ALL SHORE INDUSTRIES, INC.

SPECIFICATION FOR
LIQUID CRYSTAL DISPLAY MODULE

MODULE # : ASI-E-164AS-GC-_S/W

(1) NUMBER OF CHARACTER---------- 16 CH * 4 LINE
(2) MODULE SIZE ---------- 87.0 W * 60.0 H * 10.0 T (Max) mm
(3) EFFECTIVE AREA---------- 61.8 W * 25.2 H mm
(4) CHARACTER PATTERN ---------- 5 * 7 DOTS + CURSOR
(5) CHARACTER SIZE ---------- 2.96 W * 4.16 H mm
(6) CHARACTER PITCH---------- 3.55 mm
(7) DOT SIZE ---------- 0.56 W * 0.56 H mm
(8) DOT PITCH---------- 0.60 W * 0.60 H mm
(9) VIEWING DIRECTION ---------- 6 or 12 O'CLOCK
(10) LCD TYPE ---------- STN. YELLOW, GRAY REFLECTIVE

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

ALL SHORE INDUSTRIES

MODEL NO : ASI-E-164AS-GC-_S/W

CONTENTS

ACCEPTED BY :_____ PROPOSED BY :_____

MODEL NO : ASI-E-164AS-GC-_S/W

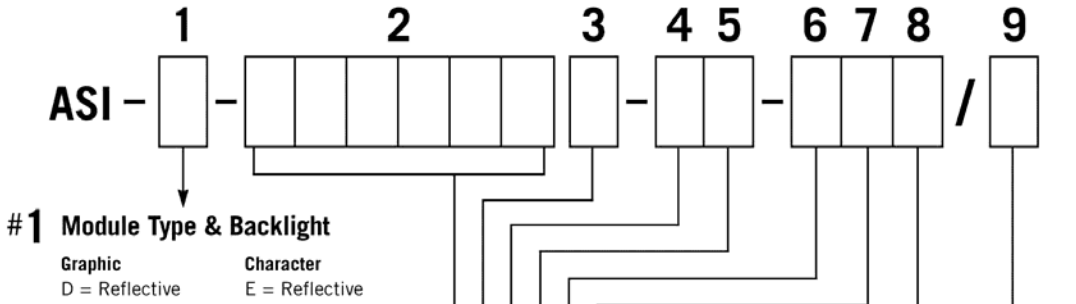
RECORD OF REVISION

DATE	PAGE	SUMMARY

ALL SHORE INDUSTRIES

MODEL NO : ASI-E-164AS-GC-_S/W

LCD MODULE PART NUMBERING SYSTEM



#1 Module Type & Backlight

Graphic	Character
D = Reflective	E = Reflective
B = EL	F = EL
C = CCFL	G = LED (VDD/VSS)
A = LED (VDD/VSS)	H = LED (+VLED/-VLED)
I = LED (+VLED/-VLED)	M = LED (A&K)
N = LED (A&K)	

Chip On Glass
J = Graphic Reflective
K = Character Reflective

#2 Series Number
min. 3 to max. 6 spaces

#3 Technology
S = STN
T = TN
F = FSTN

#4 Overall Thickness

A = 4 mm	H = 11 mm
B = 5 mm	I = 12 mm
C = 6 mm	J = 13 mm
D = 7 mm	K = 14 mm
E = 8 mm	L = 15 mm
F = 9 mm	M = 16 mm
G = 10 mm	N = 17 mm

#5 Bezel Thickness

A = 2.1 mm	F = 6.4 mm	K = 9.5 mm
B = 3.1 mm	G = 7.0 mm	L = 10 mm
C = 4.9 mm	H = 7.8 mm	
D = 5.0 mm	I = 8.9 mm	
E = 5.5 mm	J = 9.0 mm	

#6 Background Color and View Direction

TN / STN	A = Gray @ 6 o'clock
	B = Gray @ 12 o'clock
STN	C = Yellow @ 6 o'clock
	D = Yellow @ 12 o'clock
	K = Blue @ 6 o'clock
	L = Blue @ 12 o'clock
FSTN	G = Black @ 6 o'clock
	H = Black @ 12 o'clock
	I = White @ 6 o'clock
	J = White @ 12 o'clock
	Transmissive only:
STN	E = Blue @ 6 o'clock
	F = Blue @ 12 o'clock

#7 Backlight Color

W = White	R = Red
Y = Yellow-Green	B = Blue

#8 Operating Temp and Voltage

Standard
S = 0° to +50°C @ 5.0 Volts
T = 0° to +50°C @ 3.3 Volts
Extended
D = -20° to +70°C @ 5.0 Volts
E = -20° to +70°C @ 3.3 Volts

#9 Internal Code

NOTE: Some options may not be available in specific modules. Please contact your Sales Representative to check availability.

