ALL SHORE INDUSTRIES, INC.

SPECIFICATION FOR
LIQUID CRYSTAL DISPLAY MODULE

MODEL #: ASI-D-24012B-/A

(1)	NUMBER OF DOTS	----------	240W X 128H DOTS
(2)	MODULE SIZE	----------	144.0W X 104.0H X 10.3 D (MAX) mm
(3)	EFFECTIVE AREA	----------	114.0W X 64.0H mm
(4)	ACTIVE AREA	----------	107.97W X 57.57H mm
(5)	DOT SIZE	----------	0.42W X 0.42H mm
(6)	DOT PITCH	----------	0.45W X 0.45H mm
(7)	LCD TYPE	----------	STN
(6)	DRIVING METHOD	----------	1 / 128 DUTY MULTIPLEX DRIVE
(7)	VIEWING DIRECTION	----------	6 O ' CLOCK
(8)	BACK - LIGHT	----------	NONE
(9)	CONTROLLER	----------	HD61830 or LC7981

All Shore Industries, Inc. One Edgewater Plaza, Staten Island, NY 10305

ALL SHORE INDUSTRIES

MODEL NO : ASI-D-24012B-/A

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ALL SHORE INDUSTRIES

MODEL NO : ASI-D-24012B-/A

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1. GENERAL SPECIFICATIONS

1 . 1 GENERAL SPECIFICATIONS
PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

AS - 002A

1 . 2 APPLICATION NOTES FOR CONTROLLER / DRIVER :HD61830 OR LC7981
PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :
AS-110

1 . 3 THIS INDIVIDUAL SPECIFICATIONS IS PRIOR TO GENERAL SPECIFICATIONS .

2 . MECHANICAL SPECIFICATIONS

(1)	NUMBER OF DOTS	----------	240W X 128H DOTS
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(8)	BACK - LIGHT	----------	NONE
(9)	CONTROLLER	----------	HD61830 or LC7981

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3 . ABSOLUTE MAXIMUM RATINGS

3 . 1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN .	MAX .	UNIT	COMMENT
POWER SUPPLY FOR LOGIC	VDD--VSS	0	6.5	V	
POWER SUPPLY FOR LCD DRIVE	VDD-VEE	0	22	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	————	—	100	V	NOTE (1)

NOTE (1) : TEST METHOD AND CONDITIONS : AFTER CHARGING UP 200 PF CAPACITOR BY STATED VOLTAGE, THE CAPACITOR IS CONNECTED WITH INTERFACE PINS OF THE MODULE .

3 . 2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS .

I T E M		OPERATING		STORAGE		COMMENT
		MIN .	MAX .	MIN .	MAX .	
AMBIENT TEMPERATURE	N.T.	0°C	50°C	-20 °C	70 °C	NOTE (2), (3)
	W.T.	-20°C	70°C	-30 °C	80 °C	
HUMIDITY		--	85% RH	--	85% RH	WITHOUT CONDENSATION
VIBRATION		--	2.45 m /s^2 (0.25G)	--	11.76 m /s^2 (1.2G)	10~100 HZ XYZ DIRECTIONS 1 HR. EACH
SHOCK		--	2 9.4 m /s^2 (3G)	--	490.0 m /s^2 (50G)	XYZ DIRECTIONS
CORROSIVE GAS		NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE(2) : Ta AT –20 ° C (-30° FOR W.T.) : 48HR MAX.
70 ° C (80° FOR W.T.) : 168HR MAX.

NOTE (3) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE.

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4 . ELECTRICAL CHARACTERISTICS

Ta = 25°C VDD = 5.0 V

PARAMETER	SYMBOL		CONDITION	MIN .	TYP .	MAX .	UNIT
POWER SUPPLY VOLTAGE FOR LOGIC	VDD-VSS		———	4.75	5.0	5.25	V
POWER SUPPLY VOLTAGE FOR LCD DRIVE	VEE-VSS		———	-15.5	-16.0	-16.5	V
INPUT VOLTAGE NOTE (1)	VIH		H LEVEL	2.2	—	—	V
	VIL		L LEVEL	—	—	0.8	V
OUTPUT VOLTAGE NOTE (2)	VOH		H LEVEL	2.4	—	VCC	V
	VOL		L LEVEL	0	—	0.4	V
POWER SUPPLY CURRENT FOR LOGIC NOTE (2)	IDD	N.T.	VDD-VSS = 5.0 V VDD-VO = 18.2 V	—	6. 0	—	mA
		W.T.	VDD-VSS = 5.0 V VDD-VO = 16.3 V				
POWER SUPPLY CURRENT FOR DRIVE NOTE (2)	IEE	N.T.	VDD-VSS = 5.0 V VDD-VO = 18.2 V	—	5. 0	—	mA
		W.T.	VDD-VSS = 5.0 V VDD-VO = 16.3 V				
RECOMMENDED LCD DRIVING VOLTAGE NOTE (3)	VDD–VO ϕ = 10° θ* = 0°	N.T.	Ta = 0 °C	—	19.0	—	V
			Ta = 25 °C	—	18.2	—	
			Ta = 50 °C	—	15.9	—	
		W.T.	Ta = -20 °C	—	19.5	—	
			Ta = 25 °C	—	16.3	—	
			Ta = 70 °C	—	14.7	—	
CLOCK OSCILLATION FREQUENCY	FOSC		———	—	2	—	MHZ

