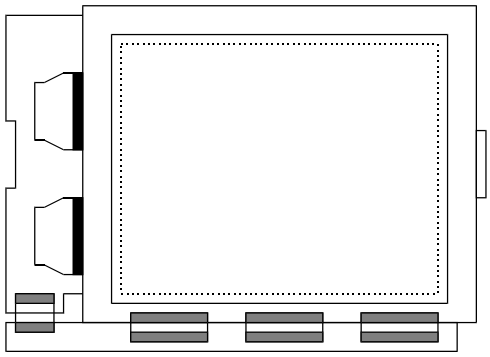
HANTRONIX

PRODUCT SPECIFICATION

HDM240192

240x192 GRAPHICS
LCD DISPLAY MODULE



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MECHANICAL DATA

(1) Part Name		
(2) Module Size	122.0 (W)mm x 92.0 (H)mm x MAX6.0 (D)mm	
(3) Dot Size	0.33 (W)mm x 0.33 (H)mm	
(4) Dot Pitch	0.36 (W)mm x 0.36 (H)mm	
(5) Number of Dots	240 (W) x 192 (H)Characters	
(6) Duty	1/192	
(7) LCD Display Mode	STN: ☐ Gray Mode ☐ Yellow Mode ☐ Bule Mode	
	FSTN: ☐ Black and White(Normal White/Positive image)	
	☐ Black and White(Normal Black/Negative Image)	
	Rear Polarizer: ☐ Reflective ☐ Transflective ☐ Transmissive	
	☐ High Transmissive	
(8) Viewing Direction	☐ 6 O'clock ☐ 12 O'clock ☐____O'clock	
(9) Weight	42g	

ABSOLUTE MAXIMUM RATINGS

(1) ELECTRICAL ABSOLUTE RATINGS

Vss=0 V

ITEM	SYMBOL	MIN	MAX	UNIT	COMMENT
Power Supply for Logic	VDD−VSS	−0.3	6.0	V	
Power Supply for LCD	VDD−VEE	0	30.0	V	
Input Voltage	VI	VSS	VDD	V	
Static Electricity	−	−	−	−	Note 1

Note 1 LCM should be grounded during handling LCM.

(2) ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE	
	MIN.	MAX.	MIN.	MAX.
Ambient Temperature	0	50	−20	70
Humidity (Without Condensation)	Note 1,3		Note 2,3	

Note 1 Ta ≦ 50°C : 85%RH max
Ta > 50°C : Absolute humidity must be lower than the humidity of 85%RH at 50°C

Note 2 Ta at −20°C will be < 48hrs, at 70°C will be < 120hrs

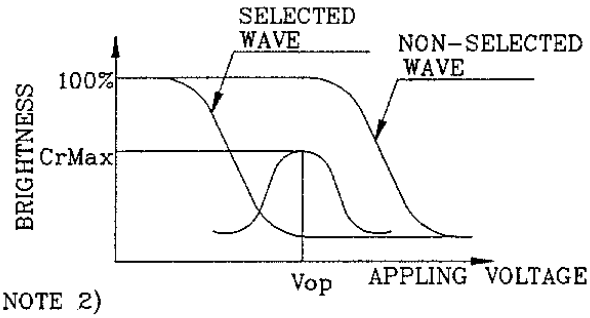
Note 3 Background color changes slightly depending on ambient temperature. This phenomenon is reversible.

ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT
Logic Circuit Power Supply	VDD−VSS	−		4.75	5.0	5.25	V
LCM Recommand LCD Module Driving Voltage	VDD−VO	VDD = 5V 1/13 Bias	0°C	−	21.3	22.1	V
			25°C	19.2	20.2	20.7	
			50°C	18.6	19.1	−	
Input Voltage	VIH	H level		0.8VDD	−	VDD	V
	VIL	L level		VSS	−	0.2VDD	V
Supply Current for Logic	IDD	VDD = 5.0V		−	3.5	−	mA
Supply Current for LCD	IEE	VDD−VO=20.2V		−	2.0	−	mA

(NOTE 1)

Definition of Operation Voltage(Vop)



