EXAMINED BY :		FILE NO . CAS-10184
Kevin Kuo	EMERGING DISPLAY	ISSUE : JUN.03,2002
APPROVED BY:	TECHNOLOGIES CORPORATION	TOTAL PAGE : 7
Roger Yang		VERSION : 3

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO. :

20400 (LED TYPES)

FOR MESSRS :

CUSTOMER'S APPROVAL

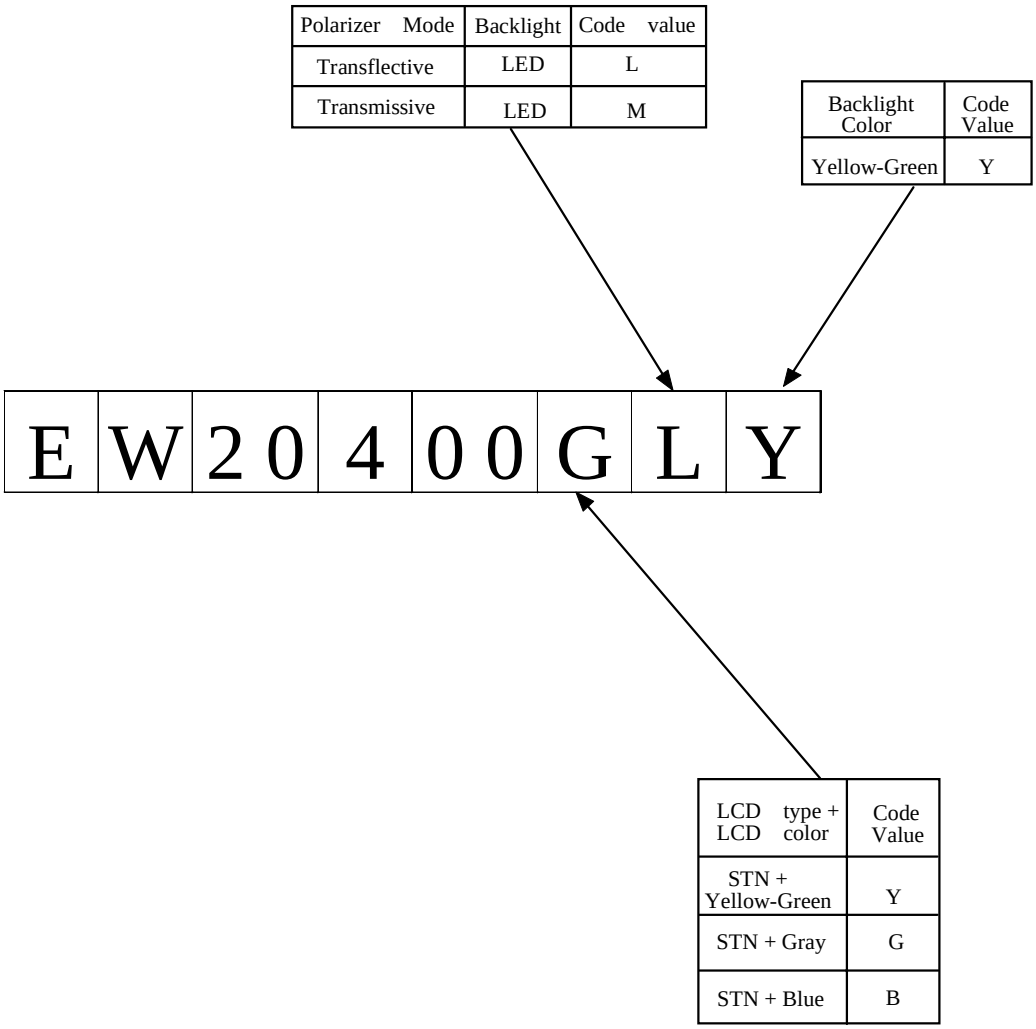
DATE :

BY :

EMERGING DISPLAY TECHNOLOGIES CORPORATION	MODEL NO. 20400 (LED TYPES)	VERSION 3
RECORDS OF REVISION	DOC . FIRST ISSUE AUG.26,1999	

DATE	REVISED PAGE NO.	SUMMARY
DEC.01,1999	1	2. MECHANICAL SPECIFICATIONS DELETE VIEWING DIRECTION
	3	5. OPTICAL CHARACTERISTICS PEAK EMISSION WAVELENGH : TYP. 570 → 572 nm
JUN.03,2002	3	5. OPTICAL CHARACTERISTICS ADD MINIMUM VALUE FOR BRIGHTNESS OF BACK-LIGHT

