ALL SHORE INDUSTRIES, INC.

SPECIFICATION FOR
LIQUID CRYSTAL DISPLAY MODULE

MODULE #: ASI-E-202CS-GC-_S/W

(1) NUMBER OF CHARACTERS ---------- 20 CH * 2 LINE
(2) MODULE SIZE---------- 190.0W * 54.0H * 10.0T (Max) mm
(3) EFFECTIVE AREA ---------- 149.0W * 31.0H mm
(4) CHARACTER PATTERN---------- 5 * 7 DOTS + CURSOR
(5) CHARACTER SIZE ---------- 6.0W * 12.75H mm
(6) CHARACTER PITCH ---------- 7.2 W * 14.25H mm
(7) DOT SIZE ---------- 1.16W * 1.55H mm
(8) DOT PITCH ---------- 1.21W * 1.6H 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-202CS-GC-_S/W

RECORD OF REVISION

DATE	PAGE	SUMMARY

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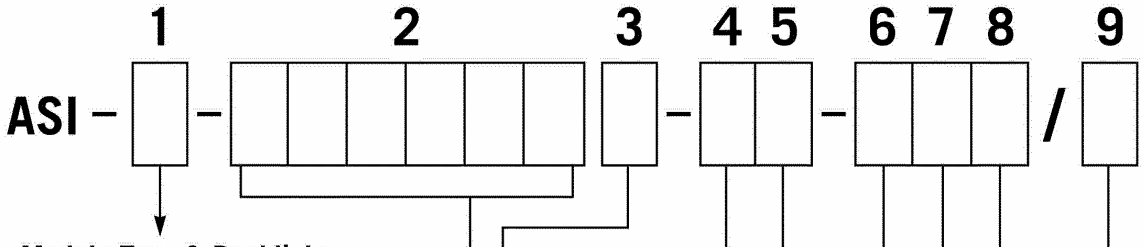
LCD MODULE PART NUMBERING SYSTEM



#1 Module Type & Backlight

Graphic

D = Reflective
B = EL
C = CCFL
A = LED (VDD/VSS)
I = LED (+VLED/-VLED)
N = LED (A&K)

Character

E = Reflective
F = EL
G = LED (VDD/VSS)
H = LED (+VLED/-VLED)
M = 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
B = 5 mm
C = 6 mm
D = 7 mm
E = 8 mm
F = 9 mm
G = 10 mm
H = 11 mm
I = 12 mm
J = 13 mm
K = 14 mm
L = 15 mm
M = 16 mm
N = 17 mm

#5 Bezel Thickness

A = 2.1 mm
B = 3.1 mm
C = 4.9 mm
D = 5.0 mm
E = 5.5 mm
F = 6.4 mm
G = 7.0 mm
H = 7.8 mm
I = 8.9 mm
J = 9.0 mm
K = 9.5 mm
L = 10 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
Y = Yellow-Green
R = Red
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.

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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 CHARACTERS ----------20 CH * 2 LINE
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5. Absolute maximum ratings

5.1 Electrical absolute maximum ratings

I T E M	*SYMBOL*	*MIN.*	*MAX.*	*UNIT*	*COMMENT*
POWER SUPPLY FOR LOGIC	VDD-VSS	0	6.0	V	
INPUT VOLTAGE	VI	VSS	VDD	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 $\leq$ 50°: 90%RH MAX.

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

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

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6. Electrical characteristics

Ta = 25° VDD = 5.0 ±0.25 V

I T E M	*SYMBOL*	*CONDITION*	*MIN.*	*TYP.*	*MAX.*	*UNIT*
INPUT VOLTAGE	VIH		2.2		VDD	V
	VIL		VSS		0.6	V
OUTPUT VOLTAGE	VOH	-IOH =0.2mA	2.4			V
	VOL	IOL = 1.2 mA			0.4	V
POWER SUPPLY CURRENT	IDD	VDD = 5.0V		2.0	3.5	mA
RECOMMENDED LCD DRIVING VOLTAGE	VDD-V0 DUTY= 1/16 =10°	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° VDD= 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°		250	350	ms	2
	tf (fall)	Φ = 10° θ = 0°		300	400	ms	2

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

NOTE (3): UNDER NORMAL TEMPERATURE AND HUMIDITY IN A DARK ROOM.

