

# NHD-5.7-320240WFB-CTXI#-1

## TFT (Thin-Film-Transistor) Color Liquid Crystal Display Module

|         |                                |
|---------|--------------------------------|
| NHD-    | Newhaven Display               |
| 5.7-    | 5.7" Diagonal                  |
| 320240- | 320xRGBx240 Pixels             |
| WFB-    | Model                          |
| C-      | Built-in Driver + Controller   |
| T-      | White LED Backlight            |
| X-      | TFT                            |
| I-      | 12:00 Optimal View, Wide Temp. |
| #-1     | <b>RoHS Compliant</b>          |

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## Document Revision History

| Revision | Date      | Description                                                         | Changed by |
|----------|-----------|---------------------------------------------------------------------|------------|
| 0        | 7/8/2009  | Initial Release                                                     | CL         |
| 1        | 7/29/2009 | MECHANICAL DRAWING UPDATE                                           | CL         |
| 2        | 11/4/2009 | Quality Information Update                                          | BE         |
| 3        | 3/26/2009 | Pin Description Update                                              | MP         |
| 4        | 4/16/2010 | Updated the Recommended LCD Connector                               | MC         |
| 5        | 12/1/2010 | Mechanical Drawing Update                                           | MC         |
| 6        | 2/22/2011 | Symbols for Pin/electrical updated                                  | BE         |
| 7        | 5/24/2011 | Electrical characteristics updated                                  | AK         |
| 8        | 1/6/2012  | Pixel data format updated                                           | AK         |
| 9        | 6/4/2012  | Mechanical drawing / Optical characteristics updated                | AK         |
| 10       | 6/8/2012  | Optical characteristics updated                                     | TJ         |
| 11       | 12/2/16   | Updated Mech. Drawing, Electrical and Optical Characteristics       | TM         |
| 12       | 4/10/17   | Optical characteristics updated                                     | TM         |
| 13       | 5/29/19   | Recommended Connector, Electrical & Optical Characteristics Updated | SB         |
| 14       | 2/5/20    | Mechanical Drawing & Backlight Current Updated                      | SB         |

## Functions and Features

- 320xRGBx240 resolution
- LED backlight
- 8-bit parallel interface
- SSD1963 Controller



## Pin Description

### CON2:

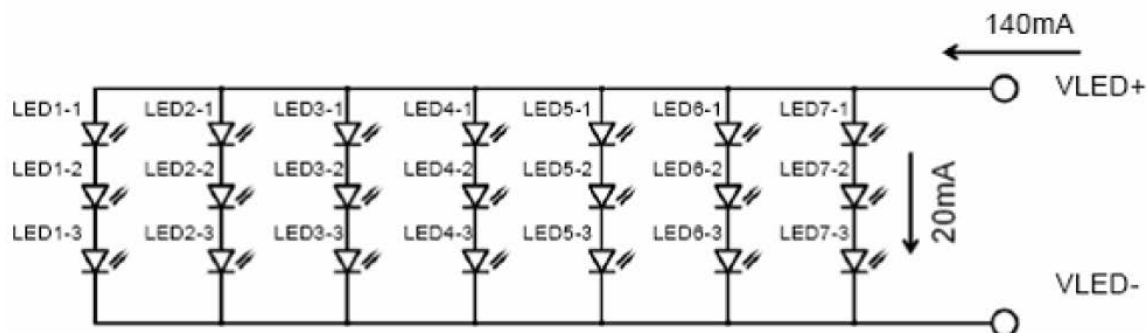
| Pin No. | Symbol          | External Connection | Function Description                        |
|---------|-----------------|---------------------|---------------------------------------------|
| 1       | GND             | Power Supply        | Ground                                      |
| 2       | V <sub>DD</sub> | Power Supply        | Power supply for LCD and logic (3.3V)       |
| 3       | NC              | -                   | No Connect                                  |
| 4       | D/C#            | MPU                 | Register Select signal: 1= Data, 0=Command  |
| 5       | WR#             | MPU                 | Active LOW Write signal, 8080 MPU interface |
| 6       | RD#             | MPU                 | Active LOW Read signal, 8080 MPU interface  |
| 7-14    | [DB0-DB7]       | MPU                 | Bi-directional data bus lines               |
| 15      | CS#             | MPU                 | Active LOW Chip Select signal               |
| 16      | RES#            | MPU                 | Active LOW Reset signal                     |
| 17      | NC              | -                   | No Connect                                  |
| 18      | R/L             | -                   | Scan direction 1: Right (Tied internally)   |
| 19      | U/D             | -                   | Scan direction 0: Down (Tied internally)    |
| 20      | NC              | -                   | No Connect                                  |

