

EXAMINED BY:  <i>Tony Chen</i>	<b>mitsutech</b>  INTERNATIONAL CORPORATION	FILE NO . CAS-10054
APPROVED BY:  <i>David Chang</i>		ISSUE : NOV.15,1999
		TOTAL PAGE : 7
		VERSION : 2

CUSTOMER	ACCEPTANCE	SPECIFICATIONS
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MODEL NO. :

162C0(REFLECTIVE TYPES)

FOR MESSRS :

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CUSTOMER'S APPROVAL

DATE :

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BY :

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MITSUTECH INT'L CORP.

MODEL NO .	VERSION
162C0(REFLECTIVE TYPES)	2

DOC . FIRST ISSUE	DEC.05,1997
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**RECORDS OF REVISION**

DATE	REVISED PAGE NO.	SUMMARY
NOV.15,1999	1 ~ 3	THE ENTIRE PAGES REVISED

NUMBERING SYSTEM

Polarizer Mode	Backlight	Code value
Reflective	—	R

Module type : D : TN Character Modules  
 W : Wide Temp. Modules

E W 16 2 C0 G R \*

LCD type + LCD color	Code Value
TN + Gray	T
STN + Yellow-Green	Y
STN + Gray	G
STN + Blue	B

Viewing direction  
 NIL : 6 o'clock  
 U : 12 o'clock

\* : 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 \* 2 LINES
- ( 2 ) MODULE SIZE ----- 85.0W \* 36.0H \* 10.0D (max.) mm
- ( 3 ) EFFECTIVE AREA ----- 63.5W \* 15.8H mm
- ( 4 ) CHARACTER FONT ----- 5 \* 7 DOTS + CURSOR
- ( 5 ) CHARACTER SIZE ----- 2.96W \* 5.56H mm
- ( 6 ) CHARACTER PITCH ----- 3.55W \* 5.94H mm
- ( 7 ) DOT SIZE ----- 0.56W \* 0.66H mm
- ( 8 ) DOT PITCH ----- 0.60W \* 0.70H mm
- ( 9 ) LCD TYPE\*
- ( 10 ) DRIVING METHOD ----- 1 / 16 DUTY MULTIPLEX DRIVE

\* PLEASE REFER TO NUMBERING SYSTEM .

### 3. ABSOLUTE MAXIMUM RATINGS

#### 3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS . ( AT Ta = 25 °C )

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)

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	ED	0 °C	50 °C	-20 °C	70 °C	NOTE (2), (3)
	EW	-20 °C	70 °C	-30 °C	80 °C	
HUMIDITY		—	90 % RH	—	90 % RH	WITHOUT CONDENSATION
VIBRATION		—	4.9 m/s <sup>2</sup> (0.5 G)	—	19.6 m/s <sup>2</sup> (2 G)	
SHOCK		—	29.4 m/s <sup>2</sup> (3 G)	—	490.0 m/s <sup>2</sup> (50 G)	XYZ DIRECTIONS
CORROSIVE GAS		NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (2) : Ta AT -20°C (-30°C FOR EW) : 48HR MAX .

70°C (80°C FOR EW) : 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	—	1.0	3.0	mA	
RECOMMENDED LCD DRIVING VOLTAGE	ED	VDD - VO	Ta = 0 °C	—	4.2	—	V
		∅ = 25°, θ = ** DUTY= 1/16	Ta = 25 °C	—	3.8	—	V
			Ta = 50 °C	—	3.4	—	V
	EW	VDD - VO	Ta = -20 °C	—	4.4	—	V
		∅ = 10°, θ = 0° DUTY= 1/16	Ta = 25 °C	—	4.4	—	V
			Ta = 70 °C	—	4.4	—	V
CLOCK OSCILLATION FREQUENCY	FOSC	Ta = 25 °C	—	270	—	KHZ	

