EXAMINED BY : Tony Chen	EMERGING DISPLAY	FILE NO . CAS-10006
		ISSUE : OCT.13,1999
APPROVED BY: David Chang	TECHNOLOGIES CORPORATION	TOTAL PAGE : 8
		VERSION : 3

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL :

161A0(LED TYPES)

FOR MESSRS :

_____

CUSTOMER'S APPROVAL

DATE :

_____

BY :

_____

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EMERGING DISPLAY TECHNOLOGIES CORPORATION	MODEL NO. 161A0(LED TYPES)	VERSION 3

RECORDS OF REVISION

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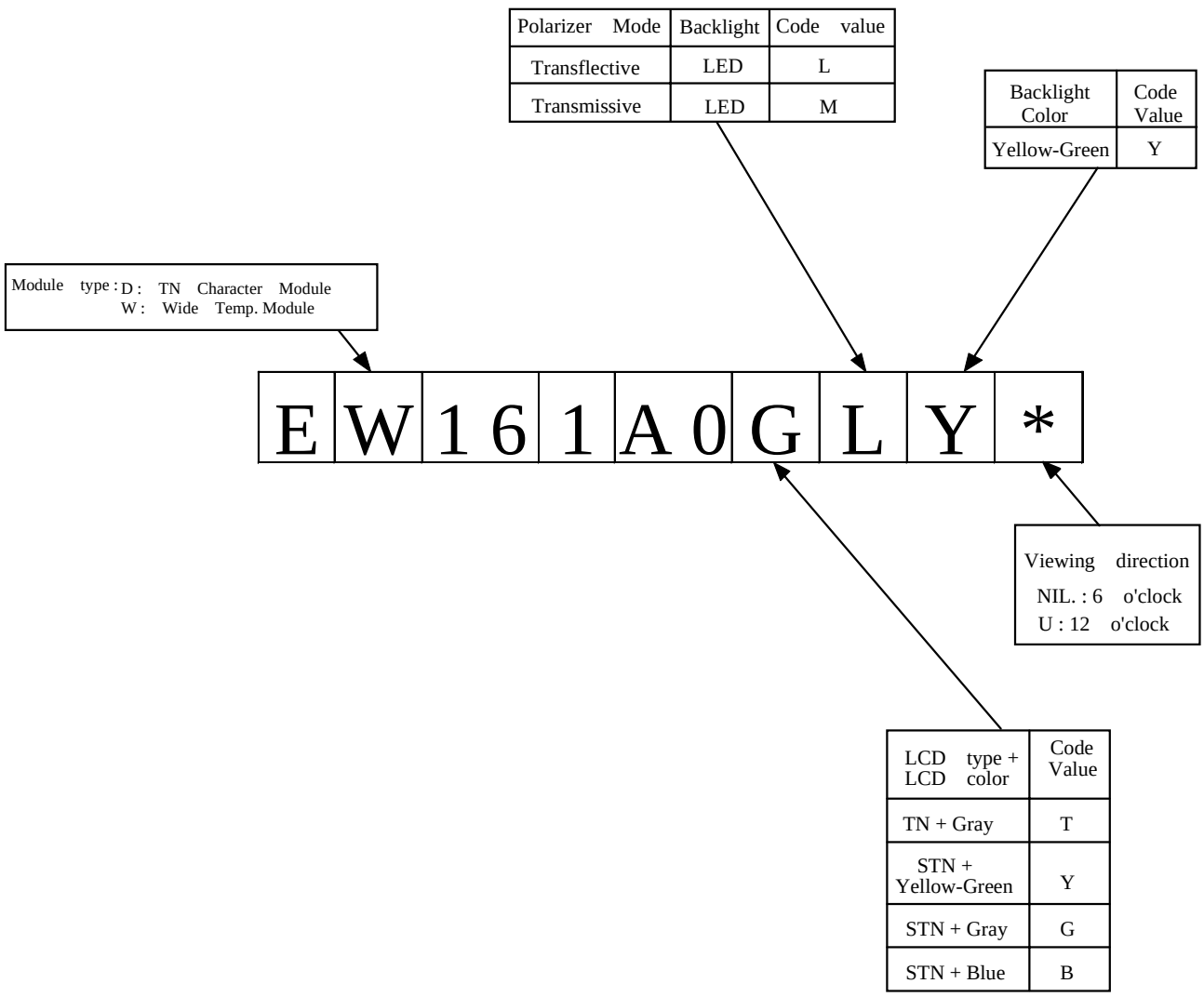
NUMBERING SYSTEM



