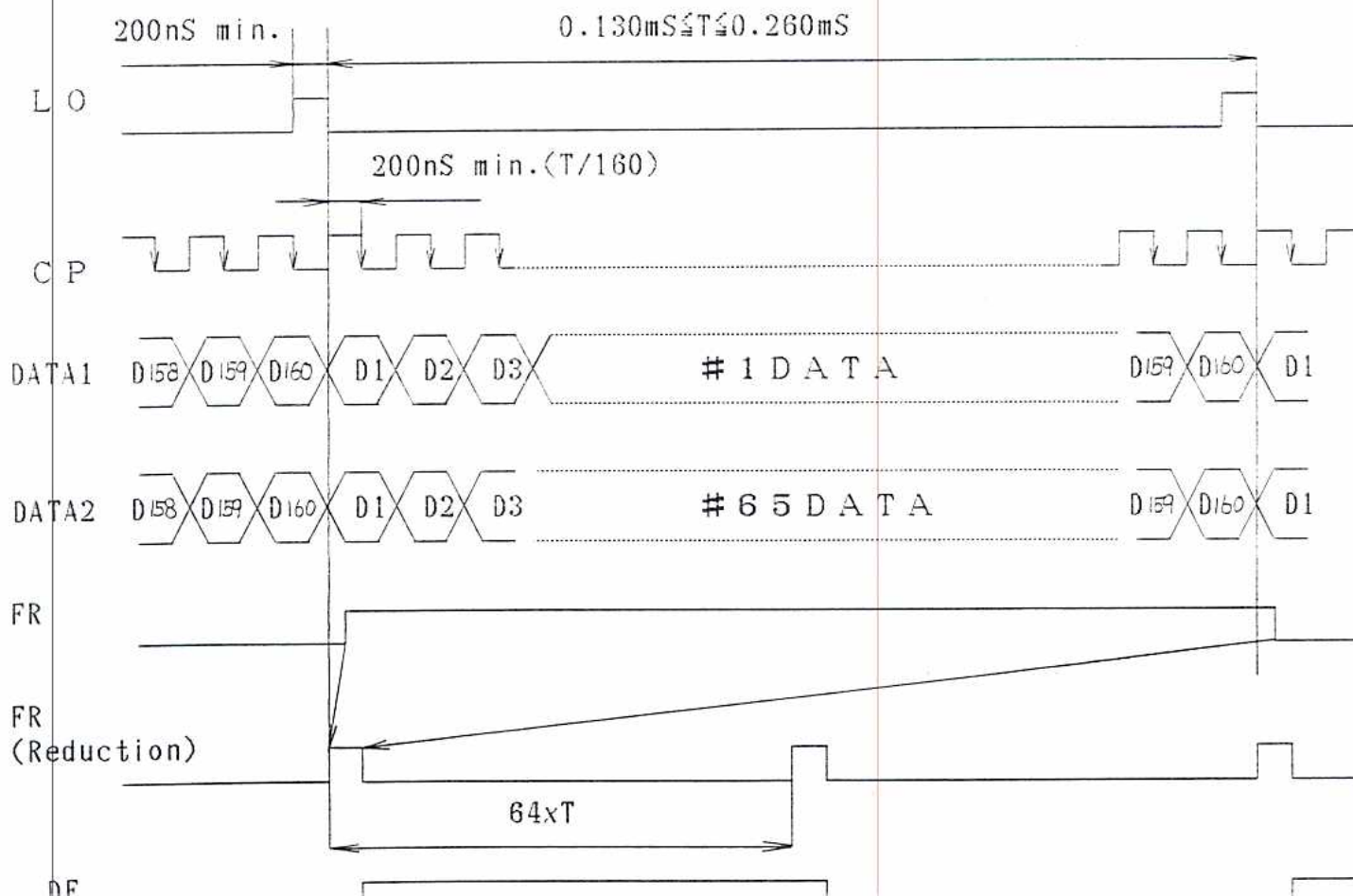
ITEM	CONDITION	MIN	TYP	MAX	UNIT
Input Voltage	—	—	1 0 0	—	V r m s
Input frequency	—	—	4 0 0	—	H Z
Current	100V, 400Hz	—	9 . 5	1 3	m A
Life	100V, 400Hz	1500	—	—	H r s
Operating Temp.	—	- 1 0	—	+ 5 0	°C
Storage Temp.	—	- 2 0	—	+ 6 0	°C

