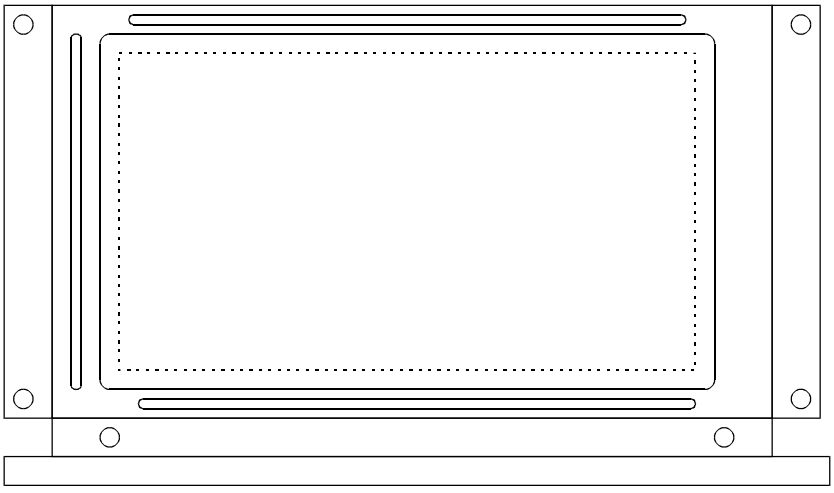
HANTRONIX

PRODUCT SPECIFICATION

HDM128GS24-1

240 x 128 GRAPHICS
LCD DISPLAY MODULE



HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	**Q.A.:** JB	**REV.:** 1.0	HDM128GS24-1	SHEET 1 OF 10 **DATE:** 12/12/97

1. MECHANICAL DATA

(1) Part Name	
(2) Module Size	170.0 (W)mm x 102.0 (H)mm x MAX 14.0 (D)mm
(3) Dot Size	0.47 (W)mm x 0.47 (H)mm
(4) Dot Pitch	0.5 (W)mm x 0.5 (H)mm
(5) Number of Dots	240 (W) x 128 (H)Dots
(6) Duty	1/128
(7) LCD	Normally Black, Negative Type
(8) Viewing Direction	6 O'clock
(9) LCD Controller	BUILT-IN T6963C (TOSHIBA)
(10) Recommended FL Inverter	TDK CORP. CXA-L10L OR CXA-L10L-F
(11) Backlight	CCFT
(12) Weight	226.5 g

2. ABSOLUTE MAXIMUM RATINGS

(1) ELECTRICAL ABSOLUTE RATINGS

Vss=0 V: Standard

ITEM	SYMBOL	MIN	MAX	UNIT	COMMENT
Power Supply for Logic	VDD−VSS	0	7.0	V	
Power Supply for LC Drive	VDD−VEE	0	24.0	V	
Input Voltage	VI	VSS	VDD	V	
FL Driving Voltage	VFL	0	1500	Vrms	
FL Input Current	IFL	−	10.0	mArms	
Static Electricity	−	−	−	−	Note 1

Note 1 LCM should be grounded during handling LCM.

(2) ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

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

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 < 120 hrs

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

3. ELECTRICAL CHARACTERISTICS

Ta=25°C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Logic Circuit Power Supply	VDD-VSS	-	4.75	5.0	5.25	V
LCD Driver Power SupplY	VDD-VEE	-	17.05	17.8	18.55	V
Input Voltage	VIH	H level	0.7VDD	-	VDD	V
	VIL	L level	VSS	-	0.3VDD	V
Power Consumption Power Supply	Pd	VDD = 5.0V VEE = -15V	-	-	180	mW
Supply Current (LCD)	IDD	VDD = 5.0V VEE = -15V	-	-	18.0	mA
	IEE		-	-	6.0	
FL Staring Voltage	VFLS	0°C	900	-	-	Vrms
FL Driving Frequency	fFL	-	15	30	50	KHZ