*: AVAILABLE ONLY FOR TN TYPE

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1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS
PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U - 0 0 2 A

1.2 APPLICATION NOTES FOR CONTROLLER / DRIVER :
PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U - K S 0 0 6 6

1.3 THIS INDIVIDUAL SPECIFICATIONS IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

(1)	NUMBER OF CHARACTER	16 CH * 1 LINES
(2)	MODULE SIZE	80.0W * 36.0H * 14.0D (max.) mm
(3)	EFFECTIVE AREA	66.0W * 16.0H mm
(4)	CHARACTER FONT	5 * 7 DOTS + CURSOR
(5)	CHARACTER SIZE	3.07W * 6.56H mm
(6)	CHARACTER PITCH	3.77W mm
(7)	DOT SIZE	0.55W * 0.75H mm
(8)	DOT PITCH	0.63W * 0.83H mm
(9)	LCD TYPE *	
(10)	DRIVING METHOD	1 / 16 DUTY MULTIPLEX DRIVE
(11)	VIEWING DIRECTION *	
(12)	BACK-LIGHT *	

* PLEASE REFER TO NUMBERING SYSTEM

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS. (AT Ta = 25 ℃)

PARAMETER	SYMBOL	MIN.	MAX.	UNIT	COMMENT
POWER SUPPLY FOR LOGIC	VDD — VSS	0	7.0	V	
POWER SUPPLY FOR LCD DRIVE	VDD — V0	0	13.0	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICTY	—	—	100	V	NOTE (1)
LED POWER DISSIPATION	PD	—	1.3	W	
LED FORWARD CURRENT	IF	—	260	mA	
LED REVERSE VOLTAGE	VR	—	8	V	

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.

ITEM		OPERATING		STORAGE		COMMENT
		MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	ED	0℃	50℃	-20℃	70℃	NOTE (2), (3)
	EW	-20℃	70℃	-30℃	80℃	
HUMIDITY		—	90 % RH	—	90 % RH	WITHOUT CONDENSATION
VIBRATION		—	4.9 m/s^2 (0.5G)	—	19.6 m/s^2 (2G)	
SHOCK		—	29.4 m/s^2 (3G)	—	490.0 m/s^2 (50G)	XYZ DIRECTIONS
CORROSIVE GAS		NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (2) : Ta AT -20℃(-30℃ FOR EW) : 48HR MAX.
70℃(80℃ FOR EW) : 168HR MAX.
NOTE (3) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE.

4. ELECTRICAL CHARACTERISTICS

Ta = 25℃ VDD = 5.0 ± 0.25 V

PARAMETER	SYMBOL		CONDITION	MIN.	TYP.	MAX.	UNIT
H LEVEL INPUT VOLTAGE	VIH		—	2.2	—	—	V
L LEVEL INPUT VOLTAGE	VIL		—	—	—	0.6	V
H LEVEL OUTPUT VOLTAGE	VOH		−IOH = 0.2 mA	2.4	—	—	V
L LEVEL OUTPUT VOLTAGE	VOL		IOL = 1.2 mA	—	—	0.4	V
POWER SUPPLY CURRENT (LOGIC)	IDD		VDD = 5.0 V	—	1.0	3.0	mA
RECOMMENDED LCD DRIVING VOLTAGE	VDD - VO ∅ = 25°, θ = ** DUTY = 1/16	ED	Ta = 0 ℃	—	4.2	—	V
			Ta = 25 ℃	—	3.8	—	V
			Ta = 50 ℃	—	3.4	—	V
	VDD - VO ∅ = 10°, θ = 0° DUTY = 1/16	EW	Ta = -20 ℃	—	4.4	—	V
			Ta = 25 ℃	—	4.4	—	V
			Ta = 70 ℃	—	4.4	—	V
CLOCK OSCILLATION FREQUENCY	FOSC		Ta = 25 ℃	—	270	—	KHZ
LED FORWARD VOLTAGE	VF		IF = 130 mA	—	4.2	4.6	V
LED FORWARD CURRENT	IF		—	—	130	—	mA
LED REVERSE CURRENT	IR		VR = 8 V	—	—	0.2	mA

