EXAMINED BY : Tony Chen	EMERGING DISPLAY	FILE NO . CAS- 10077
		ISSUE : JAN.24,2000
APPROVED BY: David Chang	TECHNOLOGIES CORPORATION	TOTAL PAGE : 8
		VERSION : 4

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO . :

24B00(LED TYPES)

FOR MESSRS :

_____

CUSTOMER'S APPROVAL

DATE :

_____

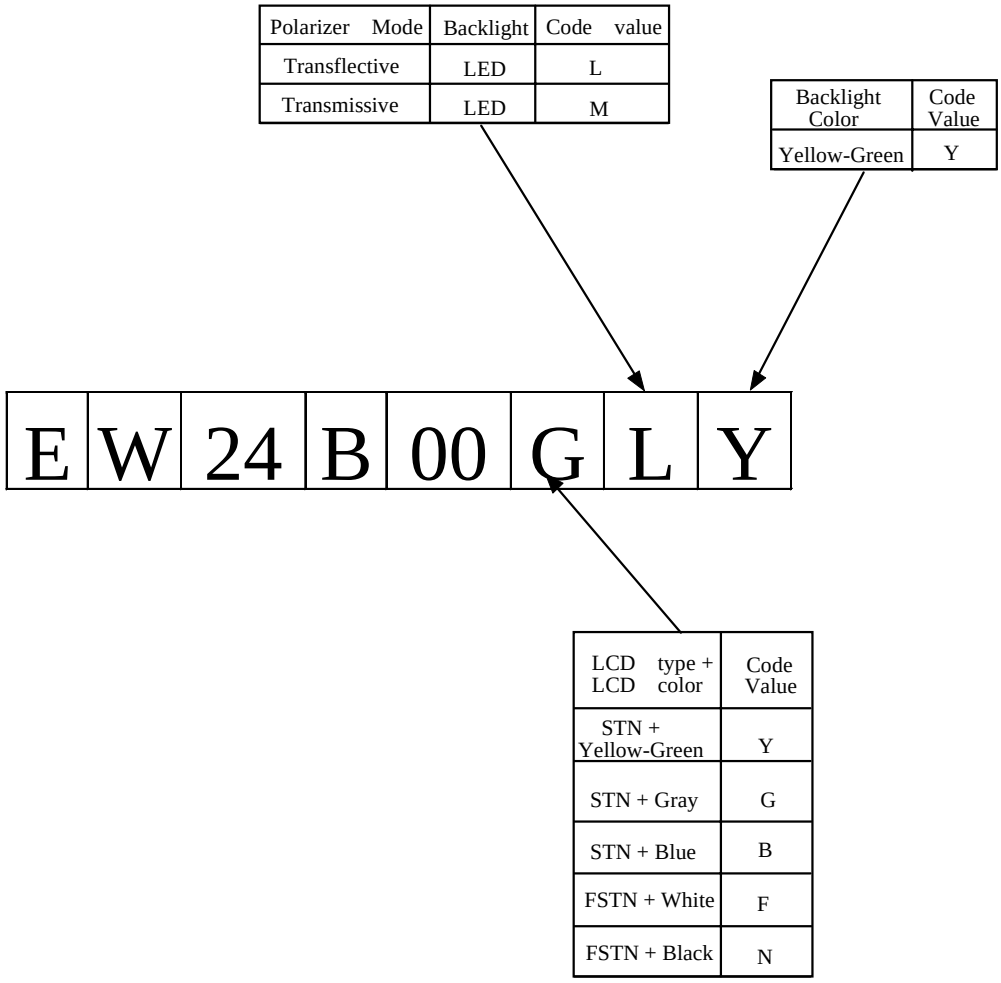
BY :

_____

EMERGING DISPLAY TECHNOLOGIES CORPORATION	MODEL NO. 24B00(LED TYPES)	VERSION 4
RECORDS OF REVISION	DOC. FIRST ISSUE NOV.28,1997	

DATE	REVISED PAGE NO.	SUMMARY
NOV.11, 1998	3	4. ELECTRICAL CHARACTERISTICS THE NUMBERS OF " RECOMMENDED LCD DRIVING VOLTAGE " REVISED AS BELOW : W.T. Ta = -20 °C 10.8 → 12.0 Ta = 25 °C 9.6 → 12.0 Ta = 70 °C 8.8 → 12.0
MAR.25,1999	3	4. ELECTRICAL CHARACTERISTICS THE NUMBERS OF " RECOMMENDED LCD DRIVING VOLTAGE " REVISED AS BELOW : W.T. Ta = -20 °C 12.0 → 13.9 Ta = 25 °C 12.0 → 12.1 Ta = 70 °C 12.0 → 11.1
JAN.24,2000	1~4	THE ENTIRE PAGES REVISED.