*Conditions

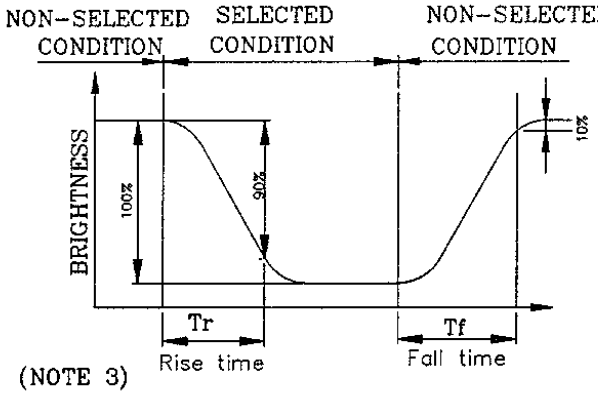
Viewing Angle : 0

Frame Frequency: 70Hz

Appling Waveform: 1/N duty 1/a bias

(NOTE 2)

Definition of Response Time(Tr,Tf)



*Conditions

Operating Voltage: Vop

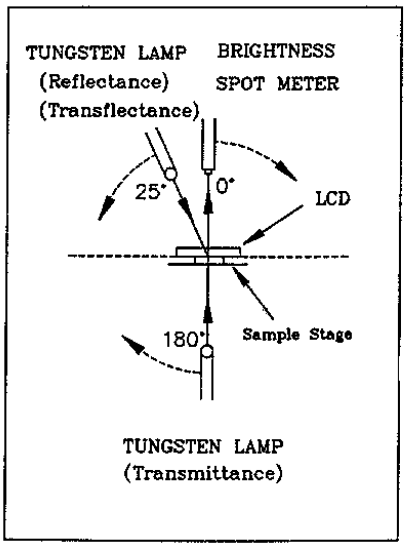
Viewing Angle: 0

Frame Frequency: 70Hz

Appling Waveform: 1/N duty 1/a bias

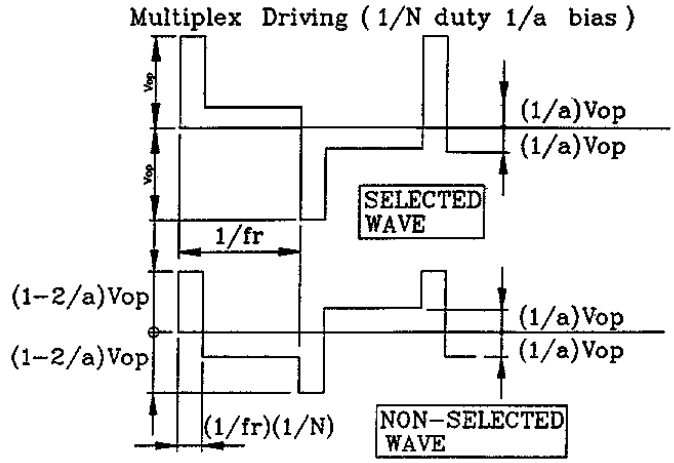
(NOTE 3)

Description of Measuring Equipment and Driving Waveforms



CONST.
TEMP.
CHAMBER

Multiplex Driving (1/N duty 1/a bias)



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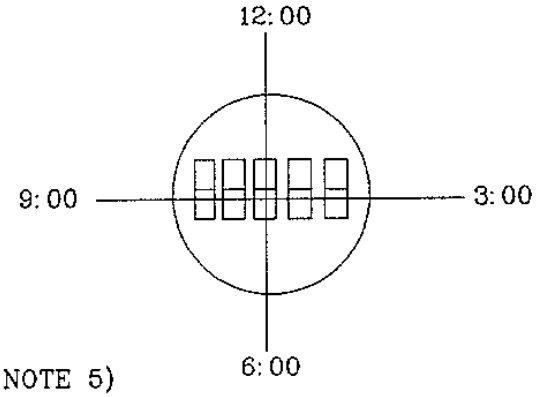
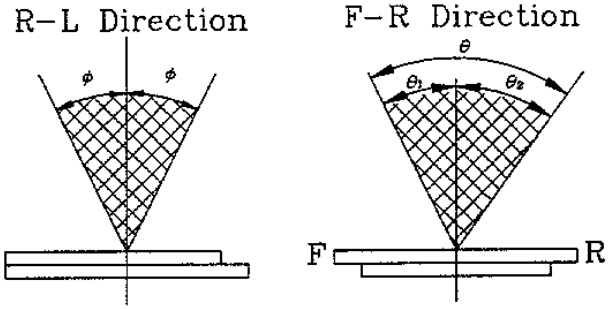
(NOTE 4)