**Recommended LCD connector:** 1.0mm pitch 20-Conductor FFC. Molex 015167-0365

### Backlight:

| Pin No. | Symbol          | External Connection | Function Description          |
|---------|-----------------|---------------------|-------------------------------|
| 1       | V <sub>DD</sub> | Power Supply        | Red, LED Anode (140mA @ 9.9V) |
| 2       | NC              | -                   | No Connect                    |
| 3       | GND             | Power Supply        | White, LED Cathode            |

**Backlight connector:** JST p/n: XHP-3 **Mates with:** JST p/n: B 3B-XH-A



## Electrical Characteristics

| Item                        | Symbol           | Condition                                          | Min.                | Typ.   | Max.                | Unit |
|-----------------------------|------------------|----------------------------------------------------|---------------------|--------|---------------------|------|
| Operating Temperature Range | T <sub>OP</sub>  | Absolute Max                                       | -20                 | -      | +70                 | °C   |
| Storage Temperature Range   | T <sub>ST</sub>  | Absolute Max                                       | -30                 | -      | +80                 | °C   |
| Supply Voltage              | V <sub>DD</sub>  | -                                                  | 3.0                 | 3.3    | 3.6                 | V    |
| Supply Current              | I <sub>DD</sub>  | V <sub>DD</sub> = 3.3V                             | 60                  | 120    | 180                 | mA   |
| "H" Level input             | V <sub>IH</sub>  | -                                                  | 0.8*V <sub>DD</sub> | -      | V <sub>DD</sub>     | V    |
| "L" Level input             | V <sub>IL</sub>  | -                                                  | GND                 | -      | 0.2*V <sub>DD</sub> | V    |
|                             |                  |                                                    |                     |        |                     |      |
| Backlight Supply Current    | I <sub>LED</sub> | -                                                  | -                   | 140    | 175                 | mA   |
| Backlight Supply Voltage    | V <sub>LED</sub> | I <sub>LED</sub> = 140mA<br>T <sub>OP</sub> = 25°C | 9.0                 | 9.8    | 10.5                | V    |
| Backlight Lifetime*         | -                |                                                    | -                   | 50,000 | -                   | Hrs. |

\*Backlight lifetime is rated as Hours until **half-brightness**, under normal operating conditions. The LED of the backlight is driven by current drain; drive voltage is for reference only. Drive voltage must be selected to ensure backlight current drain is below MAX level stated.

## Optical Characteristics

| Item                   |        | Symbol         | Condition                 | Min. | Typ. | Max. | Unit              |
|------------------------|--------|----------------|---------------------------|------|------|------|-------------------|
| Optimal Viewing Angles | Top    | φY+            | CR ≥ 10                   | -    | 70   | -    | °                 |
|                        | Bottom | φY-            |                           | -    | 50   | -    | °                 |
|                        | Left   | θX-            |                           | -    | 70   | -    | °                 |
|                        | Right  | θX+            |                           | -    | 70   | -    | °                 |
| Contrast Ratio         |        | CR             | -                         | 150  | 250  | -    | -                 |
| Luminance              |        | L <sub>V</sub> | I <sub>LED</sub> = 140 mA | 400  | 500  | -    | cd/m <sup>2</sup> |
| Response Time          | Rise   | T <sub>R</sub> | T <sub>OP</sub> = 25°C    | -    | 15   | 30   | ms                |
|                        | Fall   | T <sub>F</sub> |                           | -    | 35   | 50   | ms                |

## Controller Information

Built-in SSD1963 Controller.