MODEL NO : ASI-E-164AS-GC-_S/W

3. General specifications

3.1 General specifications

PLEASE REFER TO:
"CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (MS-10-12780)".

3.2 This individual specification is prior to general specifications

4. Mechanical data

(1) NUMBER OF CHARACTER---------- 16 CH * 4 LINE
(2) MODULE SIZE ---------- 87.0 W * 60.0 H * 10.0 T (Max) mm
(3) EFFECTIVE AREA---------- 61.8 W * 25.2 H mm
(4) CHARACTER PATTERN ---------- 5 * 7 DOTS + CURSOR
(5) CHARACTER SIZE ---------- 2.96 W * 4.16 H mm
(6) CHARACTER PITCH---------- 3.55 mm
(7) DOT SIZE ---------- 0.56 W * 0.56 H mm
(8) DOT PITCH---------- 0.60 W * 0.60 H mm
(9) VIEWING DIRECTION ---------- 6 or 12 O'CLOCK
(10) LCD TYPE ---------- STN. YELLOW, GRAY REFLECTIVE

MODEL NO : ASI-E-164AS-GC-_S/W

5 Absolute maximum ratings

5.1 Electrical absolute maximum ratings

I T E M	*SYMBOL*	*MIN.*	*MAX.*	*UNIT*	*COMMENT*
POWER SUPPLY FOR LOGIC	V_{DD}-V_{SS}	0	6.0	V	
INPUT VOLTAGE	V_I	V_{SS}	V_{DD}	V	
STATIC ELECTRICITY	———	———	100	V	NOTE (1)

NOTE (1): ELECTRO-STATIC DISCHARGE RESISTANCE IS TESTED BY CHARGING A 200PF CAPACITOR AND DISCHARGING IT BY CONTACT WITH A INTERFACE CONNECTOR PIN.

5.2 Environmental absolute maximum ratings

I T E M	*OPERATING*		*STORAGE*		*COMMENT*
	MIN.	*MAX.*	*MIN.*	*MAX.*	
AMBIENT TEMPERATURE	0℃	50℃	-20℃	70℃	
HUMIDITY	NOTE (2)		NOTE (2)		NO CONDENSATION
VIBRATION NOTE (3)	———	0.5G	———	2G	10～300HZ XYZ DIRECTIONS 1 Hr EACH
SHOCK NOTE (3)	———	3G	———	50G	10 msec XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (2) : Ta ≦ 50℃: 90% RH MAX.

Ta > 50℃: ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 90% RH AT 50℃. (80% RH AT 60℃)

NOTE (3): 1G = 9.8 m/S^2

MODEL NO : ASI-E-164AS-GC-_S/W

6. Electrical characteristics

Ta = 25° V_{DD} = 5.0±0.25 V

I T E M	*SYMBOL*	*CONDITION*	*MIN.*	*TYP.*	*MAX.*	*UNIT*
INPUT VOLTAGE	V_{IH}	———	2.2	—	—	V
	V_{IL}	———	—	—	0.6	V
OUTPUT VOLTAGE	V_{OH}	$-I_{OH}$ = 0.2 mA	2.4	—	—	V
	V_{OL}	I_{OH} = 1.2 mA	—	—	0.4	V
POWER SUPPLY CURRENT	I_{DD}	V_{DD} = 5.0 V	—	1.5	2.0	mA
RECOMMENDED LCD DRIVING VOLTAGE	V_{DD}-V_O DUTY = 1/16	Ta = 0℃	—	4.9	—	V
		Ta = 25℃	—	4.5	—	V
		Ta = 50℃	—	4.1	—	V

NOTE (1): RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT ± 0.5V BY EACH MODULE.