NUMBERING SYSTEM



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1. GENERAL SPECIFICATIONS

1.1 QUALITY 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 - T 6 9 6 3 C

1.3 THIS INDIVIDUAL SPECIFICATIONS IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

(1) NUMBER OF DOTS	----------	240W * 64H DOTS
(2) MODULE SIZE	----------	180.0W * 65.0H * 16.0D (max .) mm
(3) EFFECTIVE AREA	----------	133.0W * 40.0H mm
(4) ACTIVE AREA	----------	127.16W * 33.88H mm
(5) DOT SIZE	----------	0.49W * 0.49H mm
(6) DOT PITCH	----------	0.53W * 0.53H mm
(7) LCD TYPE *		
(8) DRIVING METHOD	----------	1 / 64 DUTY MULTIPLEX DRIVE
(9) BACK LIGHT	----------	LED, COLOR : YELLOW-GREEN

* 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 – VEE	0	22.0	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	—	—	100	V	NOTE (1)
LED POWER DISSIPATION	PD	—	7.4	W	
LED FORWARD CURRENT	IF	—	1625	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.

I T E M	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-20 °C	70 °C	-30 °C	80 °C	NOTE (2), (3)
HUMIDITY	—	85 % RH	—	85 % RH	WITHOUT CONDENSATION
VIBRATION	—	4.9 m/s^2 (0.5 G)	—	19.6 m/s^2 (2 G)	10~300 HZ XYZ DIRECTIONS 1 Hr EACH
SHOCK	—	29.4 m/s^2 (3 G)	—	490.0 m/s^2 (50 G)	10 m SEC XYZ DIRECTIONS 1 TIME EACH
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

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	—	-2.0	—	-10.0	V
INPUT VOLTAGE NOTE (1)	VIH	H LEVEL	VDD-2.2	—	VDD	V
	VIL	L LEVEL	0	—	0.8	V
OUTPUT VOLTAGE NOTE (1)	VOH	H LEVEL	VDD-0.3	—	VDD	
	VOL	L LEVEL	0	—	0.3	
POWER SUPPLY CURRENT FOR LOGIC NOTE (2)	IDD	VDD – VSS = 5.0 V VDD – VEE = 8.7 V	—	9.0	—	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (3)	VDD-VEE ∅ = 10° θ = 0° DUTY=1/64	Ta = -20 °C	—	8.7	—	V
		Ta = 25 °C	—	8.7	—	V
		Ta = 70 °C	—	7.9	—	V
CLOCK OSCILLATION FREQUENCY	f OSC	—	—	3.58	—	MHZ
LED FORWARD VOLTAGE	VF	IF = 650 mA	—	4.2	4.6	V
LED FORWARD CURRENT	IF	—	—	650	—	mA
LED REVERSE CURRENT	IR	VR = 8 V	—	—	200	μA

NOTE (1): APPLIED TO TERMINALS ($\overline{WR}$, $\overline{RD}$, $\overline{CE}$, C/$\overline{D}$, $\overline{RST}$, FS, D0~D7)

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

NOTE (3): RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT ± 0.5 V BY EACH MODULE

