

NHD-4.3-480272MF-20 Test Board

TFT Controller Evaluation Board

| | |
|---------|---|
| NHD- | Newhaven Display |
| 4.3- | 4.3" Diagonal |
| 480272- | 480xRGBx272 pixels |
| MF- | Model |
| 20- | 20-POS FFC interface (8-bit data) SSD1963 Controller |

Newhaven Display International, Inc.

2511 Technology Drive, Suite 101

Elgin IL, 60124

Ph: 847-844-8795

Fax: 847-844-8796

www.newhavendisplay.com

nhtech@newhavendisplay.com

nhsales@newhavendisplay.com

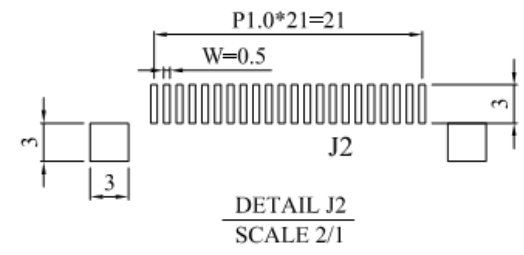
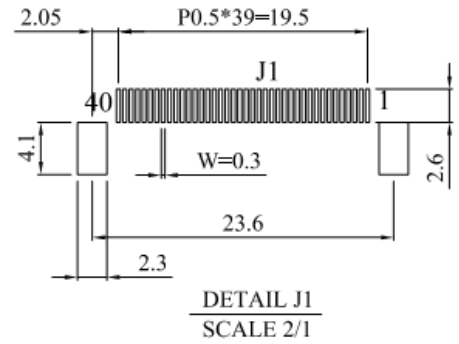
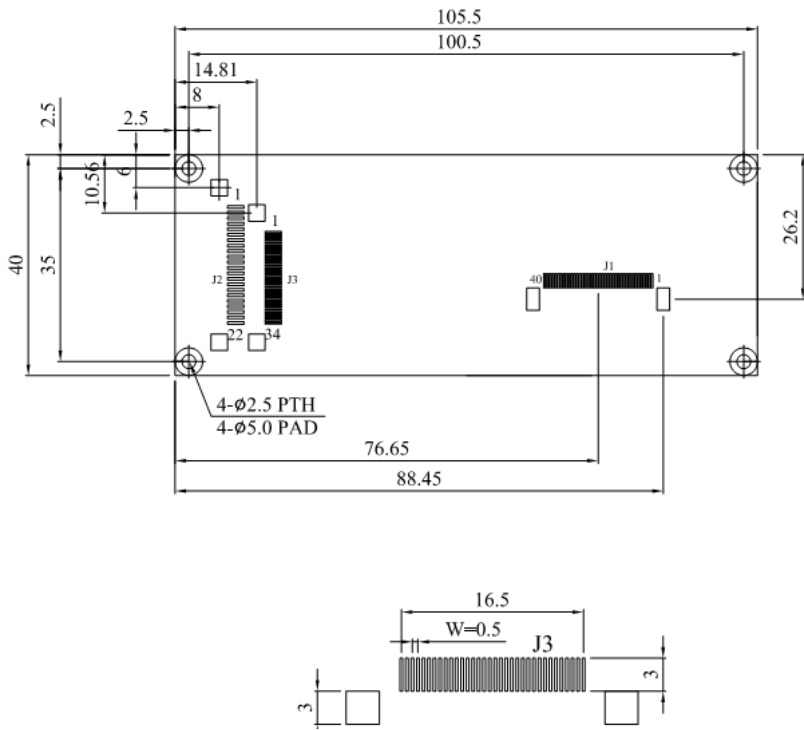
Document Revision History

| Revision | Date | Description | Changed by |
|----------|-----------|-----------------|------------|
| 0 | 5/14/2007 | Initial Release | CL |

Functions and Features

- To use for testing, evaluating, or in final production with NHD-4.3-480272MF-A displays.

Mechanical Drawing NHD-4.3-480272MF Test Board



Note: J2 has a 20-pos FFC connector assembled, pins 21,22 are not connected.

Pin Description: J1 (SSD1963 output to display panel)

| Pin No. | Symbol | External Connection | Function Description |
|---------|---------|---------------------|---------------------------------------|
| 1 | LED- | LED Power Supply | Backlight GND |
| 2 | LED+ | LED Power Supply | Backlight Power (32mA @ 20~22V) |
| 3 | GND | Power Supply | GND |
| 4 | VCC | Power Supply | Power supply for LCD and logic (3.3V) |
| 5-12 | [R0-R7] | MPU | Red Data Signals |
| 13-20 | [G0-G7] | MPU | Green Data Signals |
| 21-28 | [B0-B7] | MPU | Blue Data Signals |
| 29 | GND | Power Supply | GND |
| 30 | PCLK | MPU | Data sample Clock signal |
| 31 | DISP | MPU | Display ON/OFF signal |
| 32 | HSYNC | MPU | Line synchronization signal |
| 33 | VSYNC | MPU | Frame synchronization signal |
| 34 | DE | MPU | Data Enable signal |
| 35 | AVDD | - | No Connect |
| 36 | GND | Power Supply | GND |
| 37 | XR | Touch Panel MPU | Touch Panel RIGHT |
| 38 | YD | Touch Panel MPU | Touch Panel DOWN |
| 39 | XL | Touch Panel MPU | Touch Panel LEFT |
| 40 | YU | Touch Panel MPU | Touch Panel UP |

