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|----------------------------------------|--------------------------------------------------|---------------------|
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|          |            |                |
|----------|------------|----------------|
| CUSTOMER | ACCEPTANCE | SPECIFICATIONS |
|----------|------------|----------------|

MODEL NO. :

162G0(REFLECTIVE TYPES)

FOR MESSRS :

\_\_\_\_\_

CUSTOMER'S APPROVAL

DATE :

\_\_\_\_\_

BY :

\_\_\_\_\_

EMERGING DISPLAY  
TECHNOLOGIES CORPORATION

MODEL NO .  
162G0(REFLECTIVE TYPES)

VERSION  
2

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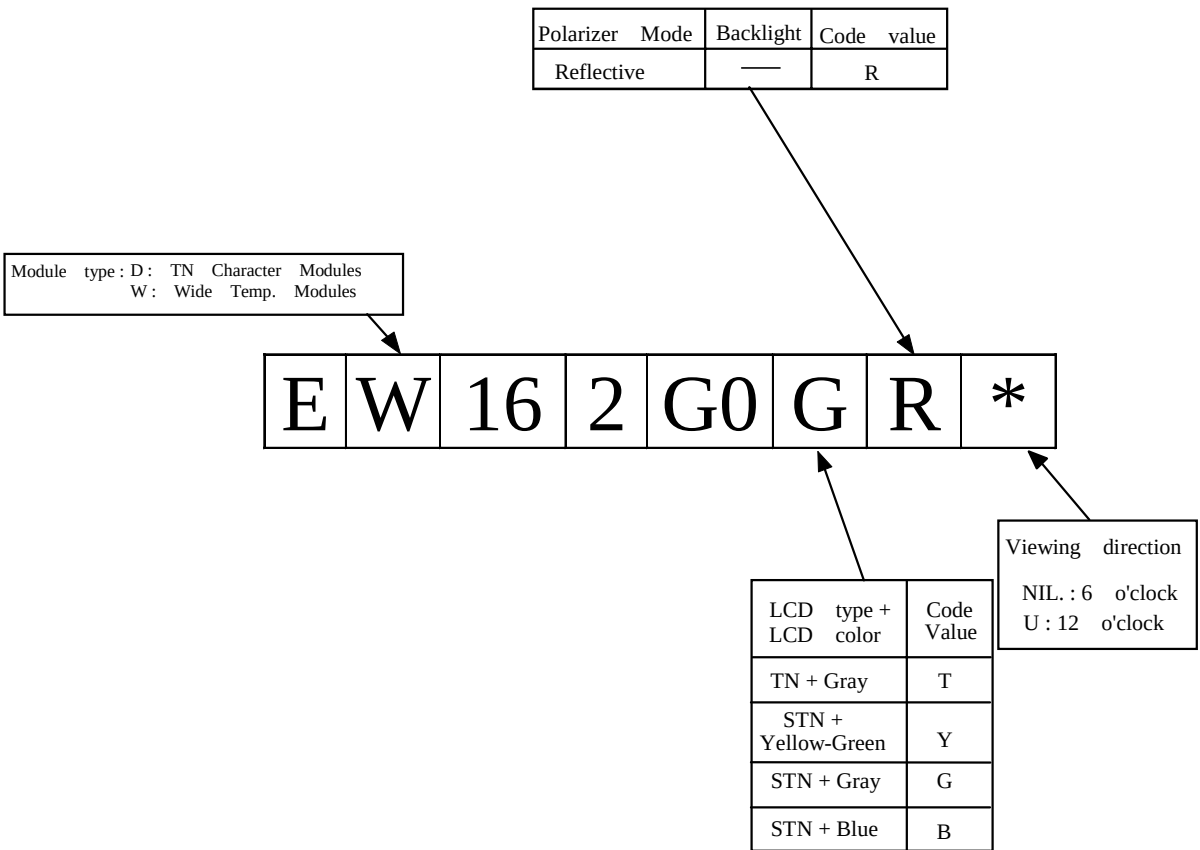
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NOV.09,1999

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THE ENTIRE PAGES REVISED

NUMBERING SYSTEM



\* : AVAILABLE ONLY FOR TN TYPE

TABLE OF CONTENTS

| NO.   | ITEM                               | PAGE |
|-------|------------------------------------|------|
| ===== |                                    |      |
| 1.    | GENERAL SPECIFICATIONS -----       | 1    |
| 2.    | MECHANICAL SPECIFICATIONS -----    | 1    |
| 3.    | ABSOLUTE MAXIMUM RATINGS -----     | 2    |
| 4.    | ELECTRICAL CHARACTERISTICS -----   | 3    |
| 5.    | OPTICAL CHARACTERISTICS -----      | 3    |
| 6.    | OUTLINE DIMENSION -----            | 4    |
| 7.    | DETAIL DRAWING OF DOT MATRIX ----- | 5    |
| 8.    | BLOCK DIAGRAM -----                | 5    |
| 9.    | INTERFACE SIGNALS -----            | 6    |
| 10.   | POWER SUPPLY -----                 | 7    |
| 11.   | DISPLAY DATA RAM ADDRESS -----     | 7    |

