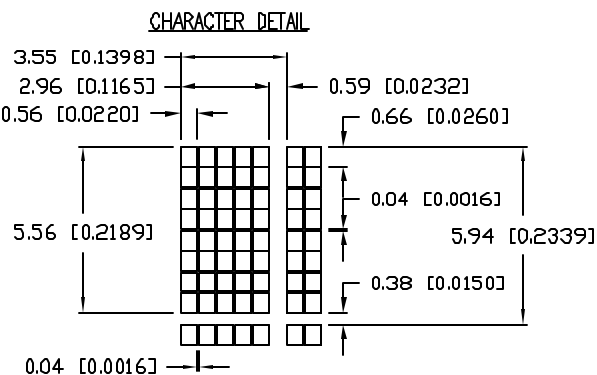


92] V.A.  
A.A.

REV.

P6



1. 1 RED/YELLOW BICOLOR LEDS, SML-LX2832IYC-TR.
2. 2 GREEN/YELLOW BICOLOR LEDS, SML-LX2832GYC-TR.
3. SAMTEC TSM-108-01-L-DV, CONNECTOR.
4. NPX LCD DRIVER: PCF2116.
5. THE BOTTOM PAD OF EACH SWITCH PAD SHOULD BE WIRED TO GROUND.

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LCM-S01602D-Q39416

16 X 2 LCD CHARACTER MODULE, CUSTOM PCB ASSEMBLY,  
12:00 VIEW, 0 TO 50°C OPERATING TEMP,  
STN. WHITE LED BACKLIGHT, NPX PCF2116 LCD DRIVER.

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PLEASE PAY ATTENTION TO YOUR SOLDERING PROCESS.

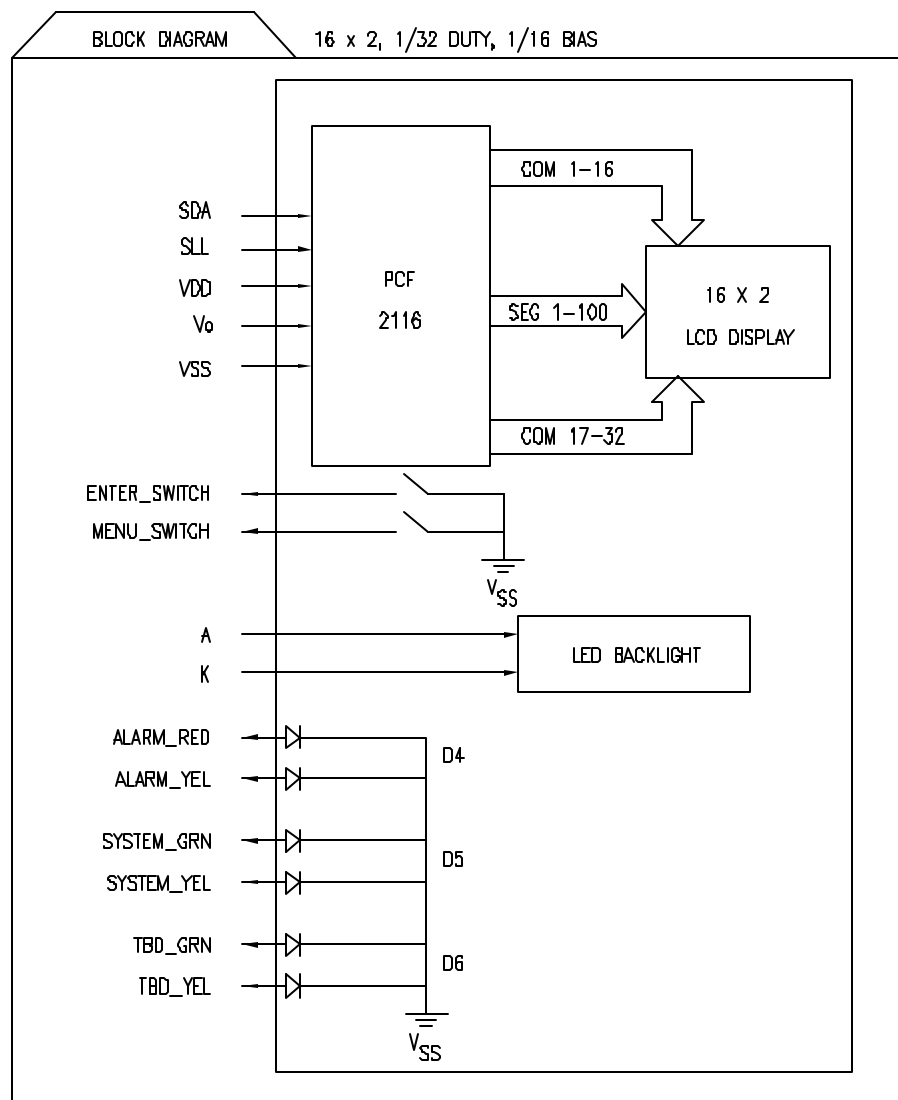


DATE: 05.22.08

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SCALE: N/A

BLOCK DIAGRAM

16 x 2, 1/32 DUTY, 1/16 BIAS



PIN CONFIGURATION

| PIN | SYMBOL       | FUNCTION                                                                                    |
|-----|--------------|---------------------------------------------------------------------------------------------|
| 1   | VSS          | GROUND (0V)                                                                                 |
| 2   | VDD          | SUPPLY VOLTAGE FOR LOGIC (+4.2V - +4.8V)                                                    |
| 3   | Vo           | THE INPUT LEVEL AT THIS PIN DETERMINES THE GENERATED VLCD OUTPUT VOLTAGE. (CONTRAST ADJUST) |
| 4   | SDA          | INPUT/OUTPUT FOR THE I2C-BUS DATA LINE.                                                     |
| 5   | SCL          | INPUT FOR THE I2C-BUS CLOCK SIGNAL.                                                         |
| 6   | RESET_L      | ACTIVE LOW RESET SIGNAL                                                                     |
| 7   | ENTER_SW     | SWITCH OUTPUT                                                                               |
| 8   | MENU_SW      | SWITCH OUTPUT                                                                               |
| 9   | ALARM_RED    | RED LED ANODE                                                                               |
| 10  | ALARM_YEL    | YELLOW LED ANODE                                                                            |
| 11  | SYSTEM_GREEN | GREEN LED ANODE                                                                             |
| 12  | SYSTEM_YEL   | YELLOW LED ANODE                                                                            |
| 13  | TBD_GREEN    | GREEN LED ANODE                                                                             |
| 14  | TBD_YEL      | YELLOW LED ANODE                                                                            |
| 15  | A            | LED BACK LIGHT ANODE                                                                        |
| 16  | K            | LED BACK LIGHT CATHODE                                                                      |

## NOTES:

1. D4 IS THE ALARM LED.
2. D5 IS THE SYSTEM LED.
3. D6 IS THE TBD LED.

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REV.

P6

PART NUMBER

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16 X 2 LCD CHARACTER MODULE, CUSTOM PCB ASSEMBLY,  
12:00 VIEW, 0 TO 50°C OPERATING TEMP.  
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## RELIABILITY NOTE

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PAGE: 2 OF 3

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|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 0A | 0B | 0C | 0D | 0E | 0F |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 2A | 2B | 2C | 2D | 2E | 2F |

DISPLAY POSITION

DDRAM ADDRESS

WHEN THE DISPLAY OPERATION IS PERFORMED, THE DDRAM ADDRESS MOVED AS FOLLOW: AFTER THE LEFT SHIFT INSTRUCTION

|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 0A | 0B | 0C | 0D | 0E | 0F | 10 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 2A | 2B | 2C | 2D | 2E | 2F | 30 |

DISPLAY POSITION

DDRAM ADDRESS

AFTER THE RIGHT SHIFT INSTRUCTION

|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 13 | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 0A | 0B | 0C | 0D | 0E |
| 33 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 2A | 2B | 2C | 2D | 2E |