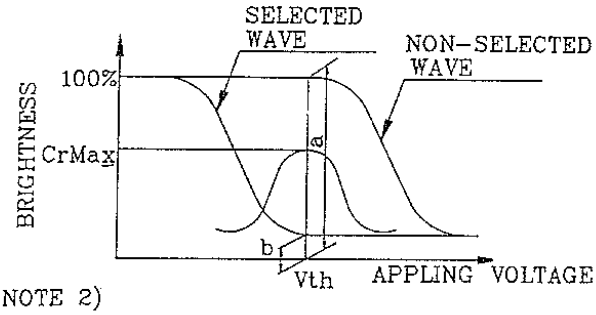
4. OPTICAL CHARACTERISTICS

Ta=25°C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Viewing Angle	θ	Cr ≧ 2.0	50	-	-	deg	NOTE 5
	ϕ		-	-	±40		
Contrast Ratio	Cr	ϕ=0°, θ=0°	10	-	-		NOTE 6
Response Time (rise)	Tr	ϕ=0°, θ=0°	-	200	500	ms	NOTE 2
Response Time (fall)	Tf	ϕ=0°, θ=0°	-	150	300	ms	

(NOTE 1)

Definition of Operation Voltage(Vop)



*Conditions

Viewing Angle(a1): 90

Frame Frequency: 70Hz

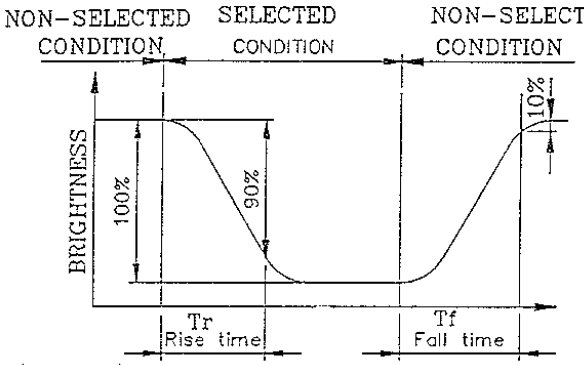
Appling Waveform: 1/N duty 1/a bias

SELECTED WAVEFORM

Vop=VDD-VEE

(NOTE 2)

Definition of Response Time(Tr,Tf)



*Conditions

Operating Voltage: Vth

Viewing Angle(a1): 90

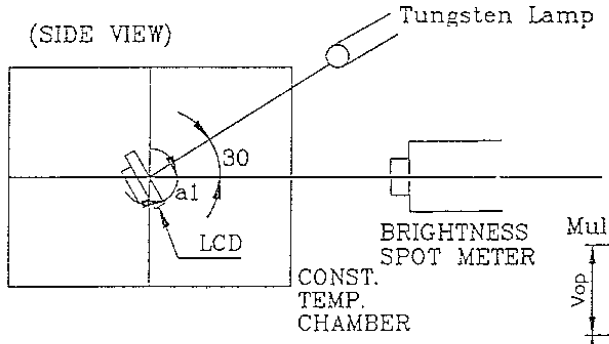
Frame Frequency: 70Hz

Appling Waveform: 1/N duty 1/a bias

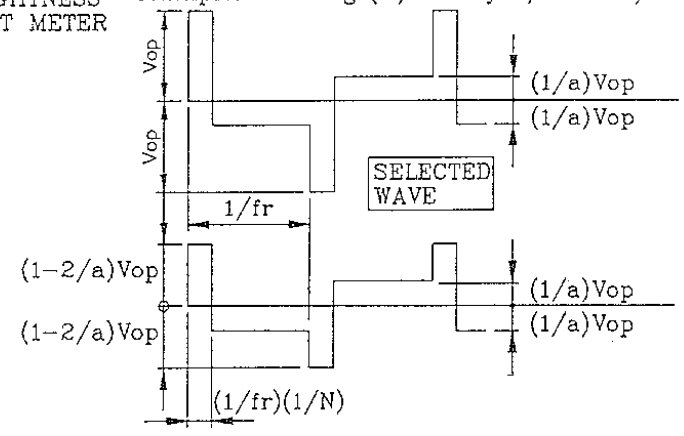
SELECTED WAVEFORM

(NOTE 3)