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 ----- 80.0W \* 36.0H \* 10.0D (max.) mm
- ( 3 ) EFFECTIVE AREA ----- 64.5W \* 13.8H 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
- ( 11 ) VIEWING DIRECTION \*

\* 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><br>(0.5 G) | —              | 19.6 m/s <sup>2</sup><br>(2 G)   |                      |
| SHOCK               |    | —              | 29.4 m/s <sup>2</sup><br>(3 G)  | —              | 490.0 m/s <sup>2</sup><br>(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 | VDD − VO<br>∅ = 25°, θ = **<br>DUTY= 1/16 | ED              | Ta = 0 °C    | —     | 4.2   | V    |
|                                 |                                           |                 | Ta = 25 °C   | —     | 3.8   | V    |
|                                 |                                           |                 | Ta = 50 °C   | —     | 3.4   | V    |
|                                 | VDD − VO<br>∅ = 10°, θ = 0°<br>DUTY= 1/16 | EW              | 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  |

#### 5. OPTICAL CHARACTERISTICS .

Ta = 25 °C

VDD = 5.0 V

| I T E M        |    | SYMBOL      | CONDITION       |            | MIN .     | TYP . | MAX . | UNIT | NOTE |
|----------------|----|-------------|-----------------|------------|-----------|-------|-------|------|------|
| VIEWING AREA   | ED | Ø 2 - Ø 1   | K ≥ 1.4         |            | 20        | —     | —     | deg. | 1    |
|                | EW |             |                 |            | 30        | —     | —     | deg. | 1    |
| CONTRAST RATIO | ED | K           | Ø = 25°, θ = ** |            | —         | 3     | —     | —    | 1    |
|                | EW |             | Ø = 10°, θ = 0° |            | 5         | —     | —     | —    | 1    |
| RESPONSE TIME  | ED | tr ( rise ) | Ø = 25°         | Ta = 25°C  | —         | 150   | 250   | ms   | 1    |
|                |    | tf ( fall ) |                 | θ = **     | Ta = 25°C | —     | 100   |      |      |
|                | EW | tr ( rise ) | Ø = 10°         | θ = -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

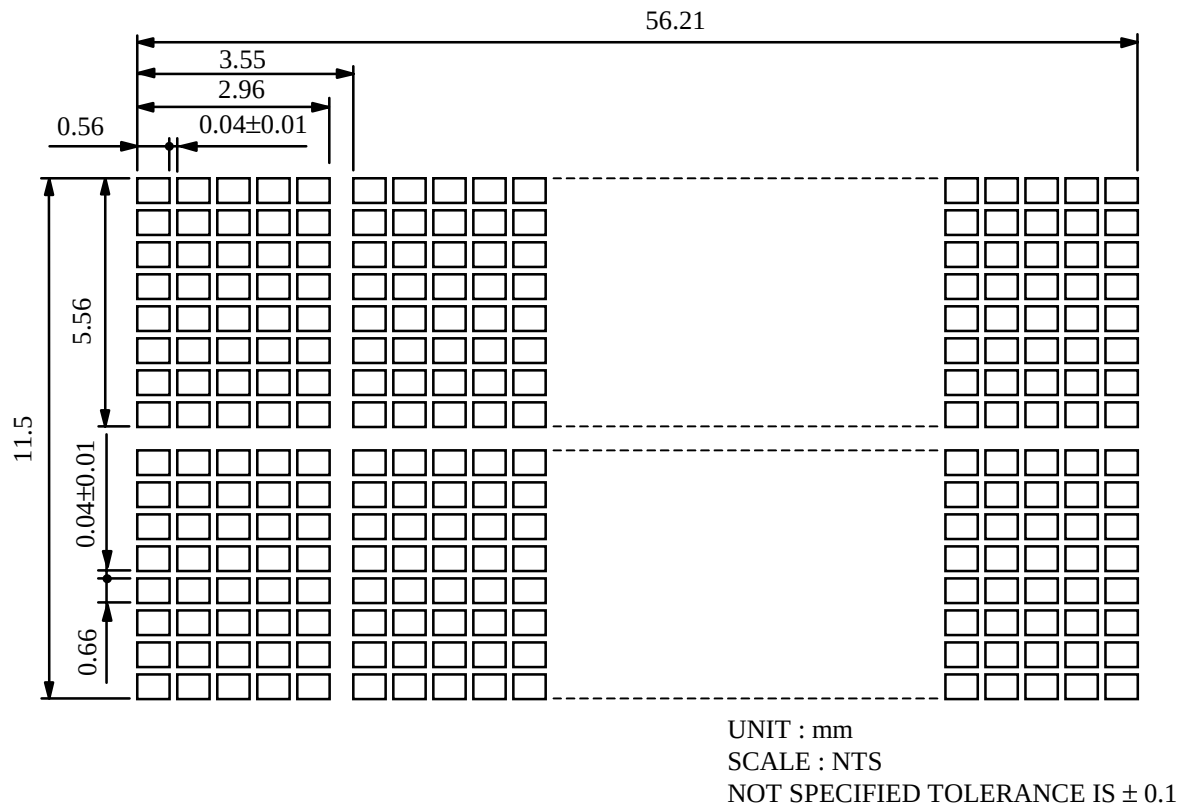
NOTE (1) : PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATION : EU-002A