NUMBERING SYSTEM



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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	20 CH * 4 LINES
(2)	MODULE SIZE	98.0W * 60.0H * 14.0D (max.) mm
(3)	EFFECTIVE AREA	76.0W * 25.2H mm
(4)	CHARACTER FONT	5 * 7 DOTS + CURSOR
(5)	CHARACTER SIZE	2.95W * 4.75H mm
(6)	CHARACTER PITCH	3.55W * 5.35H mm
(7)	DOT SIZE	0.55W * 0.55H mm
(8)	DOT PITCH	0.60W * 0.60H mm
(9)	LCD TYPE *	
(10)	DRIVING METHOD	1 / 16 DUTY MULTIPLEX DRIVE
(11)	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	REMARK
POWER SUPPLY FOR LOGIC	VDD – VSS	0	7.0	V	
POWER SUPPLY FOR LCD DRIVE	VDD – VO	0	13.0	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	—	—	100	V	NOTE (1)
LED POWER DISSIPATION	PD	—	2.6	W	
LED FORWARD CURRENT	IF	—	560	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		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-20°C	70°C	-30°C	80°C	NOTE (2), (3)
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 -30°C : 48HR MAX.
80°C : 168HR MAX.
NOTE (3) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE.

4. ELECTRICAL CHARACTERISTICS

Ta = 25 °C 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	—	2.0	5.0	mA
RECOMMENDED LCD DRIVING VOLTAGE	VDD – VO ∅ =10°, θ = 0° DUTY= 1/16	Ta = - 20 °C	—	4.4	—	V
		Ta = 25 °C	—	4.4	—	V
		Ta = 70 °C	—	4.4	—	V
CLOCK OSCILLATION FREQUENCY	fosc	Ta = 25 °C	—	270	—	KHZ
LED FORWARD VOLTAGE	VF	IF = 280 mA	—	4.2	4.6	V
LED FORWARD CURRENT	IF	—	—	280	—	mA
LED REVERSE CURRENT	IR	VR = 8 V	—	—	280	μA

5. OPTICAL CHARACTERISTICS.

Ta = 25 °C VDD = 5.0 V

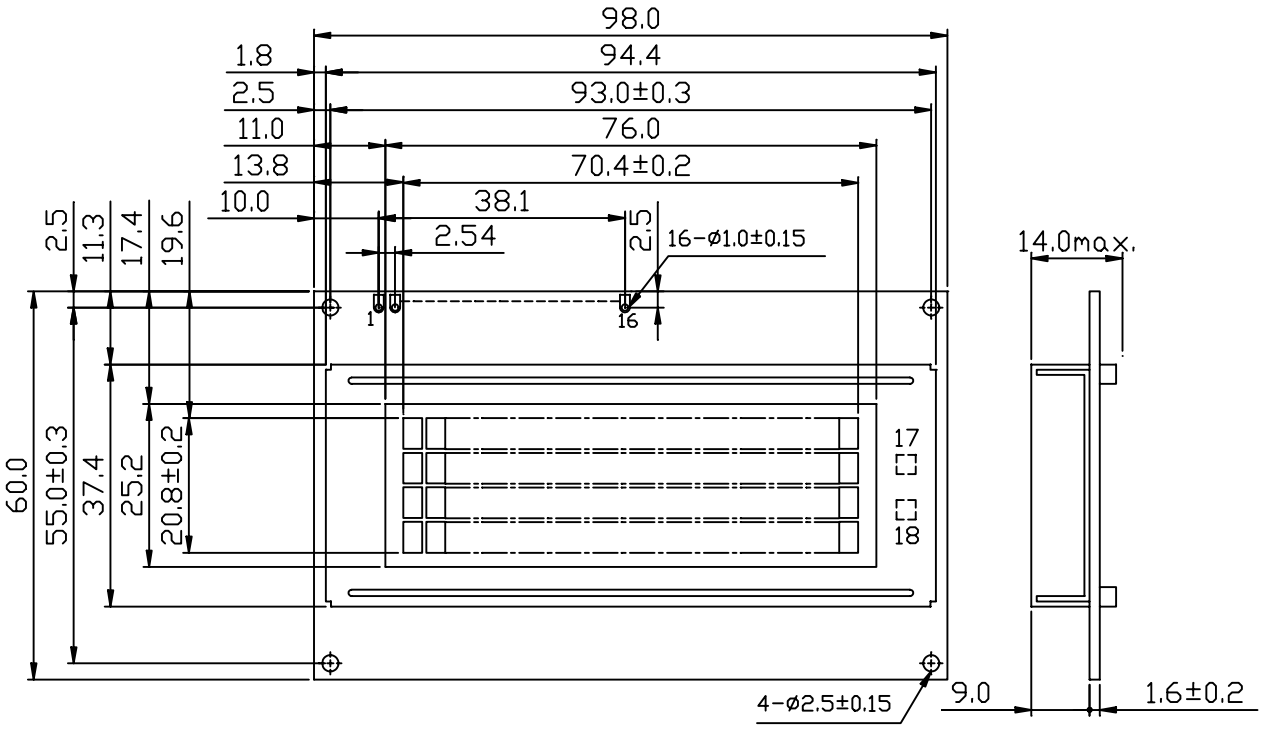
ITEM	SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	∅2 – ∅1	K ≥ 1.4		30	—	—	deg.	1
CONTRAST RATIO	K	∅ = 10° θ = 0°		5	—	—	—	1
RESPONSE TIME	tr (rise)	∅ = 10° θ = 0°	Ta = -20°C	—	5538	—	ms	1
			Ta = 25°C	—	228	—		
			Ta = 70°C	—	104	—		
	tf (fall)		Ta = -20°C	—	2316	—		
			Ta = 25°C	—	174	—		
			Ta = 70°C	—	85	—		
THE BRIGHTNESS OF BACK-LIGHT	L	IF = 240 mA		25	35	—	cd/m²	1, 2
				55	75	—		1, 3
PEAK EMISSION WAVELENGTH	λP	IF = 240 mA		—	572	—	nm	1