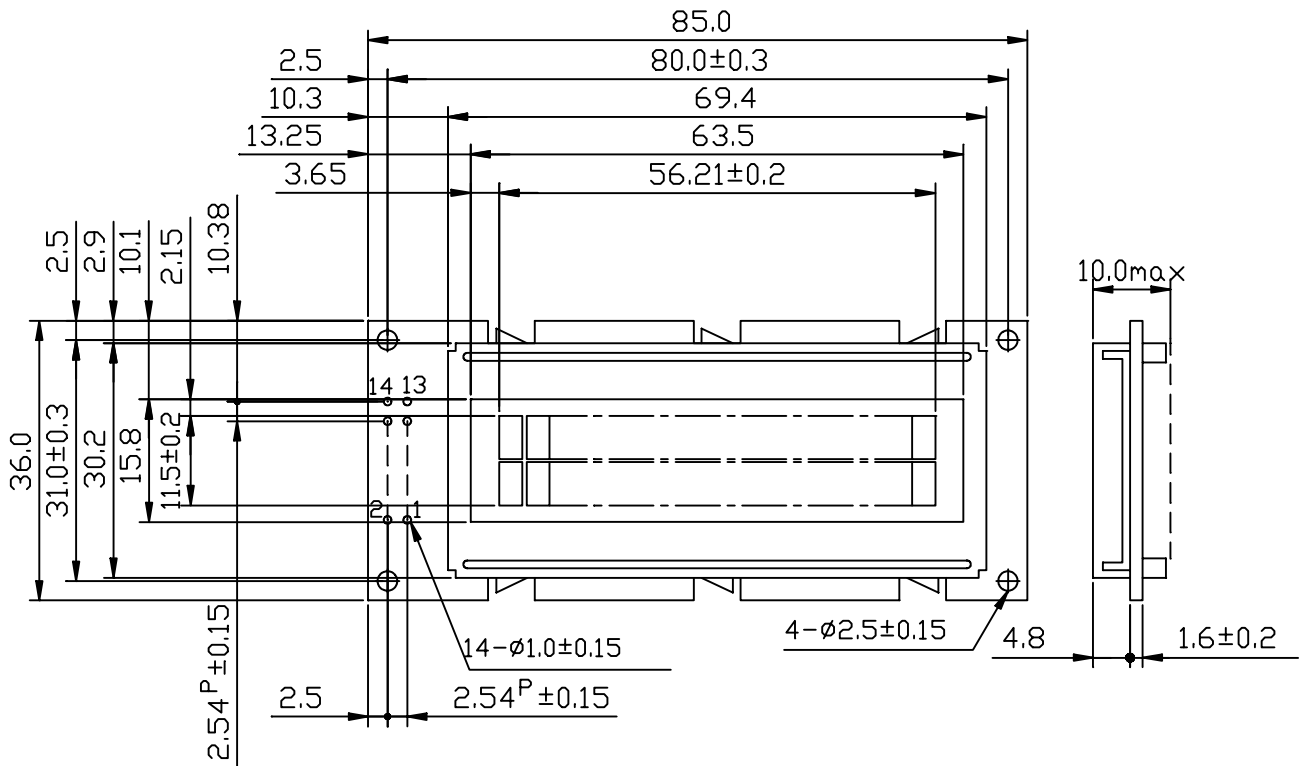
## 5. OPTICAL CHARACTERISTICS.

		Ta = 25 °C		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° θ = **	Ta = 25°C	—	150	250	ms	1
		tf ( fall )		Ta = 25°C	—	100	150		
	EW	tr ( rise )	∅ = 10° θ = 0°	Ta = -20°C	—	5538	—		
				Ta = 25°C	—	228	—		
		Ta = 70°C		—	104	—			
		tf ( fall )		Ta = -20°C	—	2316	—		
				Ta = 25°C	—	174	—		
				Ta = 70°C	—	85	—		

\*\* θ = 0° WHEN VIEWING DIRECTION IS 6 O'CLOCK  
θ = 180° WHEN VIEWING DIRECTION IS 12 O'CLOCK

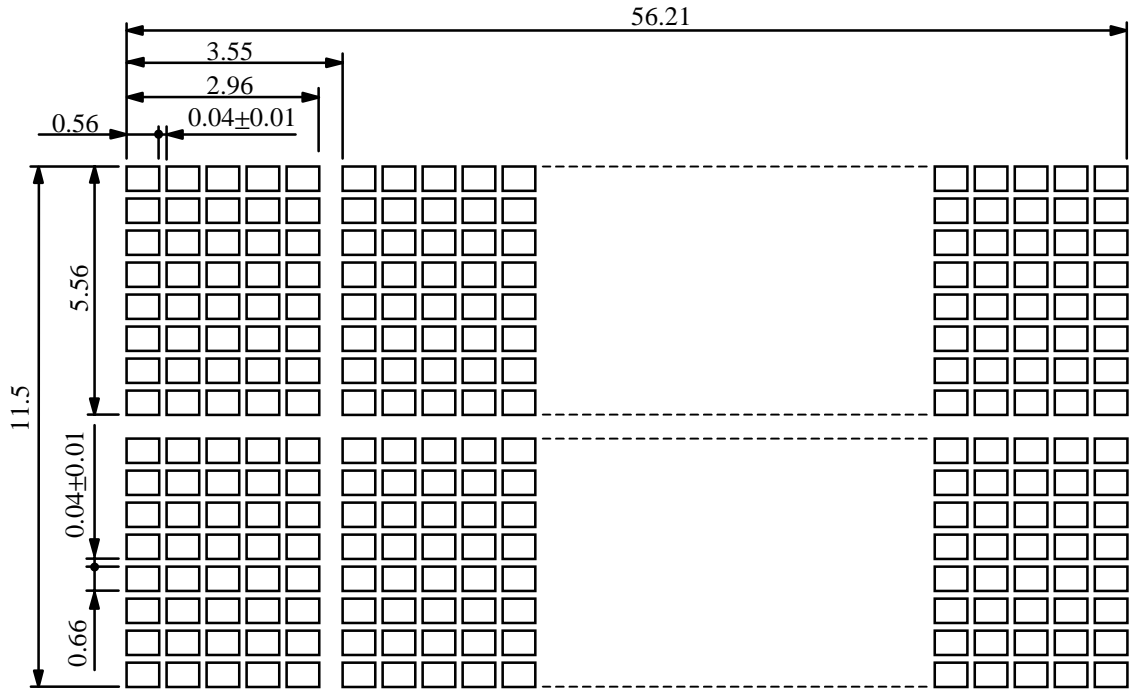
NOTE (1): PLEASE REFER TO :  
CUSTOMER ACCEPTANCE STANDARD SPECIFICATION .  
EU - 002A