Description of Measuring Equipment and Driving Waveforms



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



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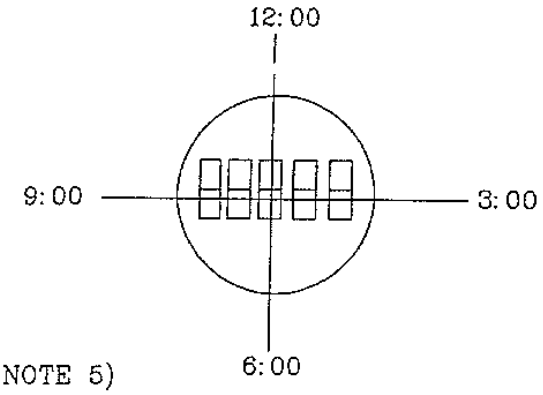
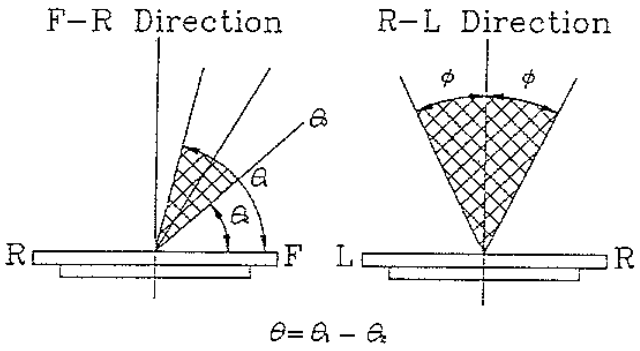
(NOTE 4)

Definition of Viewing Direction



(NOTE 5)

Definition of Viewing Angle(a1,b1)

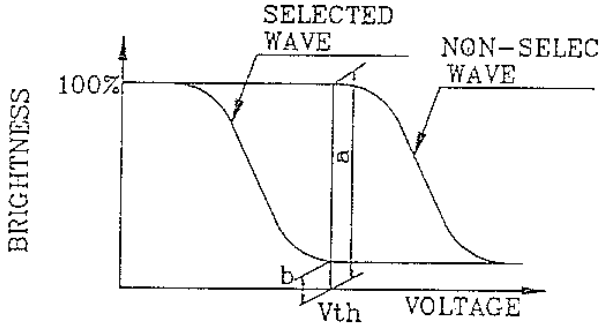


$\theta = \theta_1 - \theta_2$

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

(NOTE 6)

Definition of Contrast Ratio (Cr)



Contrast Ratio: Cr=a/b

*Conditions
Operating Voltage: Vth
Temperature :25
Viewing Angle(a1) :90
Frame Frequency: 70Hz
Appling Waveform: 1/N duty 1/a bias
SELECTED WAVEFORM

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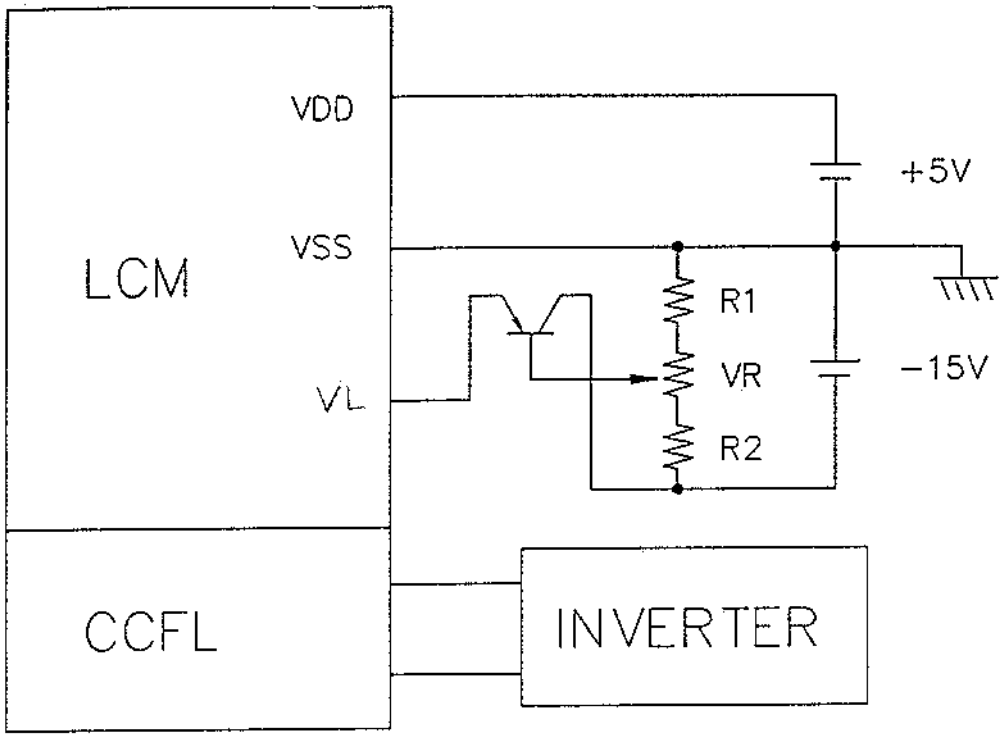
6. INTERNAL PIN CONNECTION