7. Optical characteristics

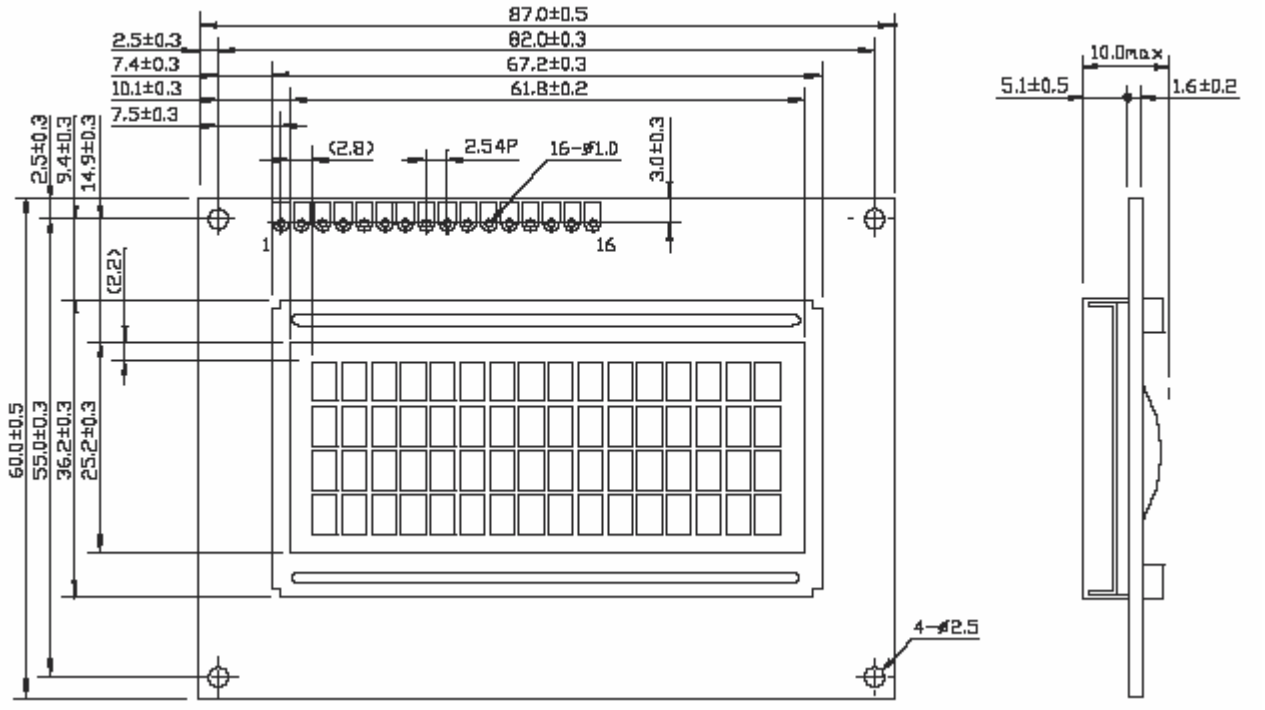
Ta = 25° V_{DD} = 5.0V

I T E M	*SYMBOL*	*CONDITION*	*MIN.*	*TYP.*	*MAX.*	*UNIT.*	*NOTE*
VIEWING ANGLE	Φ2-Φ1	K = 2.0	30	40	——	deg.	2
CONTRAST RATIO	K	Φ = 10° θ = 0°	3.0	4.0	—	——	2
RESPONSE TIME	tr (rise)	Φ = 10° θ = 0°	—	200	350	ms	2
	tf (fall)	Φ = 10° θ = 0°	—	300	400	ms	2,3

NOTE (2): SEE CUSTOMER ACCEPTANCE STANDARD SPECIFICATION FOR DEFINITION OF OPTICAL CHARACTERISTICS.