θ = 180° WHEN VIEWING DIRECTION IS 12 O'CLOCK

NOTE (1) : APPLIED TO TERMINALS E, CS, R/W, RS, DB0~DB7, RES

NOTE (2) : THE DISPLAY PATTERN IS ALL "OFF" / "ON".

NOTE (3) : RECOMMENDED LCD DRIVING VOLTAGE: MAY FLUCTUATE ABOUT +/- 1.0v BY EACH MODULE.

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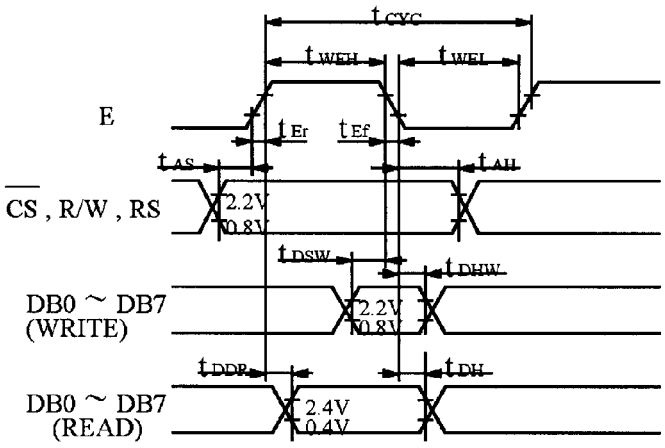
5. INTERFACE TIMING CHARACTERISTICS

ITEM		SYMBOL	MIN	TYP	MAX	MAX
ENABLE CYCLE TIME		tCYC	1.0	——	——	uS
ENABLE PULSE WIDTH	H LEVEL	tWEH	0.45	——	——	uS
	L LEVEL	tWEL	0.45	——	——	uS
ENABLE RISE TIME		tEr	——	——	25	nS
ENABLE FALL TIME		tEf	——	——	25	nS
SETUP TIME		tAS	140	——	——	nS
DATA SETUP TIME		tDSW	225	——	——	nS
DATA DELAY TIME		tDDR	——	——	225	nS
DATA HOLD TIME		tDHW	10	——	——	nS
ADDRESS HOLD TIME		tAH	10	——	——	nS
DATA HOLD TIME		tDH	20	——	——	nS



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6 . OPTICAL CHARACTERISTICS .

Ta = 25°C VDD = 5.0 V VDD-VO=**

I T E M		SYMBOL	CONDITION		MIN .	TYP .	MAX .	UNIT	NOTE
VIEWING AREA	STN	$\phi 2 - \phi 1$	$K \geqq 1.4$		40	———	———	Deg .	1
	FSTN				50	———	———	Deg.	1
CONTRAST RATIO	STN	K	$\phi = 10°$ $\theta^* = 0°$		———	5	———	———	1
	FSTN				5	———	———	———	1
RESPONSE TIME	N.T.	Tr (rise)	$\phi = 10°$ $\theta^* = 0°$	Ta=25°C	———	200	———	ms	1
		Tf (fall)		Ta=25°C	———	250	———		
	W.T.	Tr (rise)	$\phi = 10°$ $\theta^* = 0°$	Ta=-20°C	———	2150	———		
				Ta=25°C	———	190	———		
				Ta=70°C	———	85	———		
		Tf (fall)		Ta=-20°C	———	10700	———		
				Ta=25°C	———	330	———		
				Ta=70°C	———	50	———		