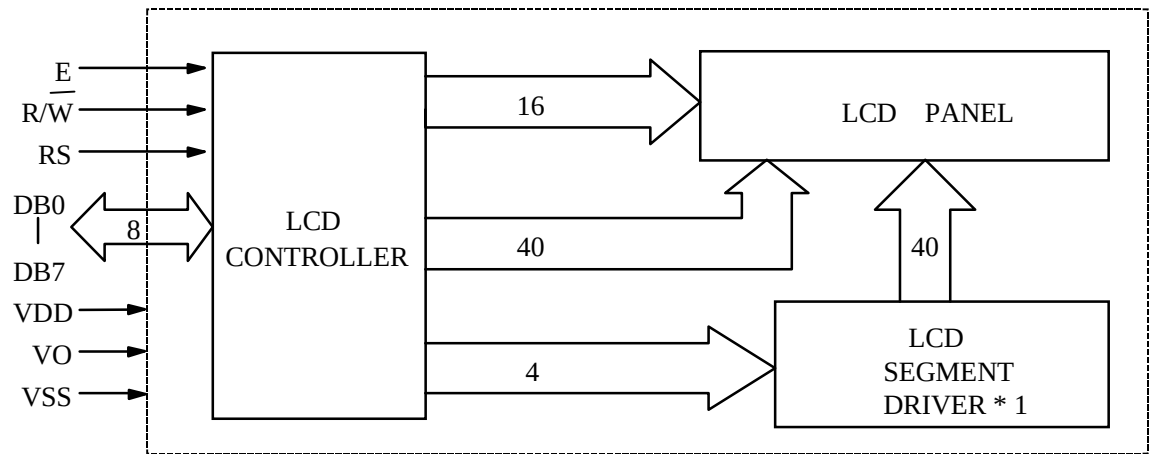




7. DETAIL DRAWING OF DOT MATRIX



8. BLOCK DIAGRAM

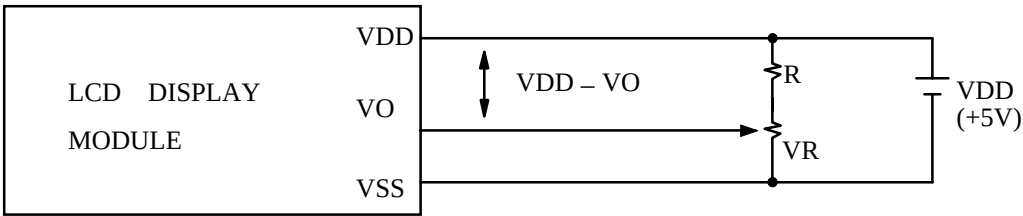


## 9. INTERFACE SIGNALS

| 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<br>RS = 1 : DATA REGISTER                       |
| 5       | $\overline{R/W}$ | READ/WRITE SELECTION                | $\overline{R/W}$ = 0 : REGISTER WRITE<br>$\overline{R/W}$ = 1 : REGISTER READ |
| 6       | E                | ENABLE INPUT                        |                                                                               |
| 7       | DB0              | DATA INPUT/OUTPUT LINES             | 4 BIT/8BIT<br>SELECTABLE<br><br>4 BIT : DB4 - DB7<br>8 BIT : DB0 - DB7        |
| 8       | DB1              |                                     |                                                                               |
| 9       | DB2              |                                     |                                                                               |
| 10      | DB3              |                                     |                                                                               |
| 11      | DB4              |                                     |                                                                               |
| 12      | DB5              |                                     |                                                                               |
| 13      | DB6              |                                     |                                                                               |
| 14      | DB7              |                                     |                                                                               |

10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCD MODULE



VDD – VO : LCD DRIVING VOLTAGE

VR : 10K $\Omega$  ~ 20K $\Omega$

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

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 |