5. OPTICAL CHARACTERISTICS

Ta = 25 °C VDD = 5.0 V

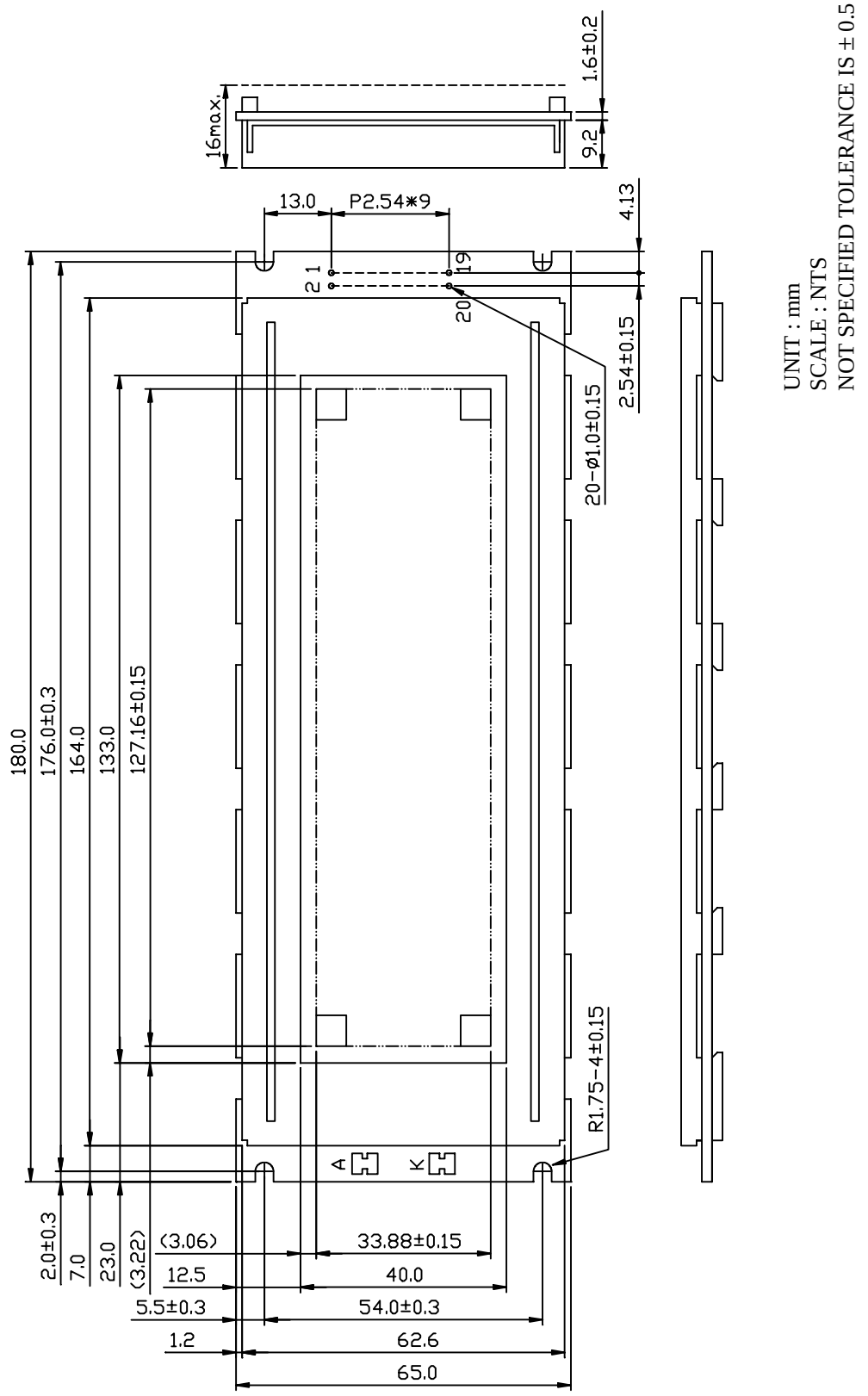
ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	STN	∅2 - ∅1	K≧ 1.4		40	—	—	deg.	1
	FSTN				50	—	—	deg.	1
CONTRAST RATIO	STN	K	∅ = 10 °		—	5	—	—	1
	FSTN		θ = 0 °		5	—	—	—	1
RESPONSE TIME		tr (rise)	∅ = 10° θ = 0°	Ta = -20°C	—	3982	—	ms	1
				Ta = 25°C	—	228	—		
				Ta = 70°C	—	83	—		
		tf (fall)		Ta = -20°C	—	3752	—		
				Ta = 25°C	—	176	—		
				Ta = 70°C	—	94	—		
THE BRIGHTNESS OF BACK-LIGHT		L	IF = 650 mA		—	30	—	cd/m²	1, 2
						65			1, 3
PEAK EMISSION WAVELENGTH		λP	IF = 650 mA		—	572	—	nm	1

