

SPECIFICATION
OF
GRAPHIC TYPE DOT MATRIX LCD MODULE

FOR MESSRS.

OPTREX TYPE NO. : DMF612N

CLIENT TYPE NO. : _____

PREPARED BY OPTREX

APPROVED BY

ISSUED DATE :

OPTREX CORPORATION

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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. : DMP612N

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 64 dots vertical by 480 dots horizontal LCD screen by means of driving signals which are given by external 1-bit serial data and then decoded inside the module.

5 Outline Dimensions :

Refer to the attached outline dimensional drawing No. UE30666.

6 Performances

6-1 Mechanical Data

ITEM	DIMENSIONS	UNIT
MODULE DIMENSIONS	260 (W) × 58 (H) × 12 MAX (D)	mm
Active Viewing Area	225.54 (W) × 30.02 (H)	mm
Dot Pixels	480 (W) × 64 (H)	dots
Dot Size	0.41 (W) × 0.41 (H)	mm
Dot Pitch	0.47 (W) × 0.47 (H)	mm

(1) Absolute Maximum Rating

ITEM	SYMBOL	CONDITION	MIN.	MAX.	UNIT
Logic Supply Voltage	VCC-VSS	—	- 0.3	7	V
LCD Driving Voltage	VCC-VBE	—	+ 0.3	19	V
Input Voltage	V I	—	- 0.3	VCC+0.3	V
Operating Temp.	T o p r	—	0	+ 50	°C
Storage Temp.	T s t g	—	- 20	+ 60	°C

(2) Electrical Characteristics

I T E M	SYMBOL	CONDITION	MIN.	MAX.	UNIT
Logic Supply Voltage	VCC-VSS	—	4.5	5.5	V
LCD Supply Voltage	VSS-VBE	—	—	-11.5	V
Power Supply	I CC	—	—	15	mA
	I EE	—	—	20	mA
Input Voltage "H" Level	V IH	"High" レベル	0.7VCC	VCC	V
Input Voltage "H" Level	V IL	"Low" レベル	0	0.3VCC	V