9 T i m i n g C h a r a c t e r i s t i c s

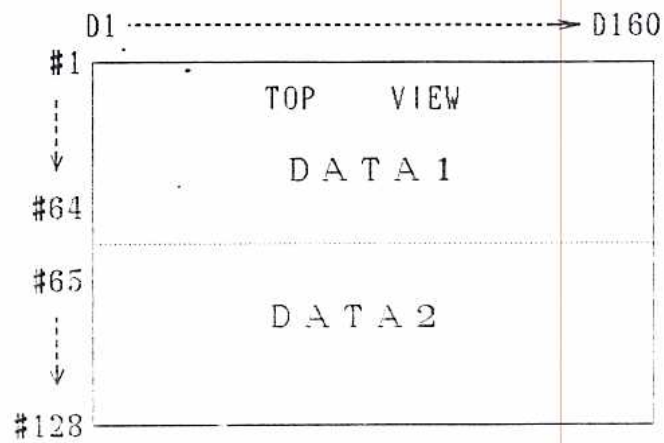
I T E M	SYMBOL	MIN.	MAX.	UNIT
Clock Cycle Time	t_{CPW}	2 0 0	—	n S
Clock High Level Width	t_{DHS}	2 0 0	—	n S
Clock Low Level Width	t_{DLH}	4 0	—	n S
Clock Set up Time	t_{LW}	5 0	—	n S
Clock Hold Time	t_{DHS}	5 6 0	—	n S
Data Set up Time	t_{FDS}	1 0 0	—	n S
Data Hold Time	t_{FDH}	8 0 0	—	n S
Frame Data Set up Time	t_{DFD}	—	1000	n S