PIN NO.	SYMBOL	FUNCTION
1	FGND	FRAME GROUND (0V)
2	GND	GROUND
3	VDD	POWER SUPPLY FOR LOGIC (+5V)
4	VEE	POWER SUPPLY FOR LC DRIVING
5	$\overline{WR}$	DATA WRITE
6	$\overline{RD}$	DATA READ
7	$\overline{CE}$	CHIP ENABLE
8	C/D	$\overline{WR}$="L",C/D="H" :COMMAND WRITE $\overline{WR}$="L",C/D="L" :DATA WRITE $\overline{RD}$="L",C/D="H" :STATUS READ $\overline{RD}$="L".C/D="L" :DATA READ
9	NC	NO CONNECTION
10	$\overline{RESET}$	CONTROLLER RESET
11	D0	DATA INPUT/OUTPUT
12	D1	DATA INPUT/OUTPUT
13	D2	DATA INPUT/OUTPUT
14	D3	DATA INPUT/OUTPUT
15	D4	DATA INPUT/OUTPUT
16	D5	DATA INPUT/OUTPUT
17	D6	DATA INPUT/OUTPUT
18	D7	DATA INPUT/OUTPUT
19	FS	FONT SELECT CONNECT TO VDD : 6X8 PIXELS/CHARACTER CONNECT TO GND : 8X8 PIXELS/CHARACTER
20	RV	DISPLAY DATA REVERSE RV=H : REVERSE DISPLAY RV=L : NORMAL DISPLAY

FL CONNECTOR : J.A.E./IL-G-5S-S3C2

PIN NO.	SYMBOL	FUNCTION
1	V_{FL}	POWER SUPPLY FOR FL DRIVE
2	NC	NO CONNECTION
3	NC	NO CONNECTION
4	NC	NO CONNECTION
5	V_{FL}	POWER SUPPLY FOR FL DRIVE