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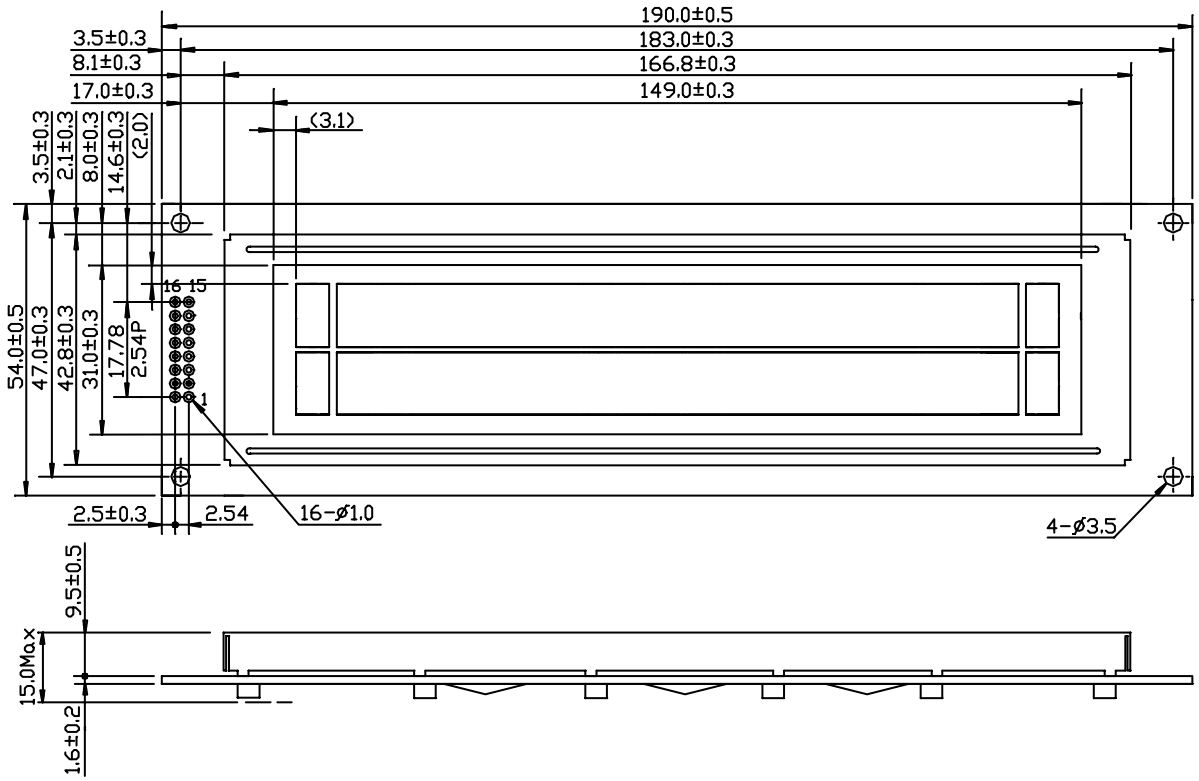
8. Outline dimension



Interface pin connection

PIN NO.	1	2	3	4	5	6	7	8
SYMBOL	VSS	VDD	V0	RS	R/$\overline{W}$	E	DB0	DB1
PIN NO.	9	10	11	12	13	14	15	16
SYMBOL	DB2	DB3	DB4	DB5	DB6	DB7	NC	NC