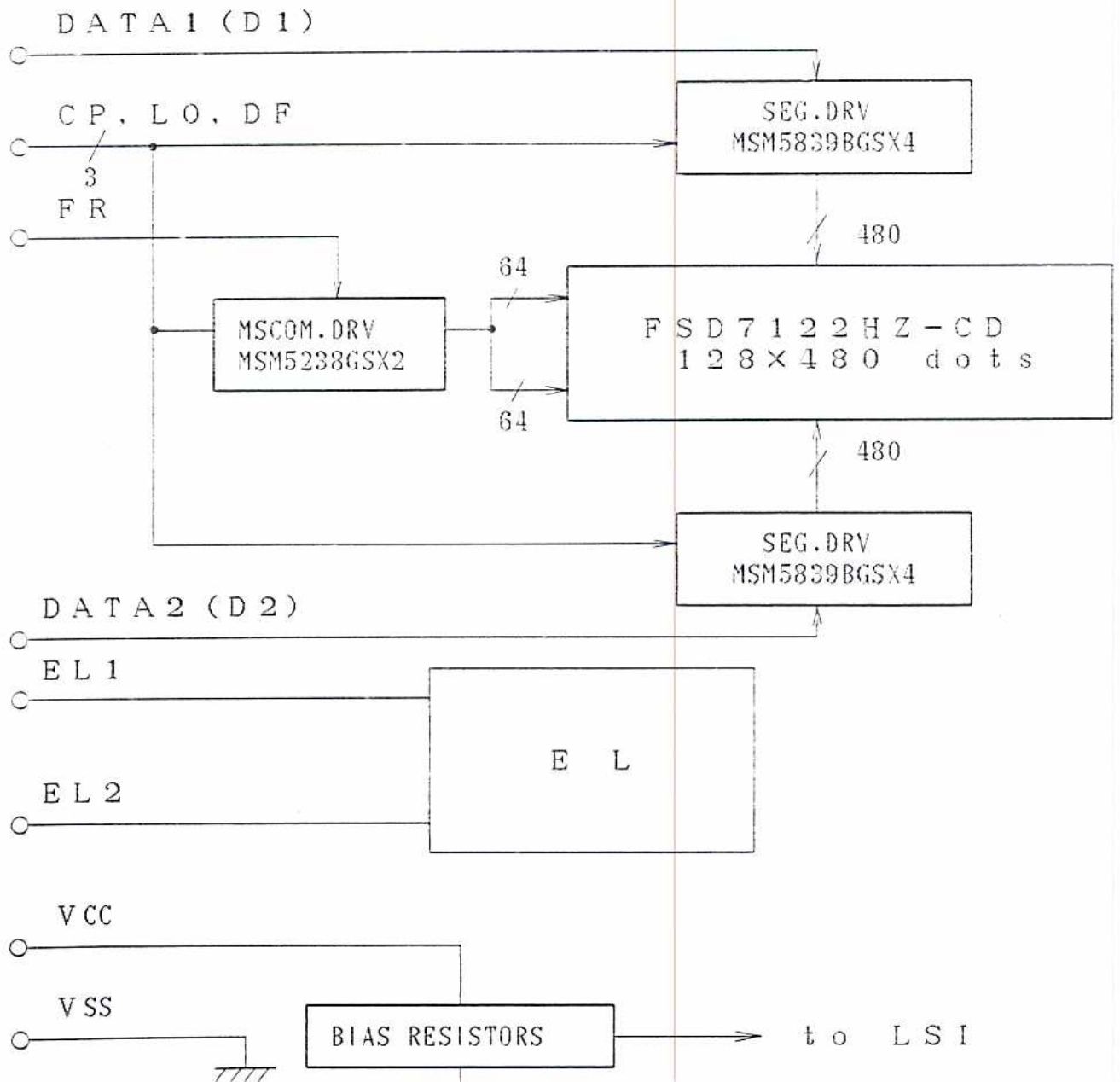
9 Timing Chart



10 Comparison of Display And Data



11 Block Diagram



1 2 Reliability (EXCEPT EL PANEL)

(1) Temperature Range

ITEM	SYMBOL	CONDITION	REGULATION
Operating Temperature Range	T _{opr}	-10℃ ~ +70℃	No change on display and in operation under the test conditions 13-(2)-1), 13-(2)-2).
Storage Temperature Range	T _{stg}	-20℃ ~ +75℃	No change on display and in operation under the test conditions 13-(2)-3), 13-(2)-4).

(2) Others

ITEM	CONDITION	REGURATION
Damp Proof	13-(2)-5)	No change on display and in operation under the test conditions.
Shock	13-(2)-6)	No change on display and in operation under the test conditions.
Vivration	13-(2)-7)	No change on display and in operation under the test conditions.(Note)

Note: Exept Polarizer

1 3 Test

(1)Test Condition

1) Temperature and Humidity

Unless specified otherwise, test will be conducted under the following condition.

Temperature : 20±5 °C

Humidity : 65±5 %

2) Operation

Unless specified otherwise, test will be conducted under functioning state.

3) Container

Unless specified otherwise, vibration and shock test will be conducted on the product itself without putting it in a container.

4) Test Frequency

In case of test related to deterioration such as shock test. It will be conducted only once.

(2) Test Method

1) High Temperature Operation

96 - 100 Hrs in an environment temperature $70 \pm 2 \text{ }^\circ\text{C}$ to be measured under same condition.

2) Low Temperature Operation

After storage of 96 - 100 Hrs in an environment of temperature $-10 \pm 2 \text{ }^\circ\text{C}$ to be measured under the same condition.

No dew to be found.

3) High Temperature Storage

To be measured after storage of 96 - 100 Hrs under non-operation state in an environment of temperature $75 \pm 2 \text{ }^\circ\text{C}$ and returned to normal temperature humidity.