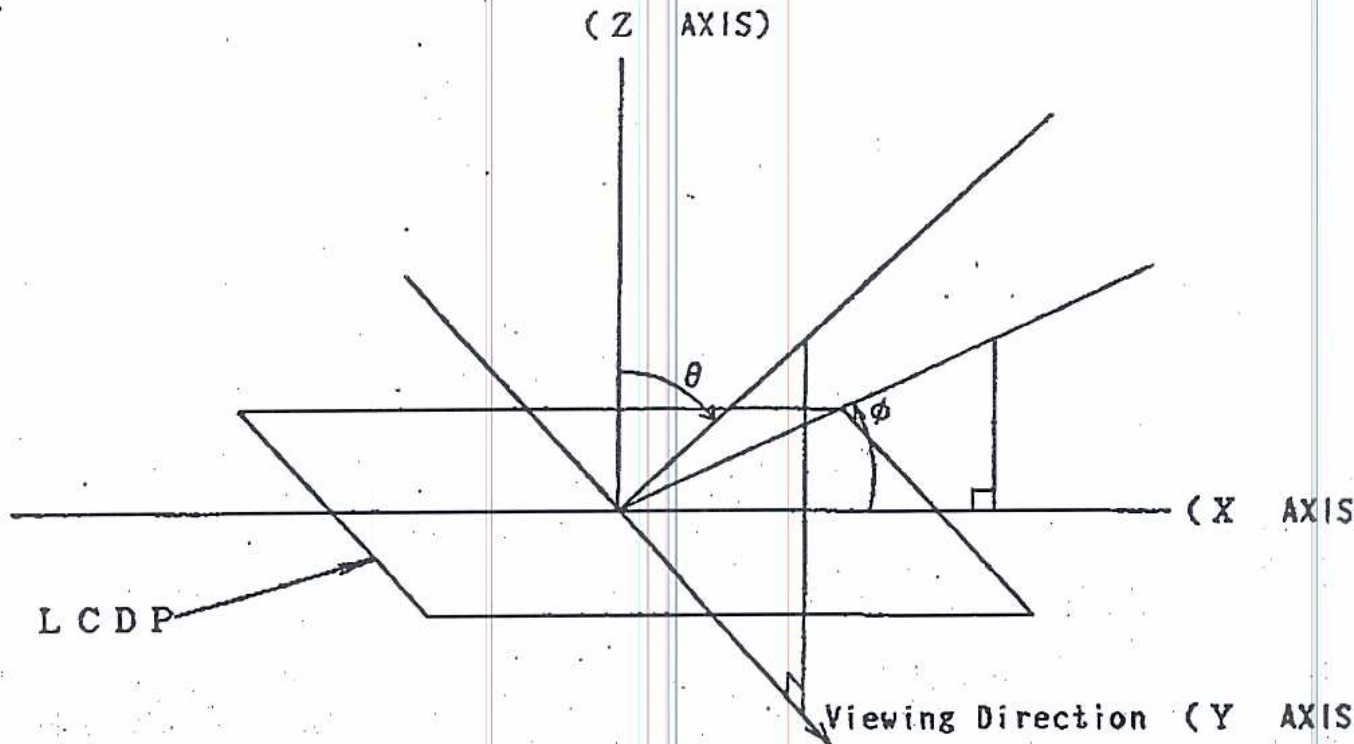
(1) Optical Specification

ITEM	SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	
LCD Driving Voltage (1/64Duty)	VCC -VEE	Ta =	0 °C	13.1	14.1	15.1	V	
		Ta =	25 °C	12.0	12.9	13.8	V	
		Ta =	50 °C	10.9	11.7	12.5	V	
Contrast ratio	CR	$\theta = 10^\circ \quad \phi = 90^\circ$		4	5	—	—	
Viewing Angle		CR ≥ 2	θ	— 10	—	20	deg	
			ϕ	45	90	135	deg	