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

NOTE (2) : POLARIZER MODE : TRANSFLECTIVE

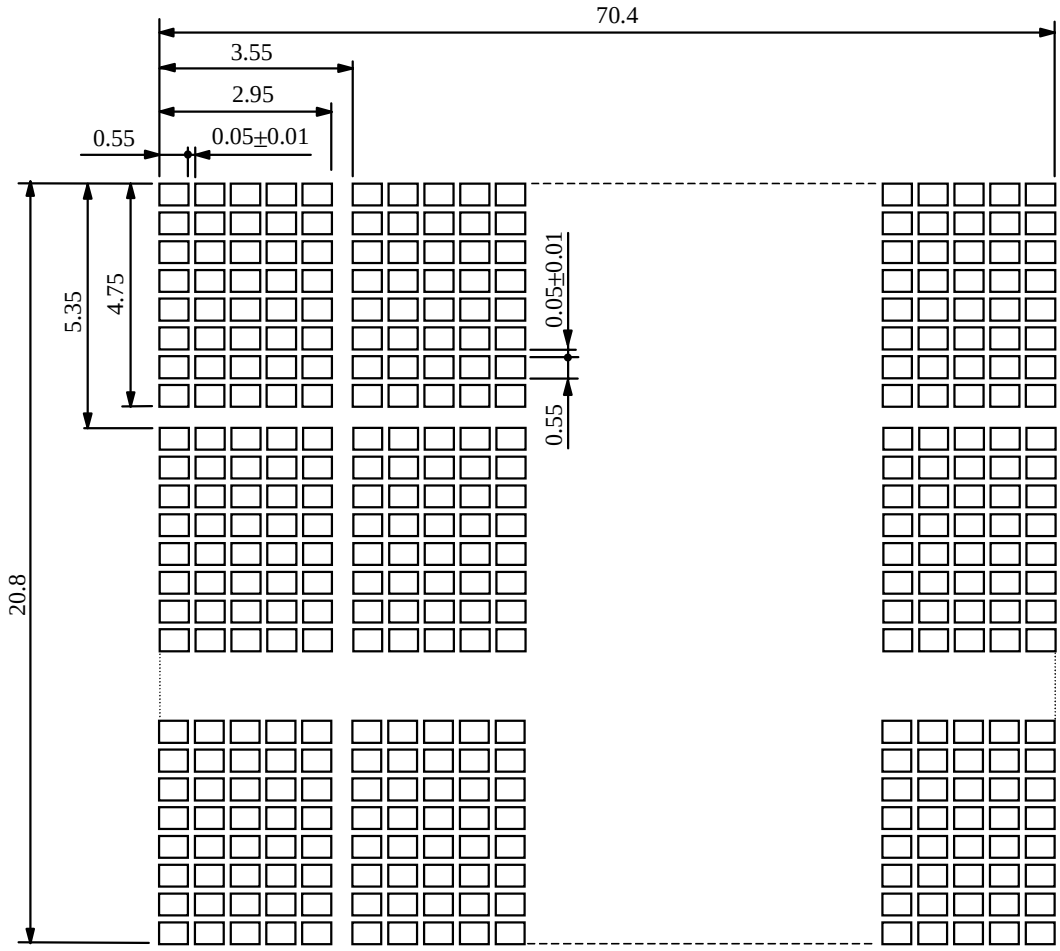
NOTE (3) : POLARIZER MODE : TRANSMISSIVE