∅ = 25° FOR TN TYPE
∅ = 10° FOR STN TYPE
** θ = 0° WHEN VIEWING DIRECTION IS 6 O'CLOCK
θ = 180° WHEN VIEWING DIRECTION IS 12 O'CLOCK

5. OPTICAL CHARACTERISTICS.

Ta = 25 ℃ VDD = 5.0 V

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	ED	∅2 - ∅1	K≧ 1.4		20	—	—	deg.	1
	EW				30	—	—	deg.	1
CONTRAST RATIO	ED	K	∅ = 25°, θ = * *		—	3	—	—	1
	EW		∅ = 10°, θ = 0°		5	—	—	—	1
RESPONSE TIME	ED	tr (rise)	∅ = 25°	Ta = 25℃	—	150	250	ms	1
		tf (fall)	θ = * *	Ta = 25℃	—	100	150		
	EW	tr (rise)	∅ = 10°	Ta = -20℃	—	5538	—		
				Ta = 25℃	—	228	—		
				Ta = 70℃	—	104	—		
		tf (fall)	θ = 0°	Ta = -20℃	—	2316	—		
				Ta = 25℃	—	174	—		
				Ta = 70℃	—	85	—		
THE BRIGHTNESS OF BACK-LIGHT		L	IF = 130 mA		—	31	—	cd/m²	1, 2
					—	67	—		1, 3
PEAK EMISSION WAVELENGTH		λP	IF = 130 mA		—	570	—	nm	1

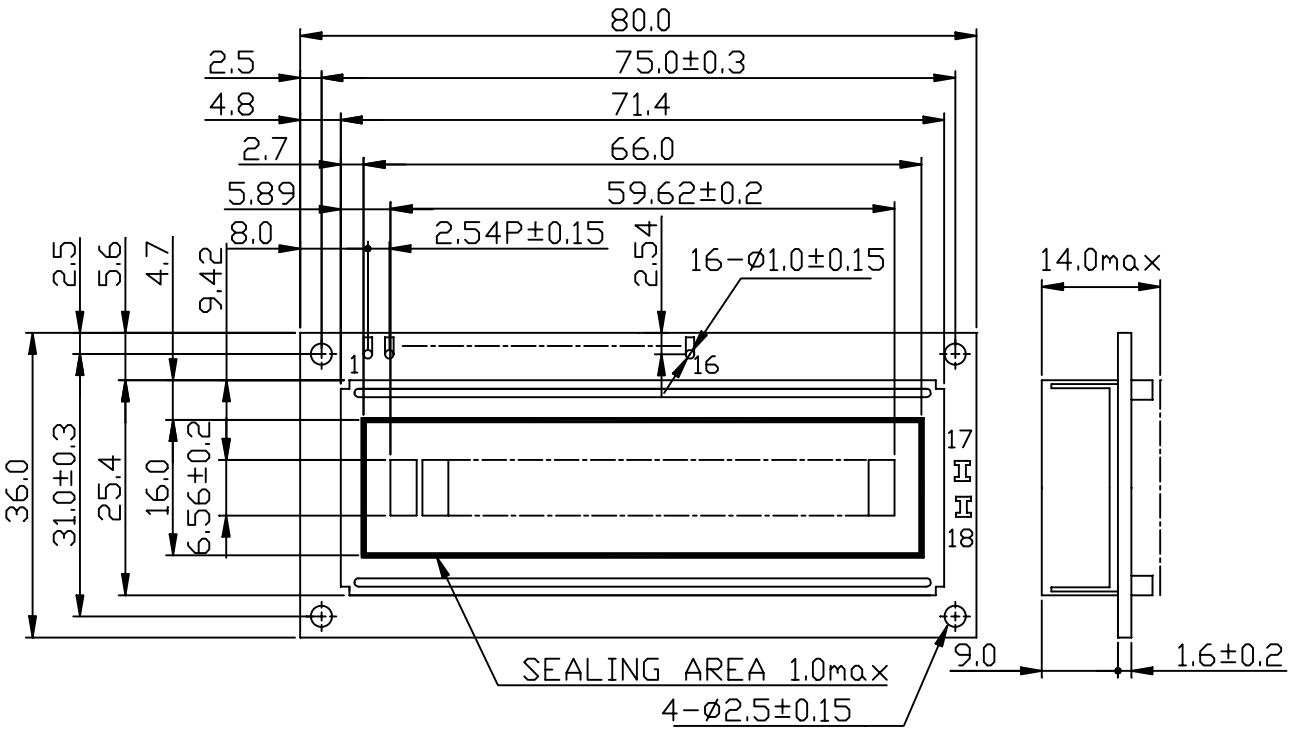
∅ = 25° FOR TN TYPE
∅ = 10° FOR STN TYPE
* * θ = 0° WHEN VIEWING DIRECTION IS 6 O'CLOCK
θ = 180° WHEN VIEWING DIRECTION IS 12 O'CLOCK