Response Time	Rise	τ_r	Note 1	Ta=25 °C	—	120	200	mS
	Decay	τ_d	Note 2	Ta=25 °C	—	120	200	mS

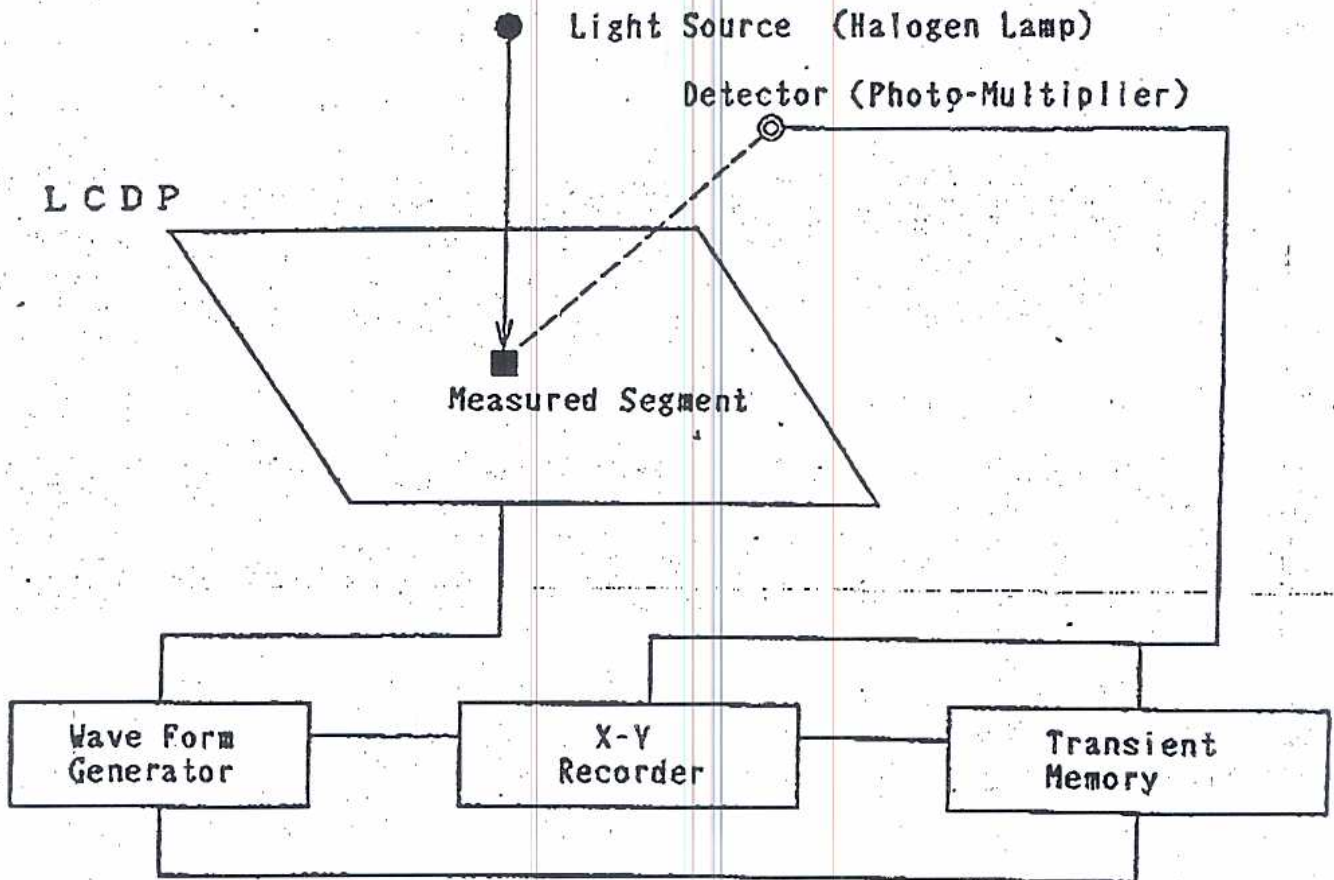
- Note 1: The time required which the blacking ratio of segment becomes 90% when waveform is switched to selected one from nonselected one.
- Note 2: The time required which the blacking ratio of segment becomes 10% when waveform is switched to selected one from nonselected one.