6 . OUTLINE DIMENSION



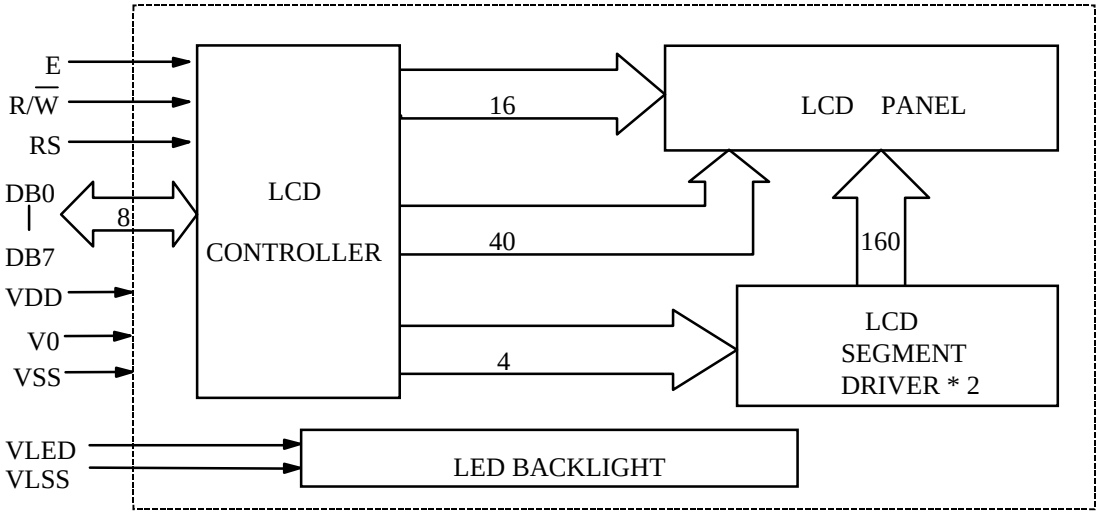
UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5

7. DETAIL DRAWING OF DOT MATRIX



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

8. BLOCK DIAGRAM

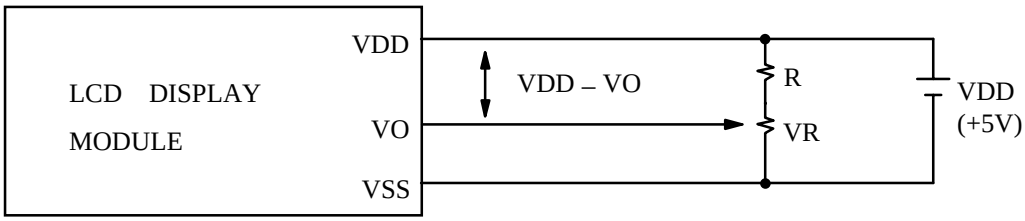


9 . INTERFACE SIGNALS

PIN NO.	SYMBOL	DESCRIPTION	FUNCTION
1	VSS	GROUND	0V (GND)
2	VDD	POWER SUPPLY FOR LOGIC CIRCUIT	+5V
3	V0	LCD CONTRAST FOR LOGIC CIRCUIT	
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)

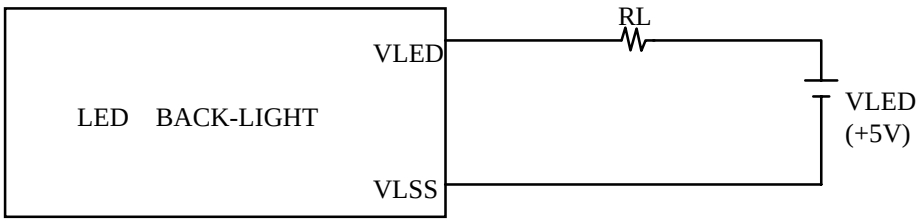
10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCD MODULE



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

10.2 POWER SUPPLY FOR LED BACKLIGHT



RECOMMENDED RESISTOR RL : 3~6.8Ω , 1 / 2 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	17	18	19	20
LINE 1	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90	91	92	93
LINE 2	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE	CF	D0	D1	D2	D3
LINE 3	94	95	96	97	98	99	8A	9B	9C	9D	9E	9F	A0	A1	A2	A3	A4	A5	A6	A7
LINE 4	D4	D5	D6	D7	D8	D9	DA	DB	DC	DD	DE	DF	E0	E1	E2	E3	E4	E5	E6	E7