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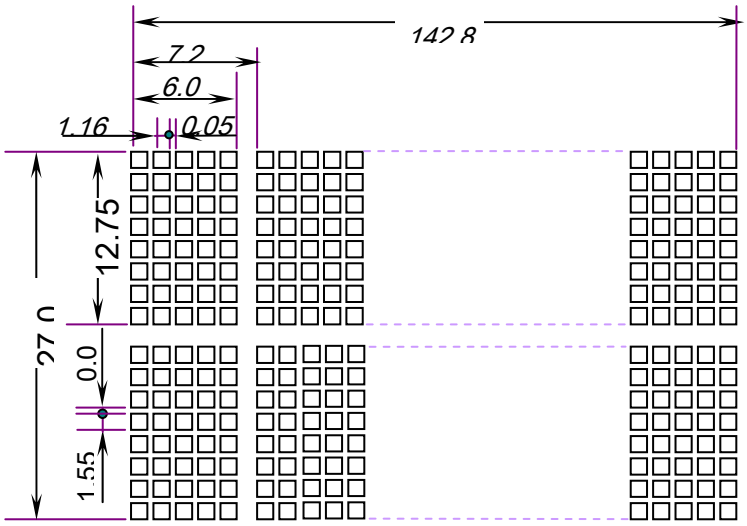
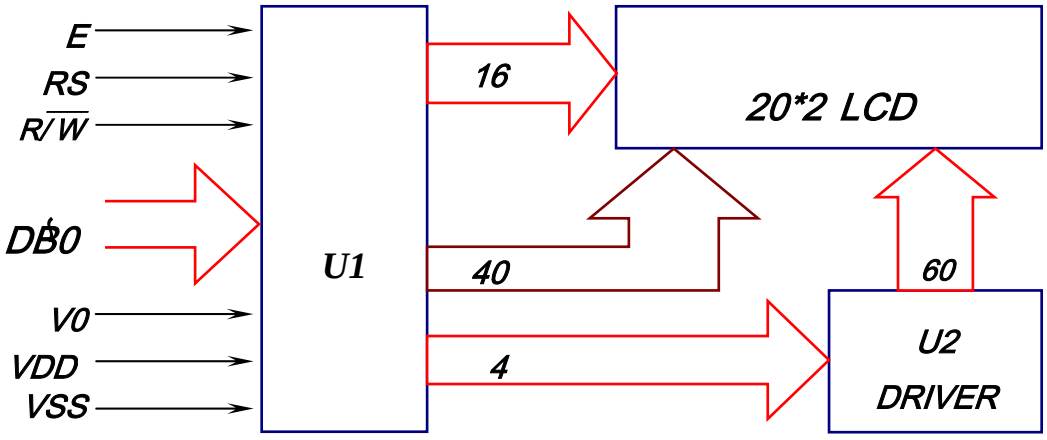


Block diagram



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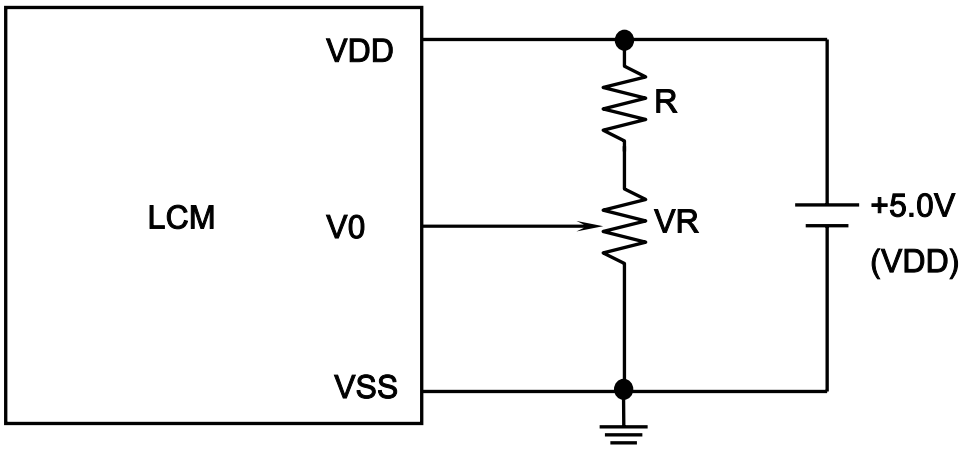
Display data address charts

Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
LINE1	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90	91	92	93
LINE2	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE	CF	D0	D1	D2	D3

10. Power supply for LCM



RECOMMENDED RESISTOR R: VDD – VO~1.5V
VDD – VO: LCD DRIVING VOLTAGE
VR: 10KΩ ~ 20KΩ