*θ = 180° WHEN VIEWING DIRECTION IS 12 O'CLOCK

** N.T. = 18.2V

W.T. = 16.3V

NOTE (1) SEE CUSTOMER ACCEPTANCE STANDARD SPECIFICATION FOR DEFINITION OF.. OPTICAL CHARACTERISTICS

AS-002A

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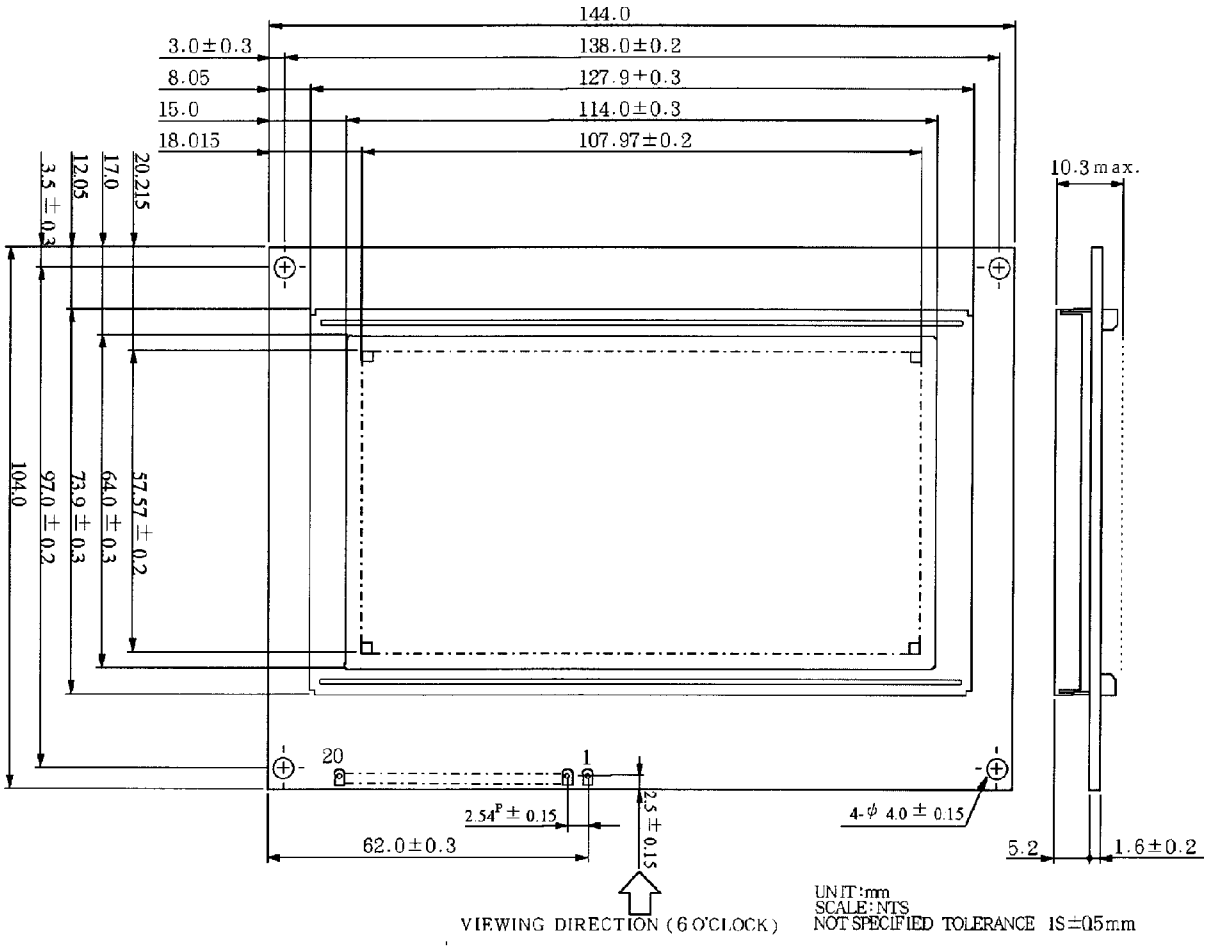
7 . OUTLINE DIMENSION