NOTE (1): PLEASE REFER TO :
CUSTOMER ACCEPTANCE STANDARD SPECIFICATION : EU-002A

NOTE (2): POLARIZER MODE : TRANSFLECTIVE

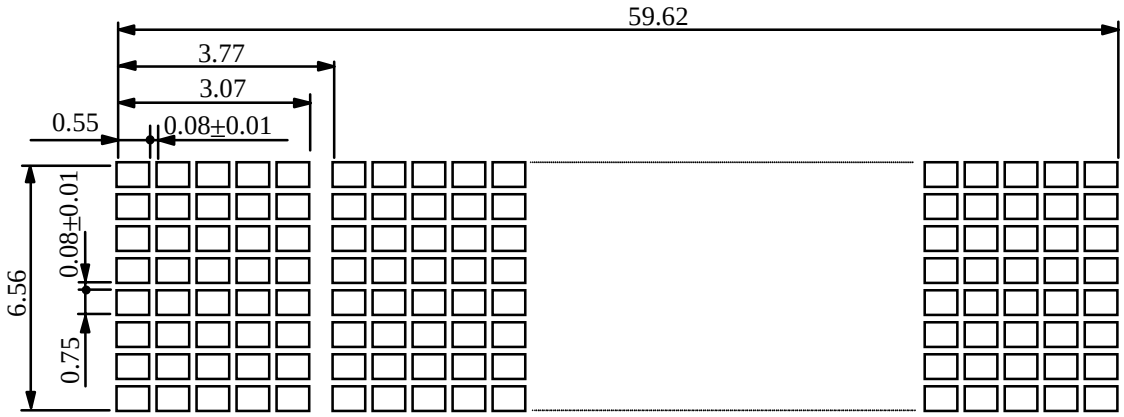
NOTE (3): POLARIZER MODE : TRANSMISSIVE

6 . OUTLINE DIMENSION



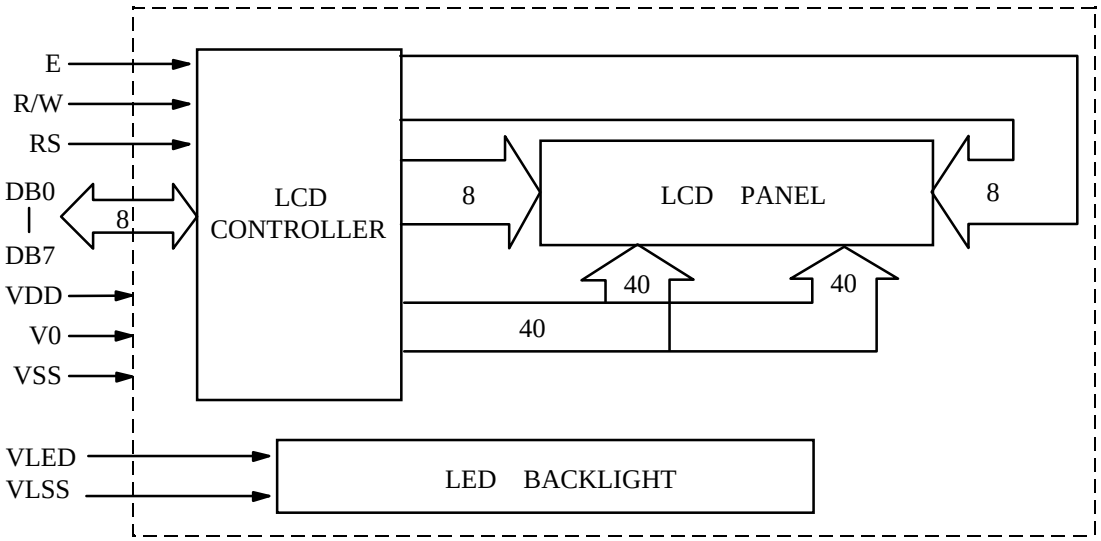
UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5