(2) Electro-Optical Characteristic Measuring Method

-1 Definition of Viewing angle

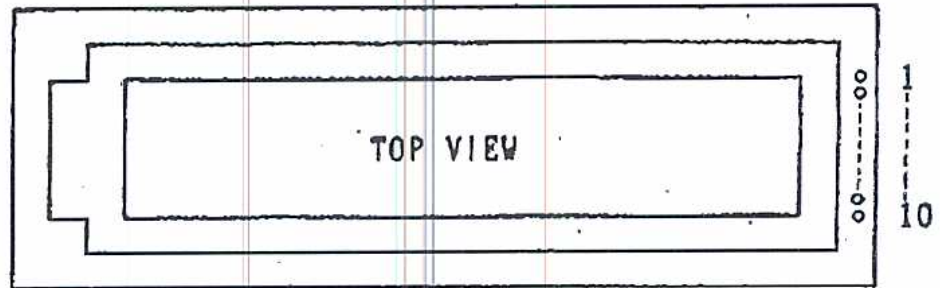


-2 Apparatus



7 I/O Terminals

(1) Pin No. Layout

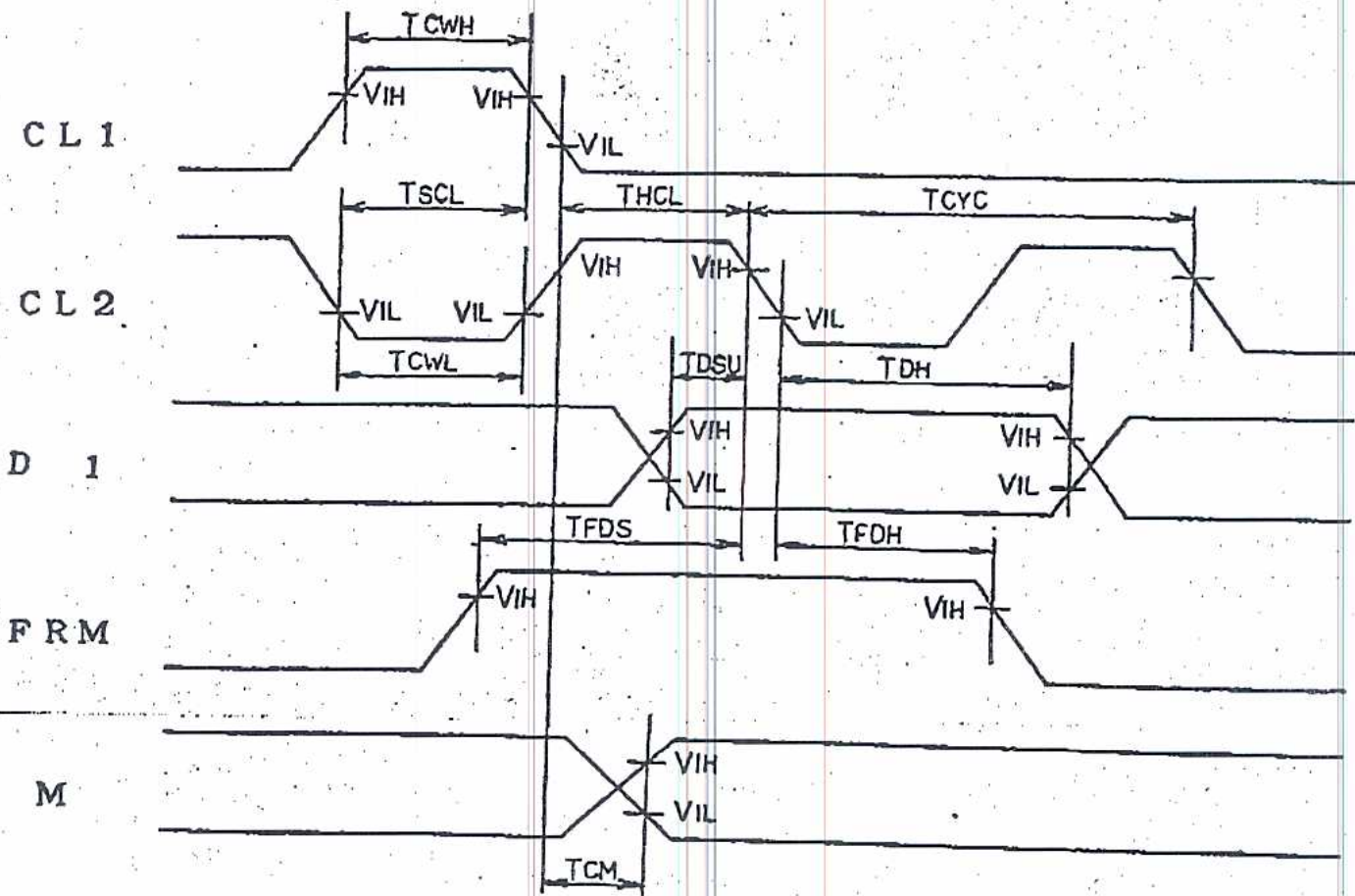


(2) Pin Assignment

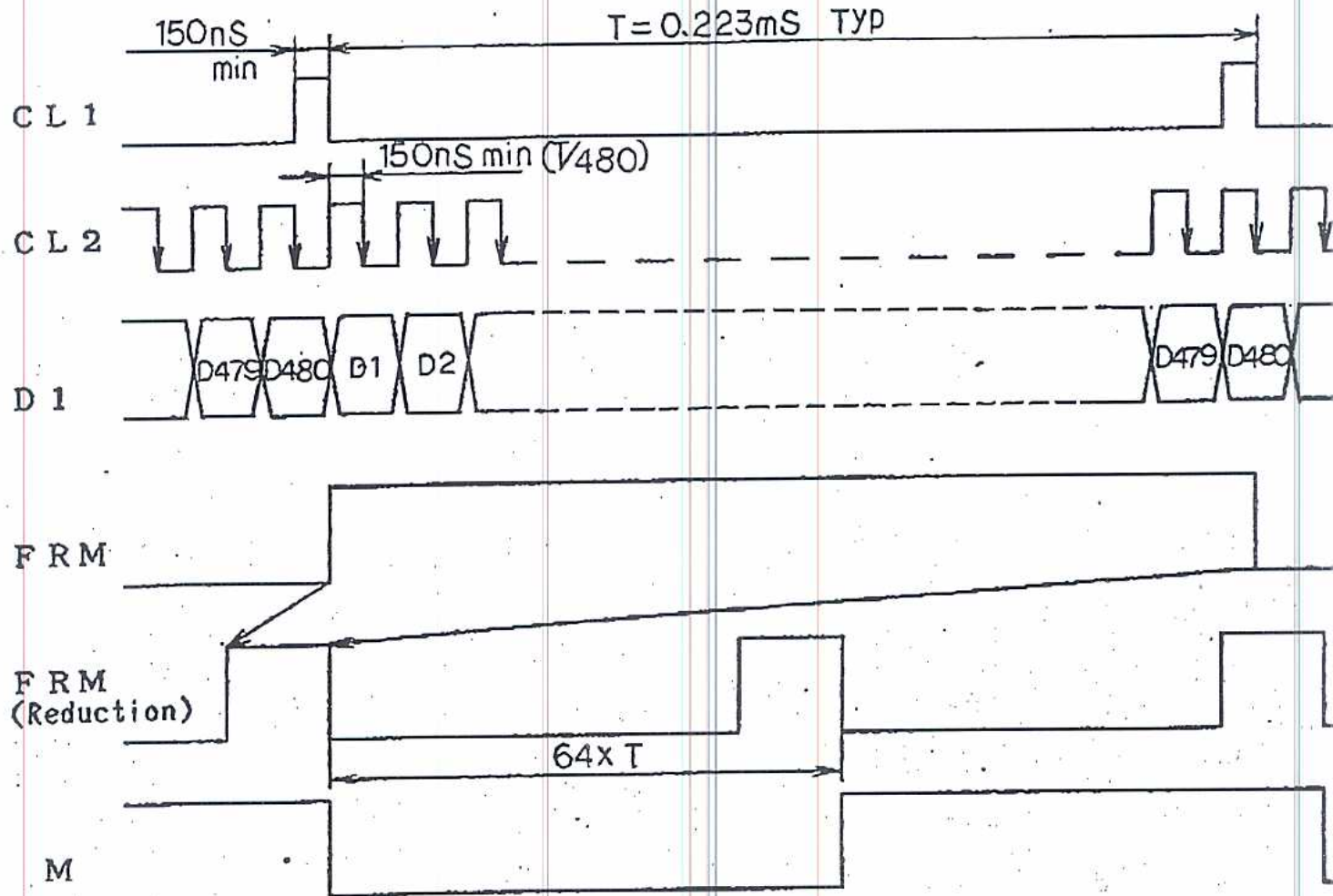
Pin No	SYMBOL	LEVEL	FUNCTION
1	D 1	H / L	Display data
2	FRM	H → L	Frame Signal
3	M	H / L	Alternate Signal for LCD Driving
4	CL 1	H → L	Data latch Signal
5	CL 2	H → L	Clock Signal for Shifting Serial Data
6	N C	—	No Connection
7	V C C	—	Power Supply for Logic