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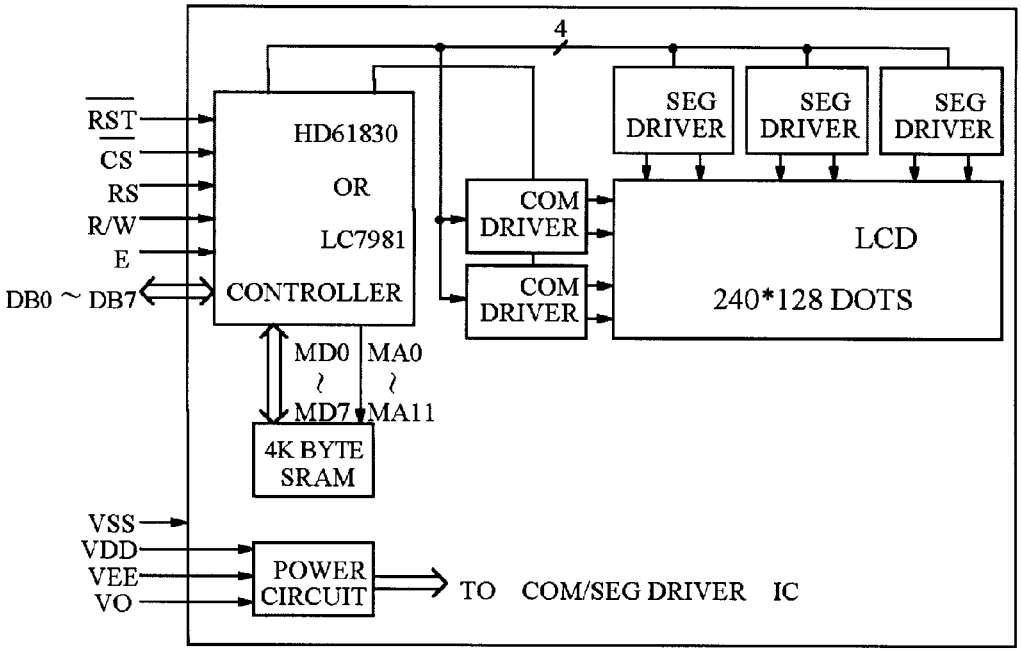
8. BLOCK DIAGRAM



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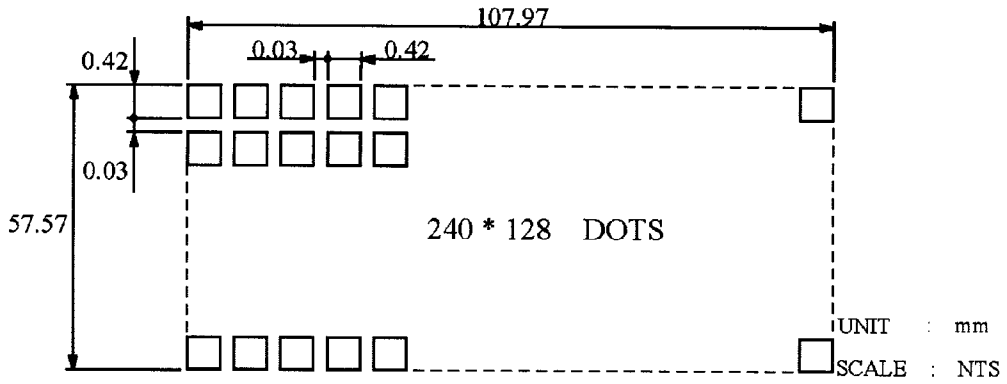
9 . DETAIL DRAWING OF DOT MATRIX



10 . INTERFACE SIGNALS

PIN NO.	SYMBOL	LEVEL	FUNCTION
1	VSS	_____	GROUND
2	VDD	_____	POWER SUPPLY FOR LOGIC CIRCUIT
3	VO	_____	OPERATING VOLTAGE FOR LCD DRIVING
4	RS	H/L	H : INSTRUCTION REGISTER L : DATA REGISTER
5	R/W	H/L	H : DATA INPUT (LCD MODULE →MPU) L : DATA WRITE (LCD MODULE ←MPU)
6	E	H,H→L	ENABLE SIGNAL
7 – 14	DBO - DB7	H/L	DATA BUS LINE
15	CS	H	CHIP SELECTION
16	RST	L	RESET
17	VEE	_____	POWER SUPPLY FOR LCD DRIVING
18-20	N.C	_____	_____

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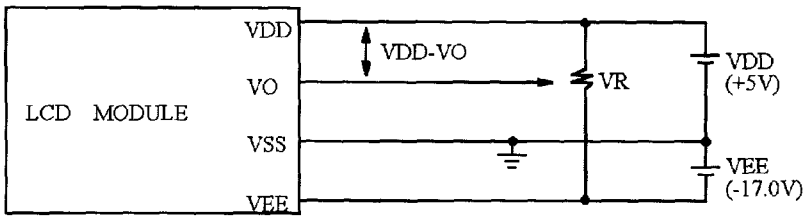
11 . POWER SUPPLY

11 . 1 POWER SUPPLY FOR LCM



VDD-V0 : LCD DRIVING VOLTAGE
VR : 20K Ω

11 . 3 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL