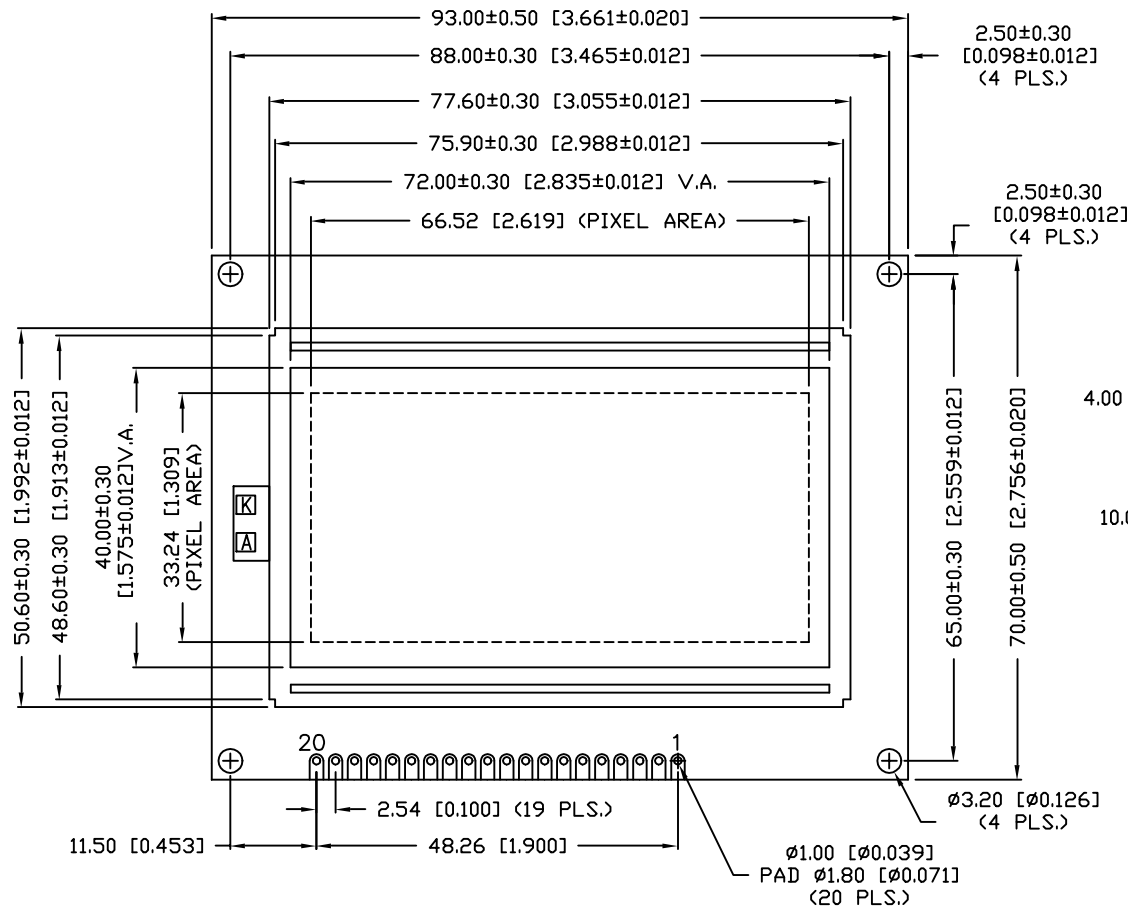


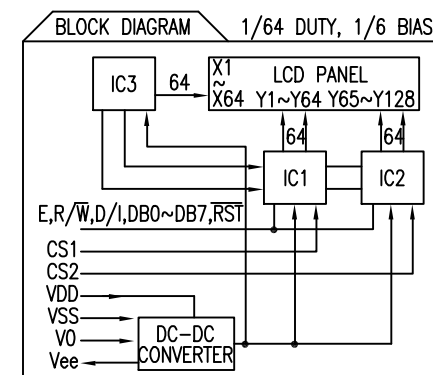
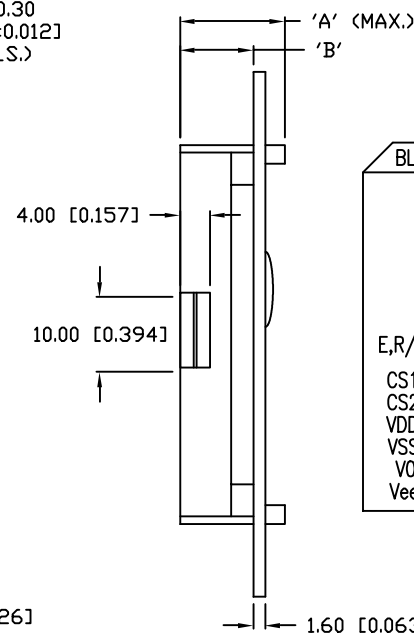
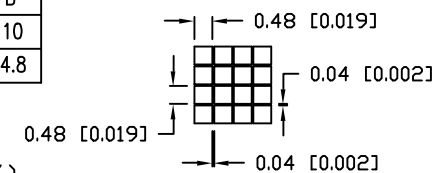
| P/N PREFIX/SUFFIX TABLE |    |             |                                  |
|-------------------------|----|-------------|----------------------------------|
| LCM-X                   | DX | DESCRIPTION |                                  |
| STANDARD                | S  | SR          | STN, REFLECTIVE                  |
| HIGH TEMP.              | H  | SF          | STN, TRANSFLECTIVE(W/ BACKLIGHT) |

CAUTION: STATIC SENSITIVE DEVICE  
FOLLOW PROPER E.S.D. HANDLING PROCEDURES  
WHEN WORKING WITH THIS PART.



| TYPE               | DIM.  | A   | B |
|--------------------|-------|-----|---|
| WITH LED BACKLIGHT | 14.10 | 10  |   |
| NO BACKLIGHT       | 8.8   | 4.8 |   |

PIXEL DETAIL



\*UNLESS OTHERWISE SPECIFIED TOLERANCES PER DECIMAL PRECISION ARE: X=±1 (±0.039), X.X=±0.5 (±0.020), X.XX=±0.25 (±0.010), X.XXX=±0.127 (±0.005). LEAD SIZE=±0.05 (±0.002), LEAD LENGTH=±0.75 (±0.030). MIN.= +DECIMAL PRECISION -0.00, MAX.= +0.00 -DECIMAL PRECISION

UNCONTROLLED DOCUMENT

REV.

PART NUMBER

LCM-X12864GXX/G-Y

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## RELIABILITY NOTE

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**LUMEX**  
INCORPORATED

290 E. HELLEN ROAD  
PALATINE, ILLINOIS 60067  
PHONE: (847) 359-2790  
WEB: <http://www.lumex.com>

128 x 64 DOT MATRIX GRAPHIC MODULE, STN YELLOW,  
1/64 DUTY, 1/6 BIAS, WITH NEGATIVE CHARGE PUMP.

DRAWN BY:

SK

CHECKED BY:

APPROVED BY:

DATE: 4-18-00

PAGE: 1 OF 2

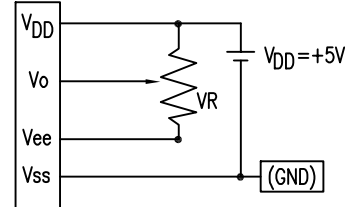
SCALE: N/A

## PIN CONFIGURATION

| PIN NO. | SYMBOL          | LEVEL  | FUNCTION                                                        |               |
|---------|-----------------|--------|-----------------------------------------------------------------|---------------|
| 1       | V <sub>SS</sub> | -      | POWER SUPPLY                                                    | GND (0V)      |
| 2       | V <sub>DD</sub> | -      |                                                                 | 5V            |
| 3       | V <sub>O</sub>  | -      |                                                                 | FOR LCD DRIVE |
| 4       | D/I             | H/L    | REGISTER SELECT SIGNAL<br>H: DATA INPUT<br>L: INSTRUCTION INPUT |               |
| 5       | R/W             | H/L    | H: DATA READ (MODULE-->MPU)<br>L: DATA WRITE (MODULE<--MPU)     |               |
| 6       | E               | H,H->L | ENABLE                                                          |               |
| 7~14    | DB0~DB7         | H/L    | DATA BUS                                                        |               |
| 15      | CS1             | H/L    | CHIP SELECTION SIGNAL FOR IC1                                   |               |
| 16      | CS2             | H/L    | CHIP SELECTION SIGNAL FOR IC2                                   |               |
| 17      | RST             | -      | RESET SIGNAL (ACTIVE "LOW")                                     |               |
| 18      | V <sub>ee</sub> | -      | OUTPUT VOLTAGE FOR LCD DRIVING                                  |               |
| 19      | A               | -      | ANODE                                                           | LED BACKLIGHT |
| 20      | K               | -      | CATHODE                                                         | LED BACKLIGHT |

V<sub>DD</sub>-V<sub>O</sub>: LCD DRIVING VOLTAGE

VR: 10KΩ-20KΩ



## READ/WRITE TIMING FOR MPU INTERFACE

| PARAMETER              | SYMBOL           | MIN  | MAX | UNIT |
|------------------------|------------------|------|-----|------|
| ADDRESS HOLD TIME      | t <sub>AH</sub>  | 10   | -   | ns   |
| ADDRESS SETUP TIME     | t <sub>AS</sub>  | 140  | -   | ns   |
| E CYCLE TIME           | t <sub>CYC</sub> | 1000 | -   | ns   |
| E HIGH LEVEL WIDTH     | t <sub>WEH</sub> | 450  | -   | ns   |
| E LOW LEVEL WIDTH      | t <sub>WEL</sub> | 450  | -   | ns   |
| DATA SETUP TIME        | t <sub>DSW</sub> | 200  | -   | ns   |
| DATA HOLD TIME (READ)  | t <sub>DHR</sub> | 20   | -   | ns   |
| DATA DELAY TIME        | t <sub>DDR</sub> | -    | 320 | ns   |
| DATA HOLD TIME (WRITE) | t <sub>DHW</sub> | 10   | -   | ns   |
| E RISE TIME            | t <sub>R</sub>   | -    | 25  | ns   |
| E FALL TIME            | t <sub>F</sub>   | -    | 25  | ns   |

## ELECTRICAL CHARACTERISTICS

V<sub>DD</sub>=4.75V to 5.25V, T<sub>A</sub>=25°C

| ITEM                     | SYMBOL                           | CONDITION           | STANDARD VALUE        |                     |                     | UNIT              |
|--------------------------|----------------------------------|---------------------|-----------------------|---------------------|---------------------|-------------------|
|                          |                                  |                     | MIN.                  | TYP.                | MAX.                |                   |
| SUPPLY VOLTAGE FOR LOGIC | V <sub>DD</sub> -V <sub>SS</sub> | -                   | 4.75                  | 5.0                 | 5.25                | V                 |
| SUPPLY CURRENT FOR LOGIC | I <sub>DD</sub>                  | V <sub>DD</sub> =5V | -                     | 8.0                 | -                   | mA                |
| INPUT VOLTAGE            | HIGH                             | V <sub>IH</sub>     | -                     | 0.7*V <sub>DD</sub> | V <sub>DD</sub>     | V                 |
|                          | LOW                              | V <sub>IL</sub>     | 0                     | -                   | 0.3*V <sub>DD</sub> | V                 |
| *LED BACKLIGHT           | VOLTAGE                          | V <sub>f</sub>      | I <sub>f</sub> =300mA | 4.2                 | 4.5                 | V                 |
|                          | CURRENT                          | I <sub>f</sub>      | -                     | 300                 | -                   | mA                |
|                          | POWER CONSUMPTION                | P <sub>D</sub>      | -                     | 1260                | -                   | mW                |
|                          | LUMINOUS                         | L                   | I <sub>f</sub> =300mA | 60                  | 90                  | cd/m <sup>2</sup> |
|                          | COLOR                            | -                   | -                     | -                   | -                   | nm                |

\*ONLY APPLIES TO MODULES WITH BACKLIGHT

## ABSOLUTE MAXIMUM RATINGS

| ITEM                         | SYMBOL                           | TEST CONDITION       | STANDARD VALUE  |                 | UNIT |
|------------------------------|----------------------------------|----------------------|-----------------|-----------------|------|
| SUPPLY VOLTAGE FOR LOGIC     | V <sub>DD</sub> -V <sub>SS</sub> | T <sub>a</sub> =25°C | -               | 7.0             | V    |
| SUPPLY VOLTAGE FOR LCD DRIVE | V <sub>DD</sub> -V <sub>O</sub>  | -                    | 10.8@40°C       | 12.4@0°C        | V    |
| INPUT VOLTAGE                | V <sub>I</sub>                   | T <sub>a</sub> =25°C | V <sub>SS</sub> | V <sub>DD</sub> | V    |
| OPERATING TEMPERATURE        | T <sub>opr</sub>                 | LCM-S                | -10             | 50              | °C   |
|                              |                                  | LCM-H                | -20             | 70              | °C   |
| STORAGE TEMPERATURE          | T <sub>stg</sub>                 | LCM-S                | -20             | 70              | °C   |
|                              |                                  | LCM-H                | -30             | 85              | °C   |

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