DISPLAY POSITION

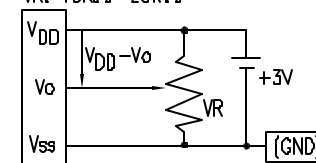
DDRAM ADDRESS

## AC CHARACTERISTICS

| SYMBOL              | PARAMETER                                  | STANDARD VALUE |      |      | UNIT |
|---------------------|--------------------------------------------|----------------|------|------|------|
|                     |                                            | MIN.           | TYP. | MAX. |      |
| F <sub>SLC</sub>    | SLC CLOCK FREQUENCY                        | —              | —    | 100  | KHz  |
| T <sub>SW</sub>     | TOLERABLE SPIKE WIDTH ON BUS               | —              | —    | 100  | ns   |
| T <sub>BUF</sub>    | BUS FREE TIME                              | 4.7            | —    | —    | µs   |
| T <sub>SU,STA</sub> | SET-UP TIME FOR A REPEATED START CONDITION | 4.7            | —    | —    | µs   |
| T <sub>HD,STA</sub> | START CONDITION HOLD TIME                  | 4              | —    | —    | µs   |
| T <sub>LOW</sub>    | SCL LOW TIME                               | 4.7            | —    | —    | µs   |
| T <sub>HIGH</sub>   | SCL HIGH TIME                              | 4              | —    | —    | µs   |
| T <sub>R</sub>      | SCL AND SDA RISE TIME                      | —              | —    | 1    | µs   |
| T <sub>F</sub>      | SLC AND SDA FALL TIME                      | —              | —    | 0.3  | µs   |
| T <sub>SU,DAT</sub> | DATA SETUP TIME                            | 250            | —    | —    | ns   |
| T <sub>HD,DAT</sub> | DATA HOLD TIME                             | 0              | —    | —    | ns   |
| T <sub>SU,STO</sub> | SETUP TIME FOR STOP CONDITION              | 4              | —    | —    | µs   |

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

VR: 10KΩ-20KΩ



## ABSOLUTE MAXIMUM RATINGS

| ITEM                         | SYMBOL           | TEST CONDITION       | STANDARD VALUE  |                 | UNIT |
|------------------------------|------------------|----------------------|-----------------|-----------------|------|
|                              |                  |                      | MIN             | MAX             |      |
| SUPPLY VOLTAGE FOR LOGIC     | V <sub>DD</sub>  | T <sub>a</sub> =25°C | -0.5            | 8.0             | V    |
| SUPPLY VOLTAGE FOR LCD DRIVE | V <sub>D</sub>   | —                    | V <sub>SS</sub> | V <sub>DD</sub> | V    |
| OPERATING TEMPERATURE        | T <sub>opr</sub> | LCM-S                | 0               | 50              | °C   |
| STORAGE TEMPERATURE          | T <sub>stg</sub> | LCM-S                | -20             | 70              | °C   |

## ELECTRICAL CHARACTERISTICS

V<sub>DD</sub>=5V, T<sub>A</sub>=25°C

| ITEM              |                 | SYMBOL          | CONDITION            | STANDARD VALUE     |      |                    | UNIT |
|-------------------|-----------------|-----------------|----------------------|--------------------|------|--------------------|------|
|                   |                 |                 |                      | MIN.               | TYP. | MAX.               |      |
| OPERATING VOLTAGE |                 | V <sub>DD</sub> | —                    | 3.0                | 3.3  | 3.6                | V    |
| SUPPLY CURRENT    |                 | I <sub>DD</sub> | —                    | —                  | TBD  | —                  | mA   |
| INPUT VOLTAGE     |                 | I <sub>IL</sub> |                      | V <sub>SS</sub>    | —    | 0.3V <sub>DD</sub> |      |
|                   |                 | V <sub>OH</sub> |                      | 0.7V <sub>DD</sub> | —    | V <sub>DD</sub>    | V    |
| LED BACKLIGHT     | FORWARD CURRENT | I <sub>F</sub>  | V <sub>F</sub> =3.4  | —                  | 30   | 40                 | mA   |
|                   | COLOR           | X               | I <sub>F</sub> =30mA | 0.287              | —    | 0.330              | mA   |
|                   |                 | Y               | I <sub>F</sub> =30mA | 0.276              | —    | 0.339              | mA   |

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