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

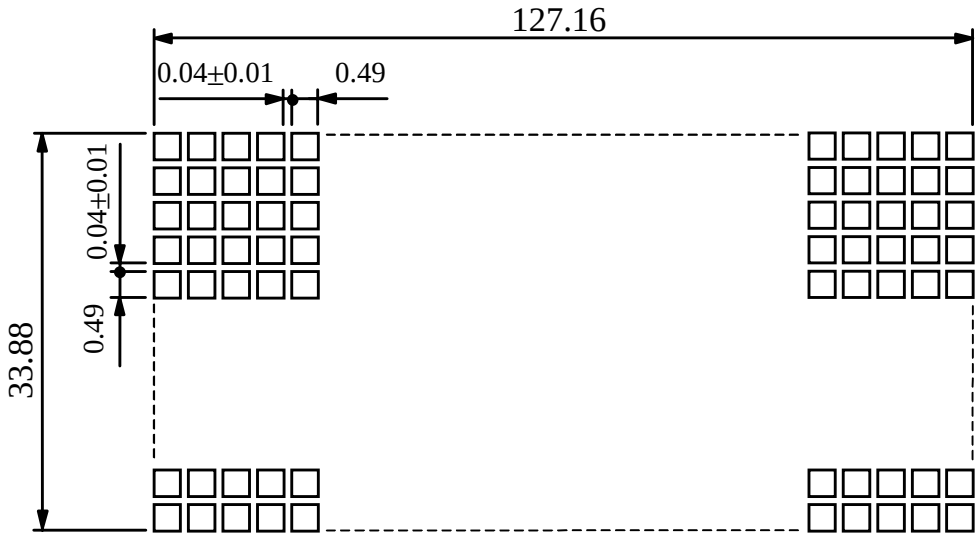
NOTE (2) : POLARIZER MODE : TRANSFLECTIVE