Definition of Viewing Direction



(NOTE 5)

Definition of Viewing Angle

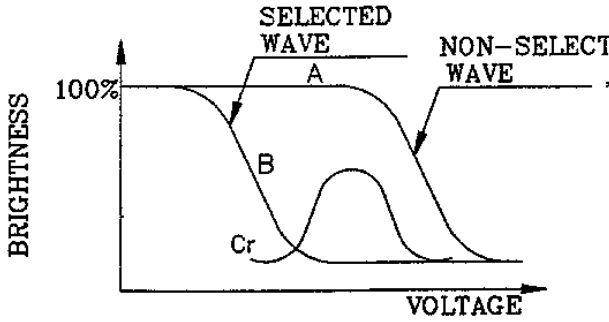


*Conditions
Operating Voltage: Vop
Frame Frequency: 70Hz
Appling Waveform: 1/N duty 1/a bias

$\theta = \theta_1 + \theta_2$

(NOTE 6)

Definition of Contrast Ratio (Cr)



*Conditions
Viewing Angle : 0
Frame Frequency: 70Hz
Appling Waveform: 1/N duty 1/a bias

Contrast Ratio : Cr=A/B

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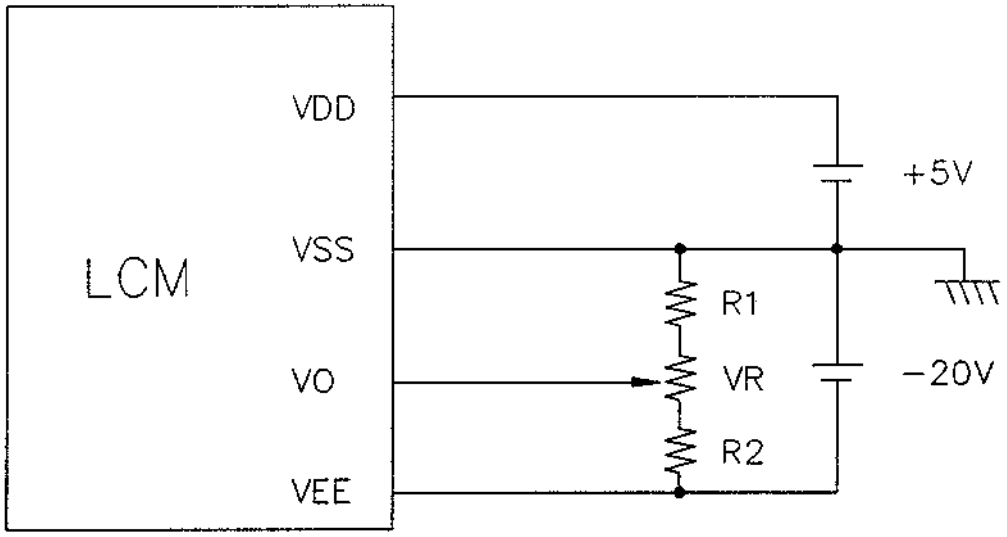
POWER SUPPLY