Please download specification at [http://www.newhavendisplay.com/app\\_notes/SSD1963.pdf](http://www.newhavendisplay.com/app_notes/SSD1963.pdf)

## 8080 Mode Interface:

The 8080 mode MPU interface consists of CS#, D/C, RD#, WR#, and DB[7:0]. This interface uses WR# to define a write cycle and RD# to define a read cycle. If the WR# goes LOW when the CS# signal is LOW, the data or command will be latched into the system at the rising edge of WR#. Similarly, the read cycle will start when RD# goes LOW and end at the rising edge of RD#. See the SSD1963 datasheet for detailed timing diagrams.

## Command Instructions:

See the SSD1963 datasheet for the Instruction Table and Command Descriptions.

## Pixel Data Format:

| Interface | Cycle           | D[7] | D[6] | D[5] | D[4] | D[3] | D[2] | D[1] | D[0] |
|-----------|-----------------|------|------|------|------|------|------|------|------|
| 8 bits    | 1 <sup>st</sup> | R7   | R6   | R5   | R4   | R3   | R2   | R1   | R0   |
|           | 2 <sup>nd</sup> | G7   | G6   | G5   | G4   | G3   | G2   | G1   | G0   |
|           | 3 <sup>rd</sup> | B7   | B6   | B5   | B4   | B3   | B2   | B1   | B0   |

## Quality Information

| Test Item                             | Content of Test                                                                                                                 | Test Condition                                                                      | Note |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|
| High Temperature storage              | Endurance test applying the high storage temperature for a long time.                                                           | +80°C , 200hrs                                                                      | 2    |
| Low Temperature storage               | Endurance test applying the low storage temperature for a long time.                                                            | -30°C , 200hrs                                                                      | 1,2  |
| High Temperature Operation            | Endurance test applying the electric stress (voltage & current) and the high thermal stress for a long time.                    | +70°C , 200hrs                                                                      | 2    |
| Low Temperature Operation             | Endurance test applying the electric stress (voltage & current) and the low thermal stress for a long time.                     | -20°C , 200hrs                                                                      | 1,2  |
| High Temperature / Humidity Operation | Endurance test applying the electric stress (voltage & current) and the high thermal with high humidity stress for a long time. | +60°C, 90% RH, 96hrs                                                                | 1,2  |
| Thermal Shock resistance              | Endurance test applying the electric stress (voltage & current) during a cycle of low and high thermal stress.                  | -20°C, 30min -> 25°C, 5min -> 70°C, 30min = 1 cycle<br>For 10 cycles                |      |
| Vibration test                        | Endurance test applying vibration to simulate transportation and use.                                                           | 10-55Hz, 1.5mm amplitude.<br>60 sec in each of 3 directions X,Y,Z<br>For 15 minutes | 3    |
| Static electricity test               | Endurance test applying electric static discharge.                                                                              | VS=800V, RS=1.5kΩ, CS=100pF<br>One time                                             |      |

**Note 1:** No condensation to be observed.

**Note 2:** Conducted after 4 hours of storage at 25°C, 0%RH.

**Note 3:** Test performed on product itself, not inside a container.

## Precautions for using LCDs/LCMs

See Precautions at [www.newhavendisplay.com/specs/precautions.pdf](http://www.newhavendisplay.com/specs/precautions.pdf)

## Warranty Information and Terms & Conditions

[http://www.newhavendisplay.com/index.php?main\\_page=terms](http://www.newhavendisplay.com/index.php?main_page=terms)