6. OUTLINE DIMENSION



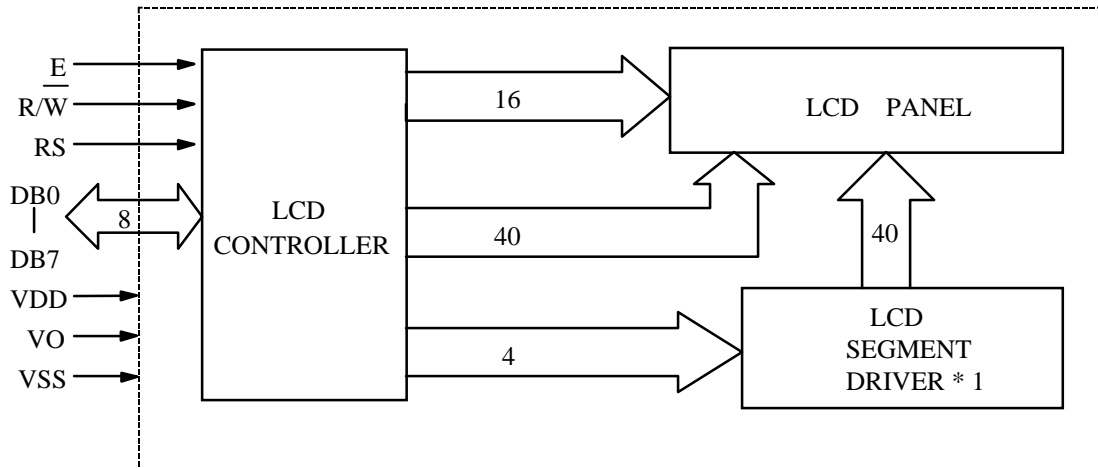
UNIT : mm  
 SCALE : NTS  
 NOT SPECIFIED TOLERANCE IS ±0.5mm

7. DETAIL DRAWING OF DOT MATRIX



UNIT : mm  
 SCALE : NTS  
 NOT SPECIFIED TOLERANCE IS  $\pm 0.1$

8. BLOCK DIAGRAM

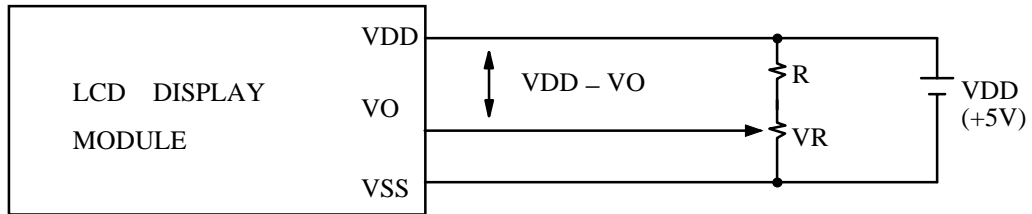


## 9. INTERFACE SIGNALS

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	$\overline{R/W}$	READ/WRITE SELECTION	$\overline{R/W}$ = 0 : REGISTER WRITE $\overline{R/W}$ = 1 : REGISTER READ
6	E	ENABLE INPUT	
7   14	DB0   DB7	DATA INPUT/OUTPUT LINES	4 BIT/ 8 BIT SELECTABLE 4 BIT:DB4-DB7 8 BIT:DB0-DB7

10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCD MODULE



VDD - VO : LCD DRIVING VOLTAGE

VR : 10KΩ ~ 20KΩ

RECOMMENDED RESISTOR R :  $VDD - VO \geq 1.5 V$

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	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