4) Low Temperature Storage

To be measured after storage of 96 - 100 Hrs under non-operation state in an environment of $-20 \pm 2 \text{ }^\circ\text{C}$ and after storage of 4 Hrs in an environment of normal temperature and humidity. No dew to be found.

5) Damp Proof Test

To be measured after storage of 96 - 100 Hrs under temperature of $40 \pm 2 \text{ }^\circ\text{C}$ and 90-95 % humidity, then returned under normal temperature and humidity for 4 Hrs. No dew condensation to be found.

6) Shock Test (Drop Test)

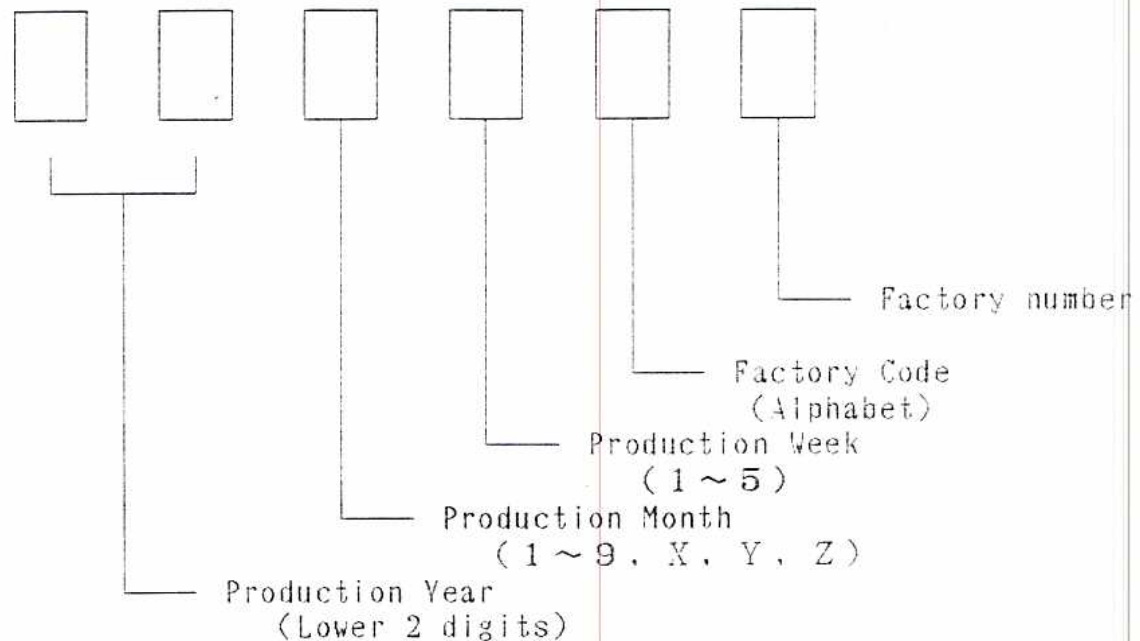
To be measured after dropping from 30cm high onto lauan board of 3cm thick and from 3 directions X, Y, Z, one time each. (Non-operation state).

7) Vibration Test

To be measured after subjecting to total fixed amplitude of 1.5mm, vibrating frequency of 10 to 55Hz, one cycle 60 seconds to 3 direction of X, Y, Z for each 15 minutes (Total 45 Minutes) and after removing vibration (Non-operation state).

14 Code System of Production Lot

The production lot of MODULE is specified on the back of PWB as follows:



Example: 8 7 3 4 R 1

15 Appearance

No defects such as stain, scratch, discoloration, weak soldering, which may spoil the appearance to be found on the LCDP surface on frontal side of holder/housing.

16 Functions

According to the regulation of functional inspection which is mutually agreed, every single piece is duly inspected.

17 Notice of Application

In case of the following, to be settled by mutual discussion.

- 1) when questions arise concerning items of this specifications.
- 2) when new problems arise not specified in this specifications.