7. DETAIL DRAWING OF DOT MATRIX



UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.1

8. BLOCK DIAGRAM

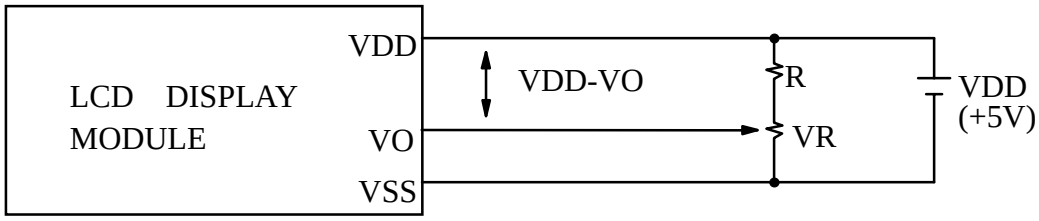


9 . INTERFACE SIGNALS

PIN NO.	SYMBOL	DESCRIPTION	FUNCTION
1	VSS	GROUND	0V (GND)
2	VDD	POWER SUPPLY FOR LOGIC CIRCUIT	+5V
3	VO	LCD CONTRAST ADJUSTMENT	
4	RS	INSTRUCTION/DATA REGISTER SELECTION	RS = 0 : INSTRUCTION REGISTER RS = 1 : DATA REGISTER
5	$R/\overline{W}$	READ/WRITE SELECTION	$R/\overline{W}$ = 0 : REGISTER WRITE $R/\overline{W}$ = 1 : REGISTER READ
6	E	ENABLE INPUT	
7	DB0	DATA INPUT/OUTPUT LINES	4 BIT/8BIT SELECTABLE 4 BIT : DB4 - DB7 8 BIT : DB0 - DB7
8	DB1		
9	DB2		
10	DB3		
11	DB4		
12	DB5		
13	DB6		
14	DB7		
15	VLED	POWER SUPPLY FOR LED BACKLIGHT(ANODE)	
16	VLSS	POWER SUPPLY FOR LED BACKLIGHT(CATHODE)	0V (GND)
17	VLED	POWER SUPPLY FOR LED BACKLIGHT(ANODE)	
18	VLSS	POWER SUPPLY FOR LED BACKLIGHT(CATHODE)	0V (GND)

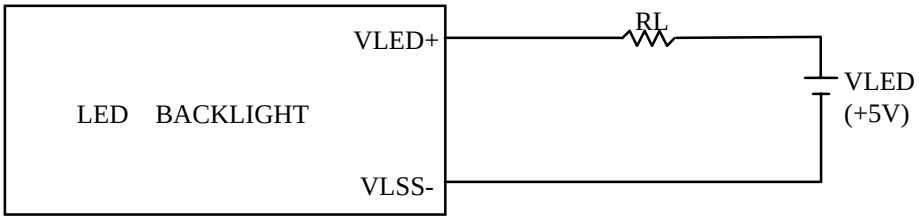
10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCD MODULE



VDD - VO: LCD DRIVING VOLTAGE
VR : 10KΩ~20KΩ
RECOMMENDED RESISTOR R : VDD – V0 ≥ 1.5V

10.2 POWER SUPPLY FOR LED BACK-LIGHT



RECOMMENDED RESISTOR RL : 6~15Ω,1/4 WATT (CONTROLLED BY USER)
* THE BRIGHTNESS WOULD BE ALTERED SUBJECT TO DIFFERENT VALUES OF RL

11. DISPLAY DATA RAM ADDRESS

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	C0	C1	C2	C3	C4	C5	C6	C7