8	V S S	—	Power Supply (GND)
9	V E E	—	Power Suply for LCD Driving
10	N C	—	No Connection

8 Timing Characteristics

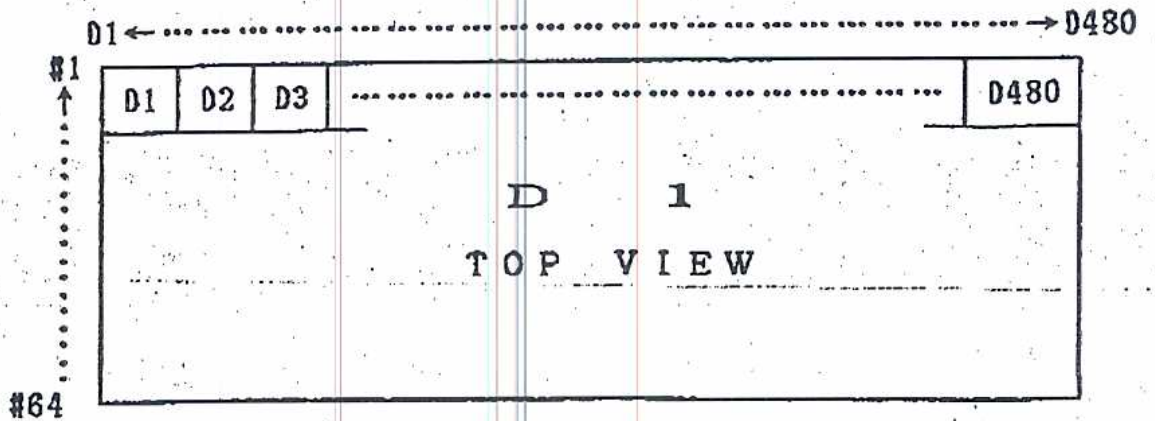
I T E M	SYMBOL	MIN.	MAX.	UN I T
Clock Cycle Time	T CYC	400	—	n S
Clock High Level Width	T CWH	150	—	n S
Clock Low Level Width	T CWL	150	—	n S
Clock Set up Time	T SCL	100	—	n S
Clock Hold Time	T HCL	100	—	n S
Data Set up Time	T DSU	80	—	n S
Data Hold Time	T DH	100	—	n S
Frame Data Set up Time	T FDS	100	—	n S
Frame Data Hold Time	T FDH	100	—	n S
M Signal Phase Shift Time	T CM	—	300	n S