MODEL NO : ASI-E-164AS-GC-_S/W

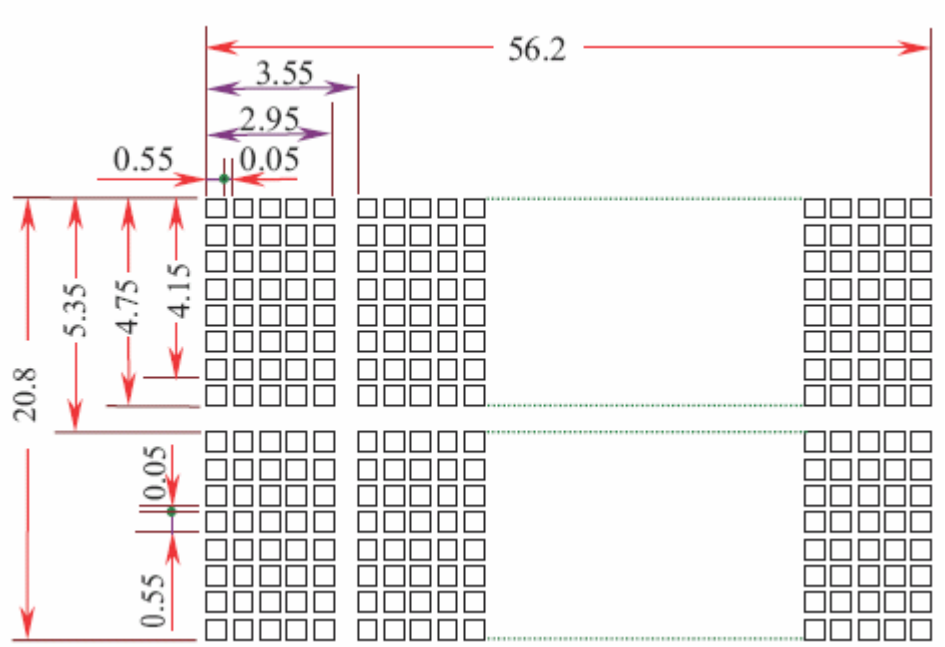
8. Outline dimension



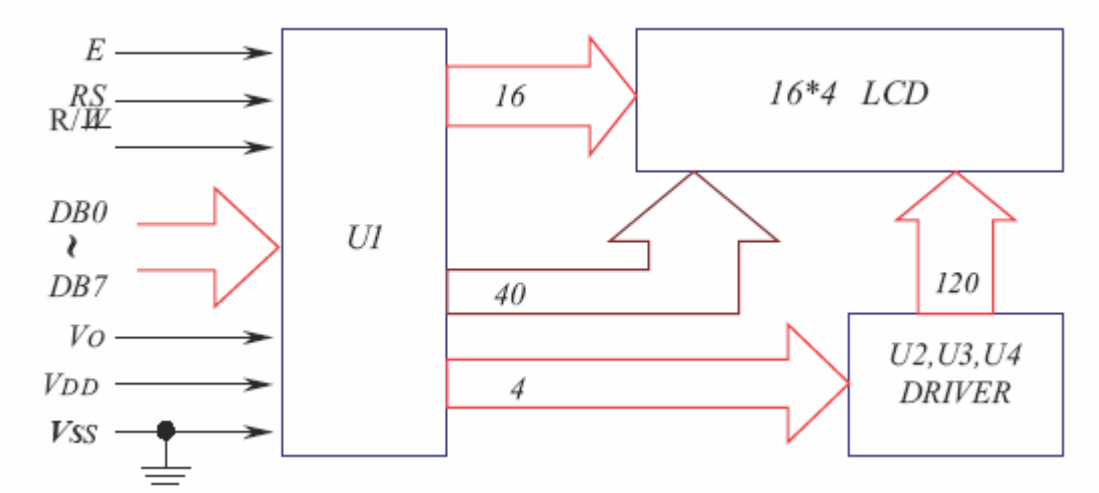
Interface pin connection

PIN NO.	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
SYMBOL	Vss	VDD	Vo	RS	R/$\overline{W}$	E	DB0	DB1
PIN NO.	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
SYMBOL	DB2	DB3	DB4	DB5	DB6	DB7	N.C	N.C

MODEL NO : ASI-E-164AS-GC-_S/W



9 Block diagram



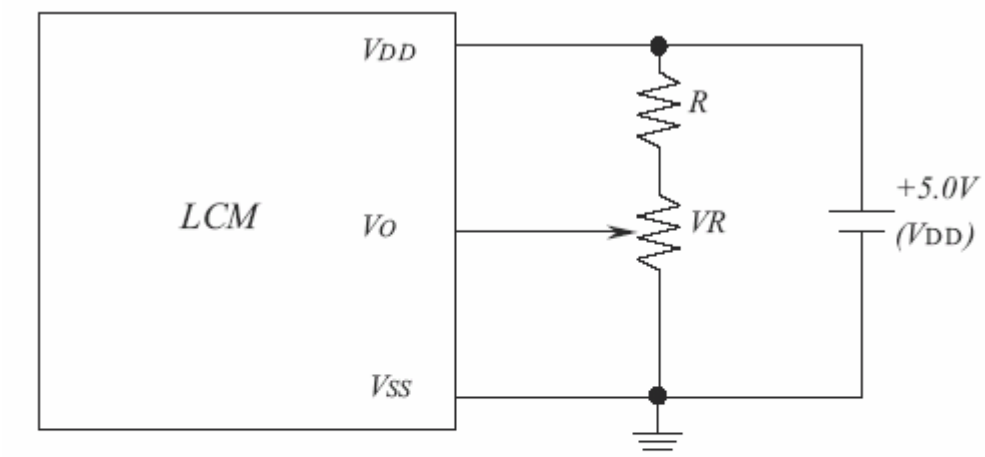
MODEL NO : ASI-E-164AS-GC-_S/W

Display data address charts

Display data address charts

Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LINE 1	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F
LINE 2	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE	CF
LINE 3	90	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F
LINE 4	D0	D1	D2	D3	D4	D5	D6	D7	D8	D9	DA	DB	DC	DD	DE	DF

10. Power supply for LCM



RECOMMENDED RESISTOR R: $V_{DD} - V_O \geqq 1.5V$
$V_{DD} - V_O$: LCD DRIVING VOLTAGE
VR: 10KΩ~ 20KΩ

The information presented in this datasheet has been carefully checked and is believed to be accurate; however, no responsibility is assumed for inaccuracies. Information contained herein is for selection purposes only, and is subject to change without notice. Please contact ASI for current datasheets prior to designing.