R1+VR+R2=10K~20K

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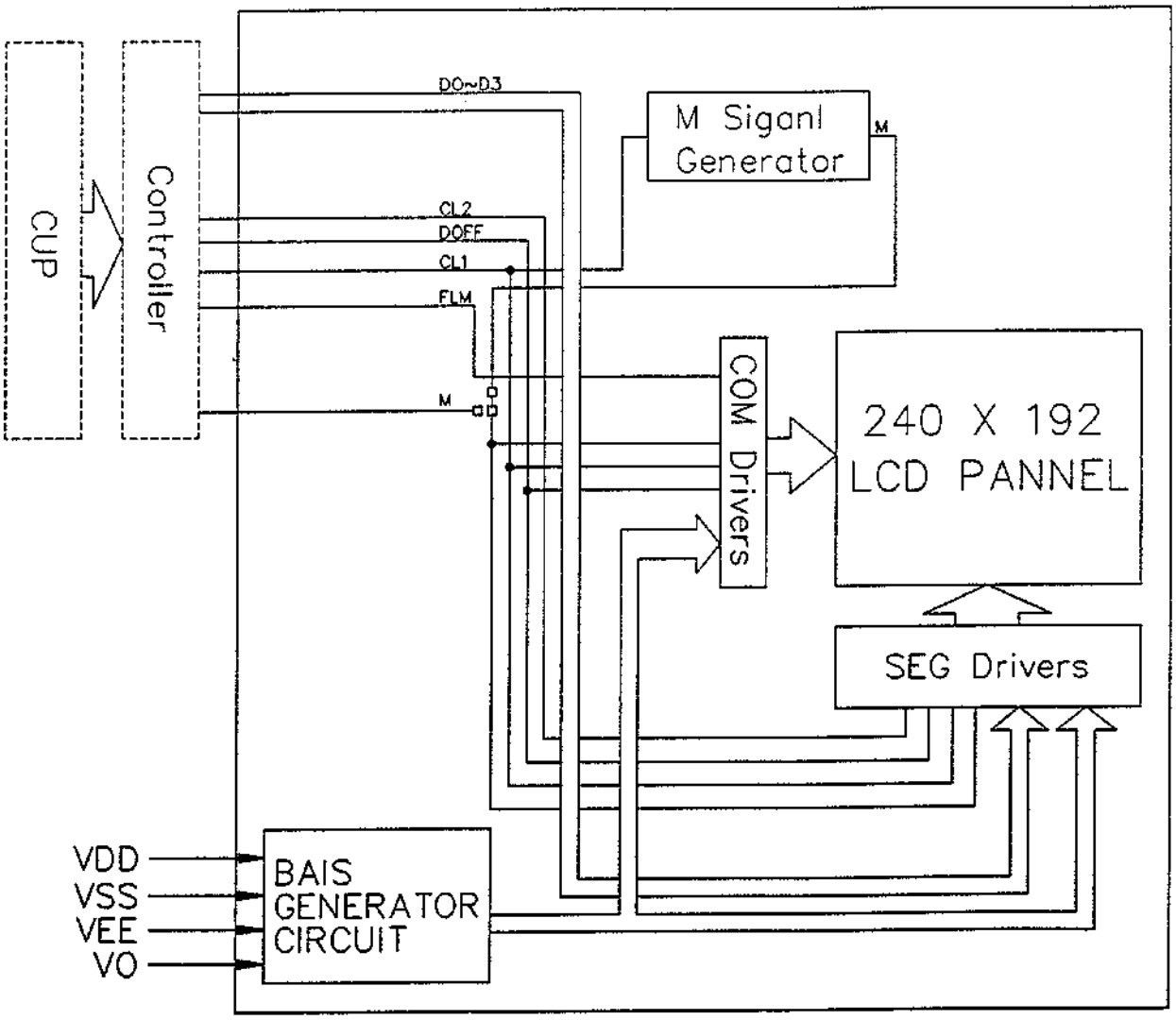
BLOCK DIAGRAM



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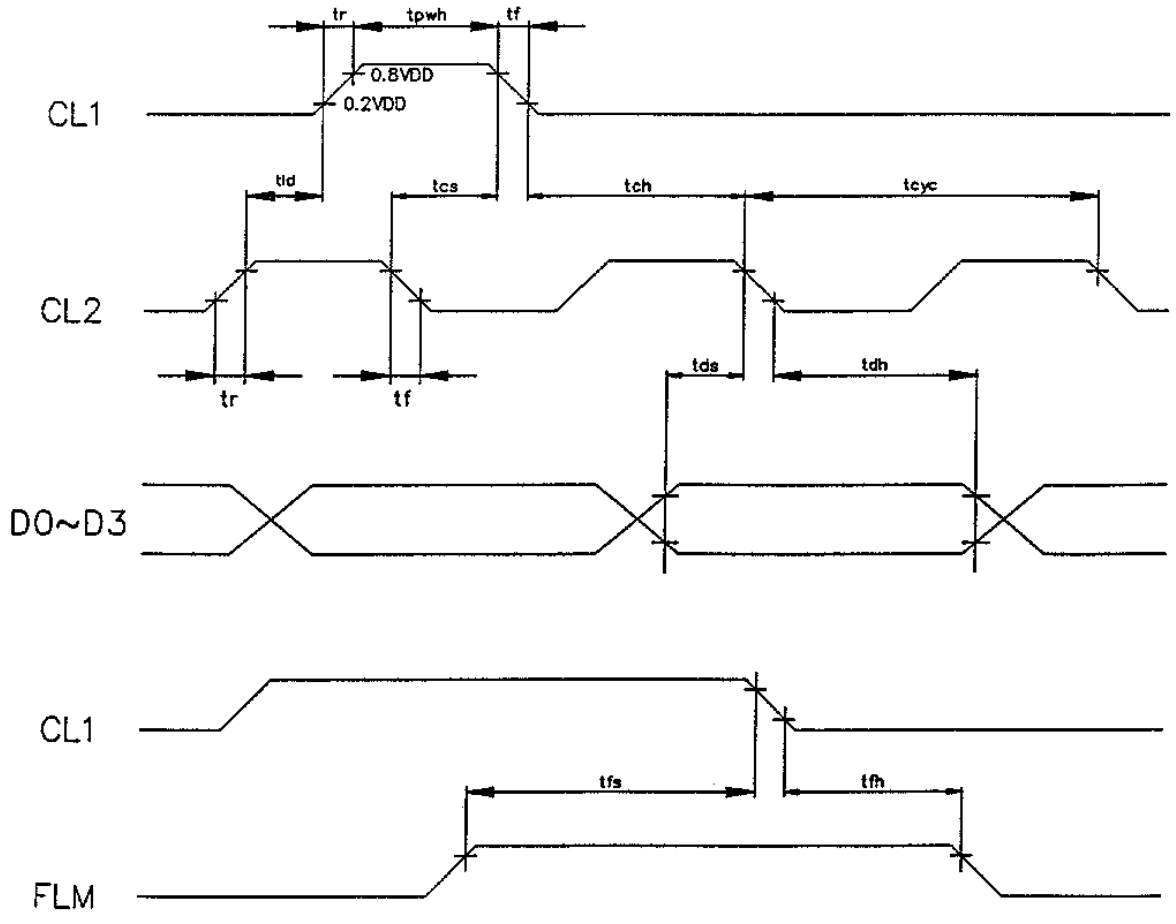
INTERNAL PIN CONNECTION

Pin No.	Symbol	Function
1	FLM	FRAME SIGNAL
2	CL1	DATA LATCH SIGNAL
3	CL2	DATA SHIFT SIGNAL
4	DOFF	DISPLAY H: ON/L: OFF
5	VDD	POWER SUPPLY FOR LOGIC
6	VSS	POWER SUPPLY (GND)
7	VO	OPERATING VOLTAGE LCD
8	D0	DISPLAY DATA
9	D1	
10	D2	
11	D3	
12	VEE	POWER SUPPLY FOR LCD
13	M	LCD DRIVE SIGNAL
14	NC	NO CONNECTION
15	NC	NO CONNECTION

connector : 53261-1590(MOLEX)

TIMING CHARACTERISTICS

Item	Symbol	Min.	Typ.	Max.	Unit
Clock cycle time	tcyc	160	–	–	ns
High level pulse width	tpwh	125	–	–	ns
Latch delay time	tld	80	–	–	ns
Clock set up time	tcs	80	–	–	ns
Clock hold time	tch	120	–	–	ns
Rise and fall time	tr,tf	–	–	30	ns
Data set up time	tds	60	–	–	ns
Data hold time	tdh	60	–	–	ns
FLM set up time	tfs	100	–	–	ns
FLM hold time	tfh	100	–	–	ns



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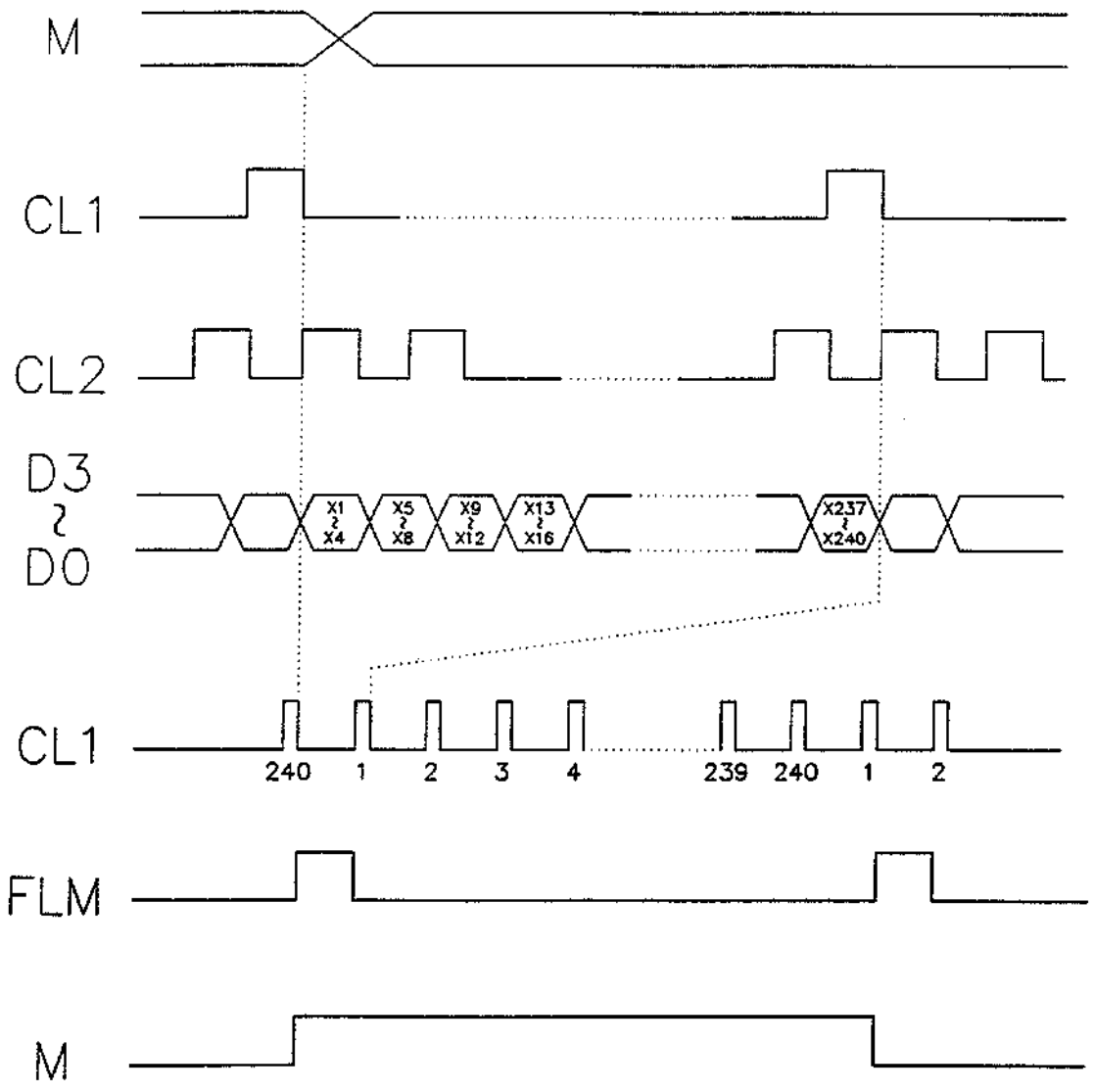
INTERFACE TIMING CHART



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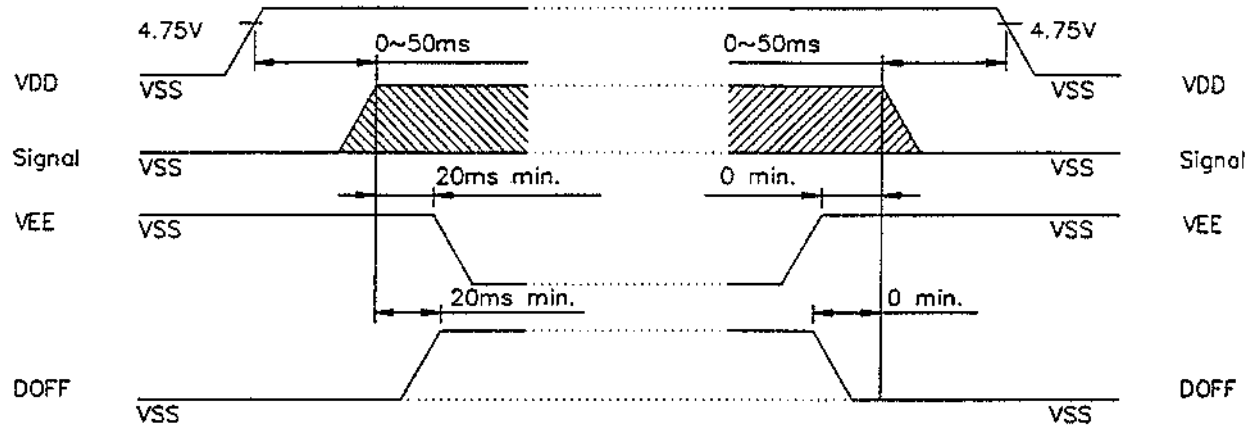
POWER ON/OFF TIMING



The missing pixels may occur when the LCM is driven beyond above power interface timing sequence.

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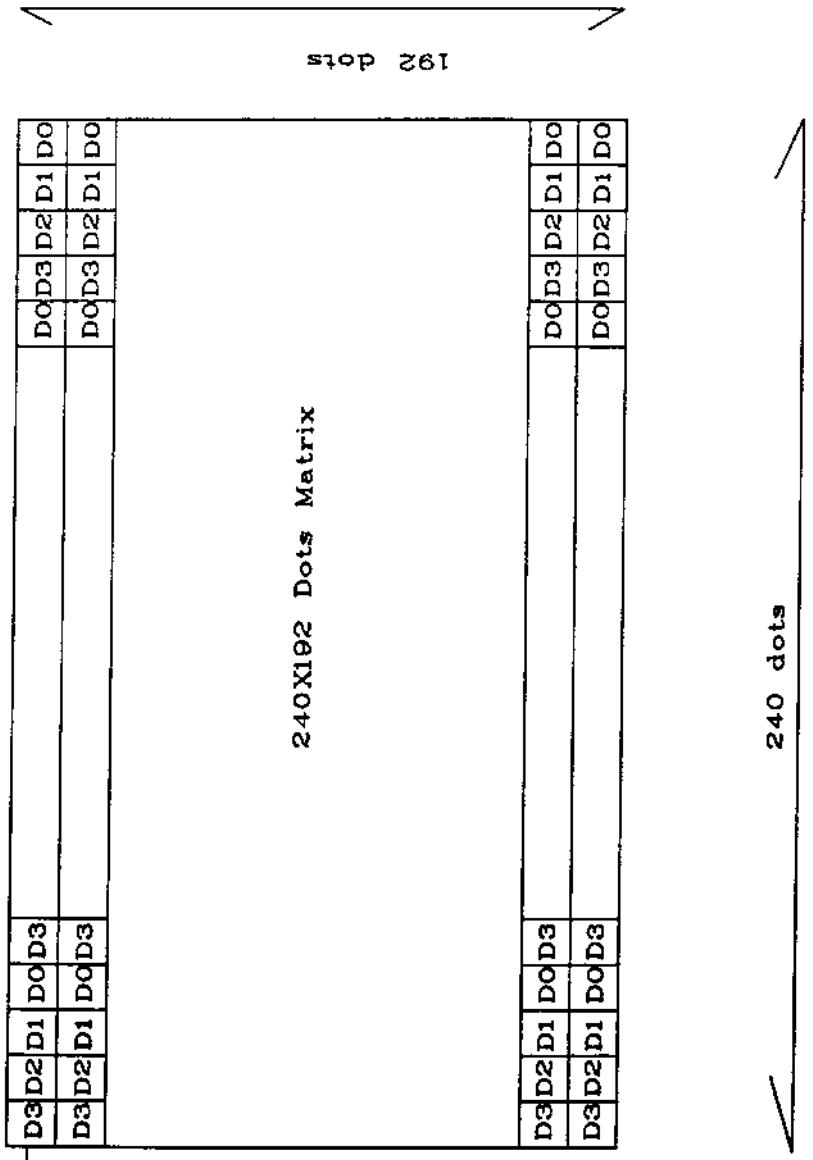
DISPLAY PATTERN



Startting dot for the starting address of display RAM.

D0~D3 are 4 bits transmitted data, where D0 is LSB and D3 is MSB.

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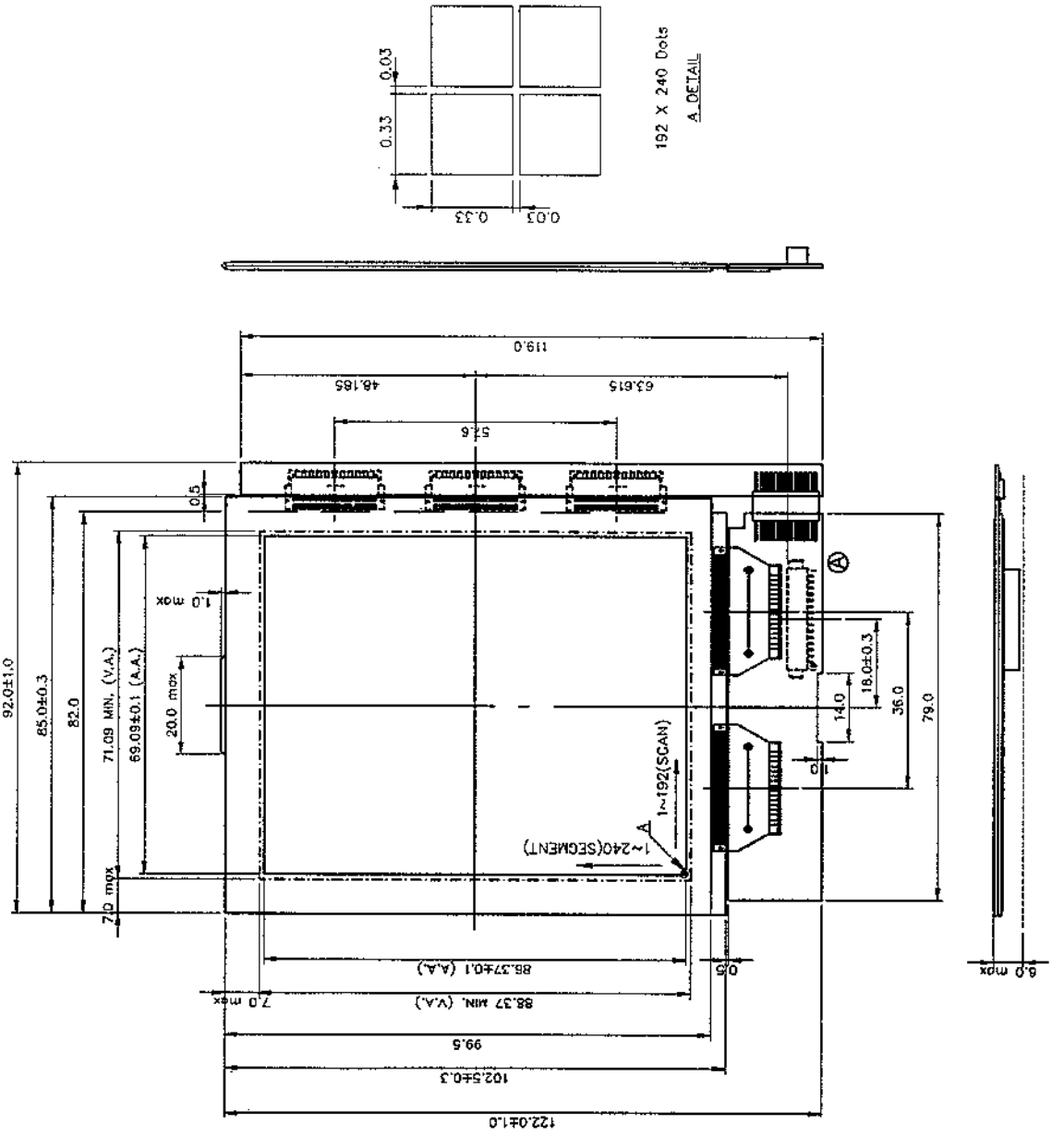

Ⓐ INTERFACE CONNECTOR
(15 pins, PITCH1.25mm)
53261-1590 (MOLEX)

Pin No.	Symbol	Description
1	FLM	Frame Signal
2	CL1	Data Latch Signal
3	CL2	Data Shift Signal
4	DOFF	Display H: ON/L: OFF
5	VDD	Power Supply For Logic
6	VSS	Power Supply (GND)
7	VO	Operating Voltage LCD
8	D0	Display Data
9	D1	
10	D2	
11	D3	
12	VEE	Power Supply For LCD
13	M	LCD Drive Signal
14	NC	NO CONNECTION
15	NC	NO CONNECTION

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