NOTE (3) : POLARIZER MODE : TRANSMISSIVE

6. OUTLINE DIMENSION

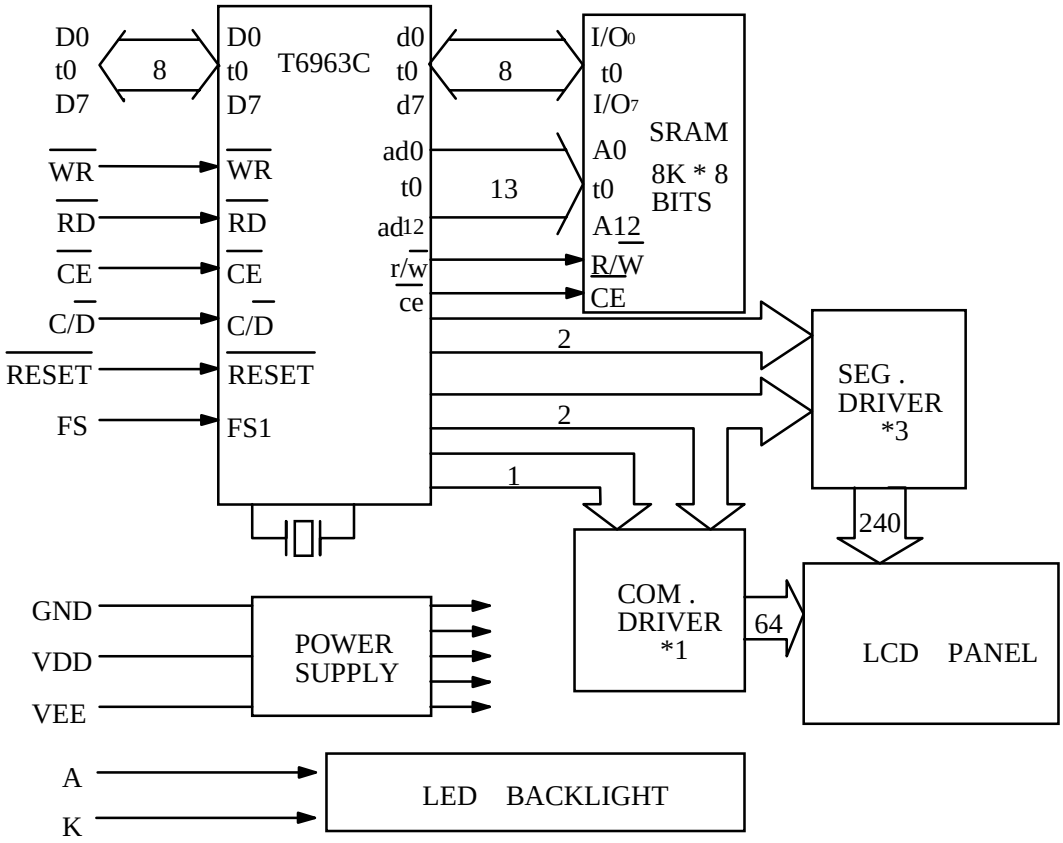


7. DETAIL DRAWING OF DOT MATRIX



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

8. BLOCK DIAGRAM

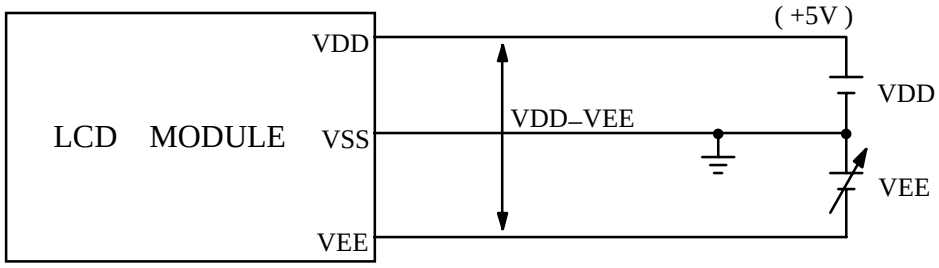


9. INTERFACE SIGNALS

PIN NO.	SIGNAL	FUNCTION
1	FGND	FRAME GROUND (0V)
2	GND	GROUND
3	VDD	POWER SUPPLY FOR LOGIC (+5V)
4	VEE	POWER SUPPLY FOR LCD DRIVER
5	$\overline{WR}$	DATA WRITE
6	$\overline{RD}$	DATA READ
7	$\overline{CE}$	CHIP ENABLE
8	C/$\overline{D}$	$\overline{WR}$ = " L " , C/$\overline{D}$ = " H " : COMMAND WRITE C/$\overline{D}$ = " L " : DATA WRITE $\overline{RD}$ = " L " , C/$\overline{D}$ = " H " : STATUS READ C/D = " L " : DATA READ
9	NC	————
10	$\overline{RESET}$	CONTROLLER RESET
11~18	D0~D7	DATA INPUT/OUTPUT
19	FS	FONT SELECT : CONNECT TO VDD : 6*8 PIXEL/FONT CONNECT TO GND : 8*8 PIXEL/FONT
20	NC	————
A	VLED	POWER SUPPLY FOR LED BACKLIGHT (ANODE)
K	VLSS	POWER SUPPLY FOR LED BACKLIGHT (CATHODE)

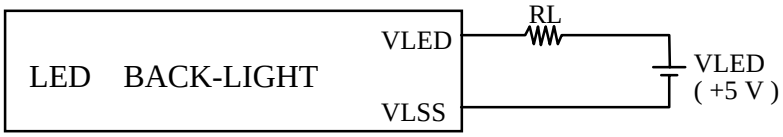
10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCD MODULE



VDD-VEE : LCD DRIVING VOLTAGE

10.2 POWER SUPPLY FOR LED BACK-LIGHT



RECOMMENDED RESISTOR RL : 1.2~2.5Ω, 1 WATT (CONTROLLED BY USER)
* THE BRIGHTNESS WOULD BE ALTERED SUBJECT TO DIFFERENT VALUES OF RL

10.3 POWER AND INTERFACE TIMING SEQUENCE