7. POWER SUPPLY



R1+VR+R2=10K~20K

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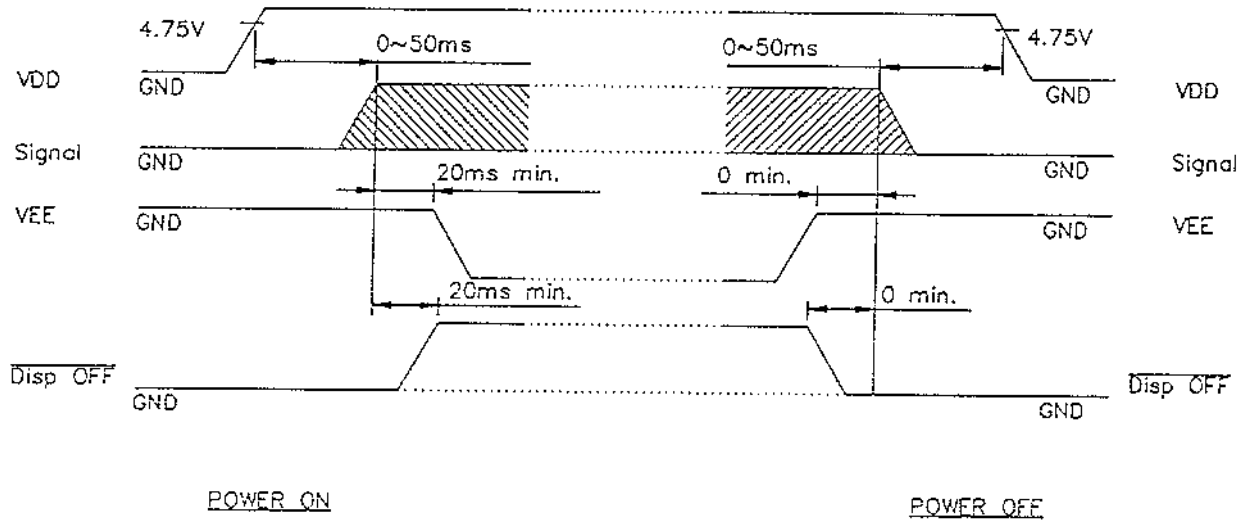
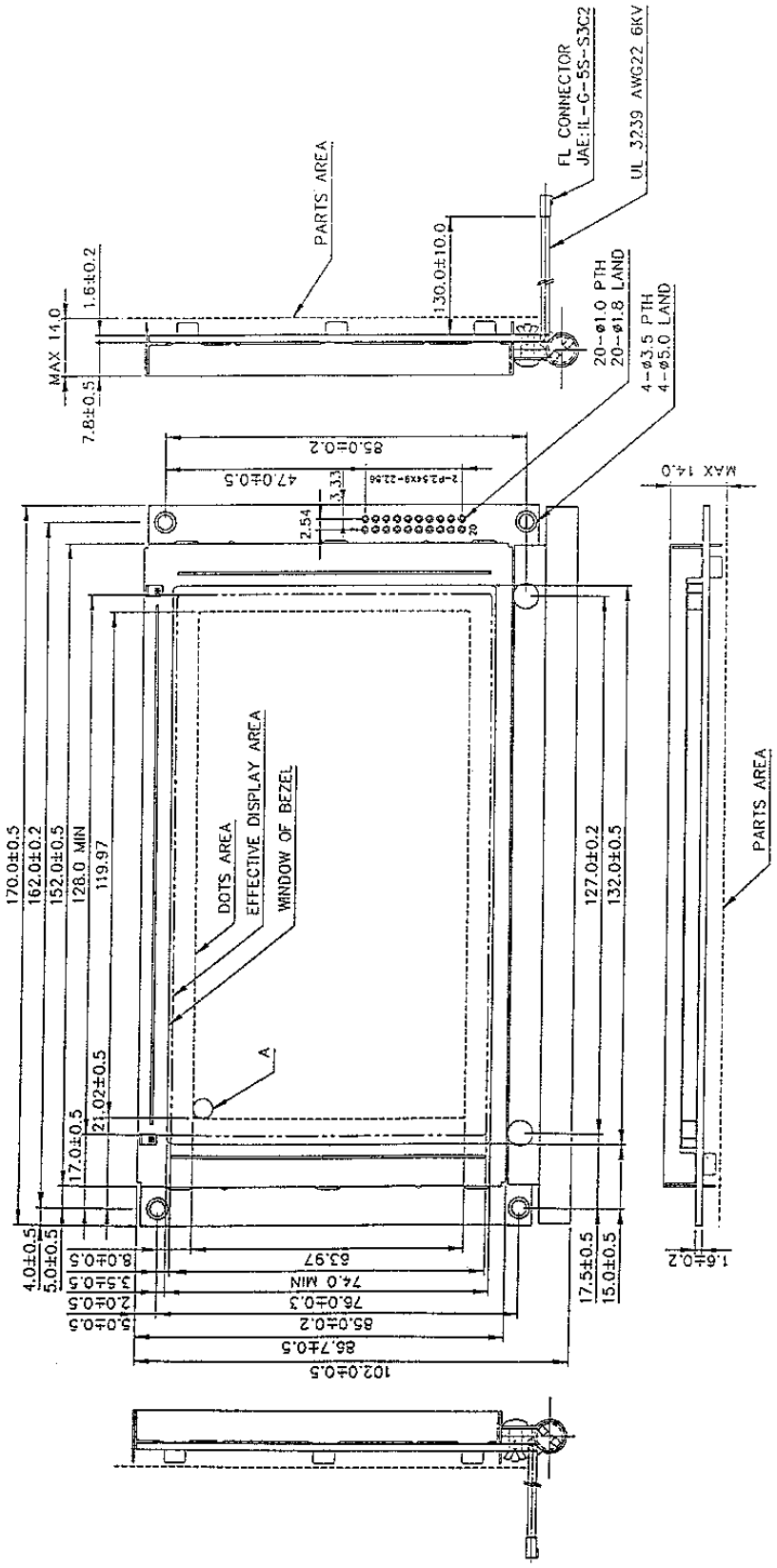
8-2 POWER ON/OFF TIMING



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



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