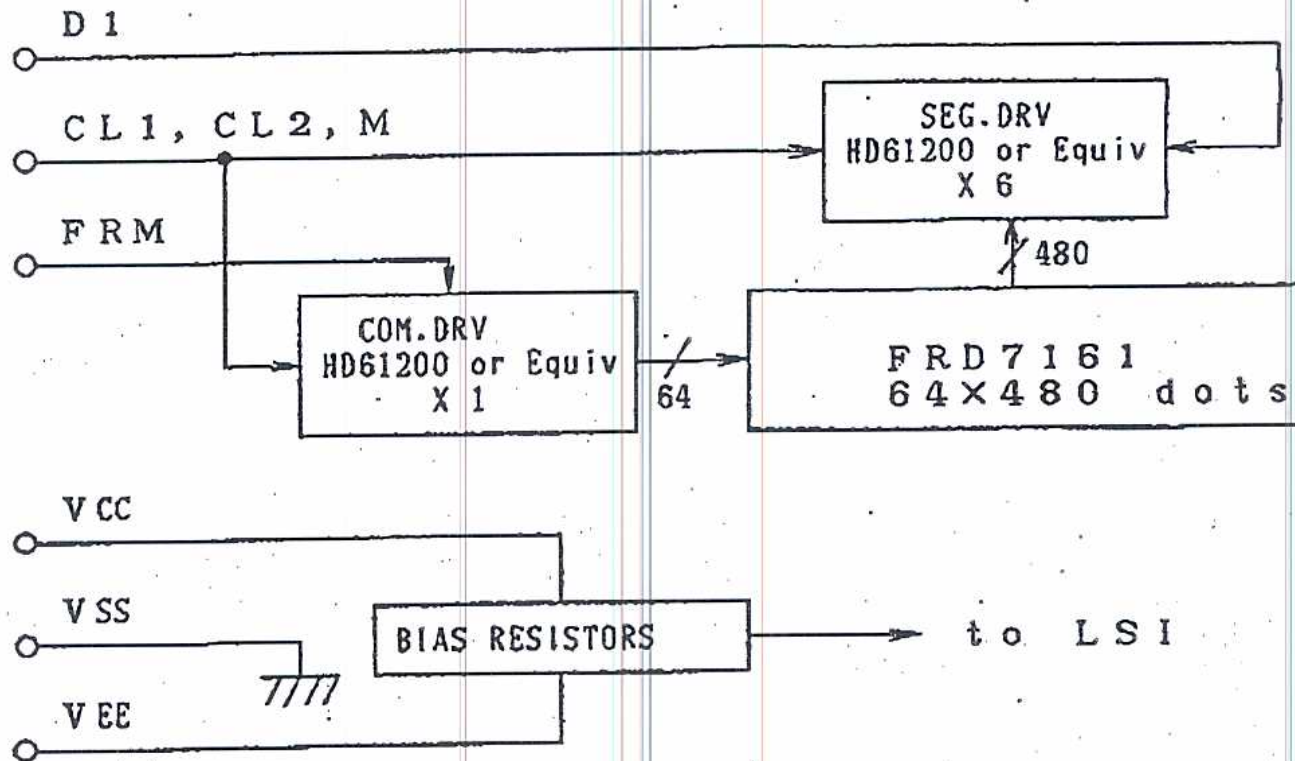
9 Timing Chart



10 Comparison of Display And Data



11 Block Diagram



12 Reliability

(1) Temperature Range

ITEM	SYMBOL	CONDITION	REGULATION
Operating Temperature Range	T _{opr}	0 °C ~ +50 °C	No change on display and in operation under the test conditions 13-(2)-1), 13-(2)-2).
Storage Temperature Range	T _{stg}	-20 °C ~ +60 °C	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

13 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 functional 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 50 ± 2 °C to be measured under same condition.
- 2) Low Temperature Operation
After storage of 96 - 100 Hrs in an environment of temperature 0 ± 2 °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 60 ± 2 °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 ± 2 °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 ± 2 °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 luan 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