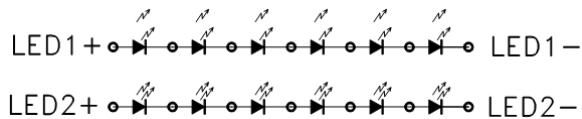
Pin Description: J2 (SSD1963 input from user's MPU)

| Pin No. | Symbol | External Connection | Function Description |
|---------|------------|---------------------|--|
| 1 | GND | Power Supply | GND |
| 2 | VCC | Power Supply | Power supply for LCD and logic (3.3V) |
| 3 | B/L Enable | Power Supply | Backlight Enable |
| 4 | RS | MPU | Register Select. RS=1: Command, RS=0: Data |
| 5 | WR | MPU | 8080 MPU Write Signal active LOW |
| 6 | RD | MPU | 8080 MPU Read Signal active LOW |
| 7-14 | DB0-DB7 | MPU | 8-bit bidirectional data bus |
| 15 | CS | MPU | Active LOW Chip Select signal |
| 16 | REST | MPU | Active LOW Reset signal |
| 17 | NC | - | No Connect |
| 18 | NC | - | No Connect |
| 19 | DISP | MPU | Display On signal |
| 20 | NC | - | No Connect |

Electrical Characteristics

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|-----------------------------|--------|--------------|---------|-------|---------|------|
| Operating Temperature Range | Top | Absolute Max | -20 | - | +70 | °C |
| Storage Temperature Range | Tst | Absolute Max | -30 | - | +80 | °C |
| Supply Voltage | VDD | | 3.0 | 3.3 | 3.6 | V |
| Input High Voltage | VIH | | 0.8*VDD | - | VDD | V |
| Input Low Voltage | VIL | | 0 | - | 0.2*VDD | V |
| Supply Current | IVCI | | - | 285 | - | mA |
| Power Consumption | PLCD | | - | 940.5 | - | mW |

Backlight diagram:



Optical Characteristics

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|------------------------|--------|-----------|------|------|------|-------------------|
| Viewing Angle – Top | | Cr ≥ 10 | - | 15 | - | ° |
| Viewing Angle – Bottom | | Cr ≥ 10 | - | 35 | - | ° |
| Viewing Angle – Left | | Cr ≥ 10 | - | 45 | - | ° |
| Viewing Angle – Right | | Cr ≥ 10 | - | 45 | - | ° |
| Contrast Ratio | Cr | | - | 400 | - | |
| Luminance | YL | | 380 | - | 480 | cd/m ² |
| Response Time (rise) | Tr | - | - | 5 | 15 | ms |
| Response Time (fall) | Tr | - | - | 15 | 30 | ms |

Touch Panel Characteristics

| Item | Min. | Typ. | Max. | Unit |
|-----------------------------|-----------|------|------|------------|
| Linearity | - | - | 1.5 | % |
| Circuit Resistance – X-Axis | 450 | 800 | 1300 | Ω |
| Circuit Resistance – Y-Axis | 100 | 350 | 800 | Ω |
| Insulation Resistance | 10 | - | - | MΩ |
| Operating Voltage | - | - | 5 | V |
| Chattering | - | - | 10 | ms |
| Transmittance | 82 | - | - | % |
| Activation Force | 50 | - | 200 | g |
| Pen Writing Durability | 100,000 | - | - | Characters |
| Pitting Durability | 1,000,000 | - | - | Touches |
| Surface Hardness | 3 | - | - | H |
| Haze | - | 7 | - | % |

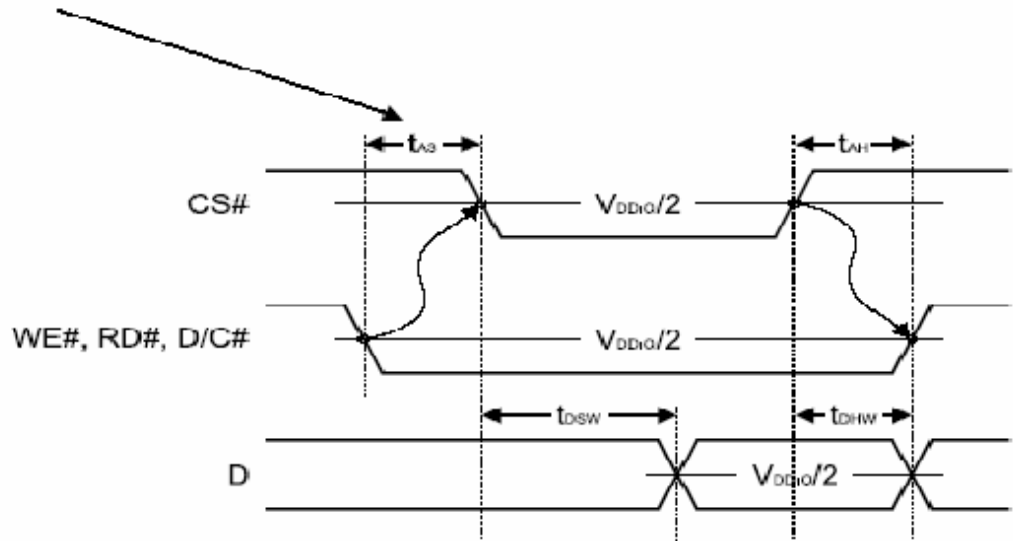
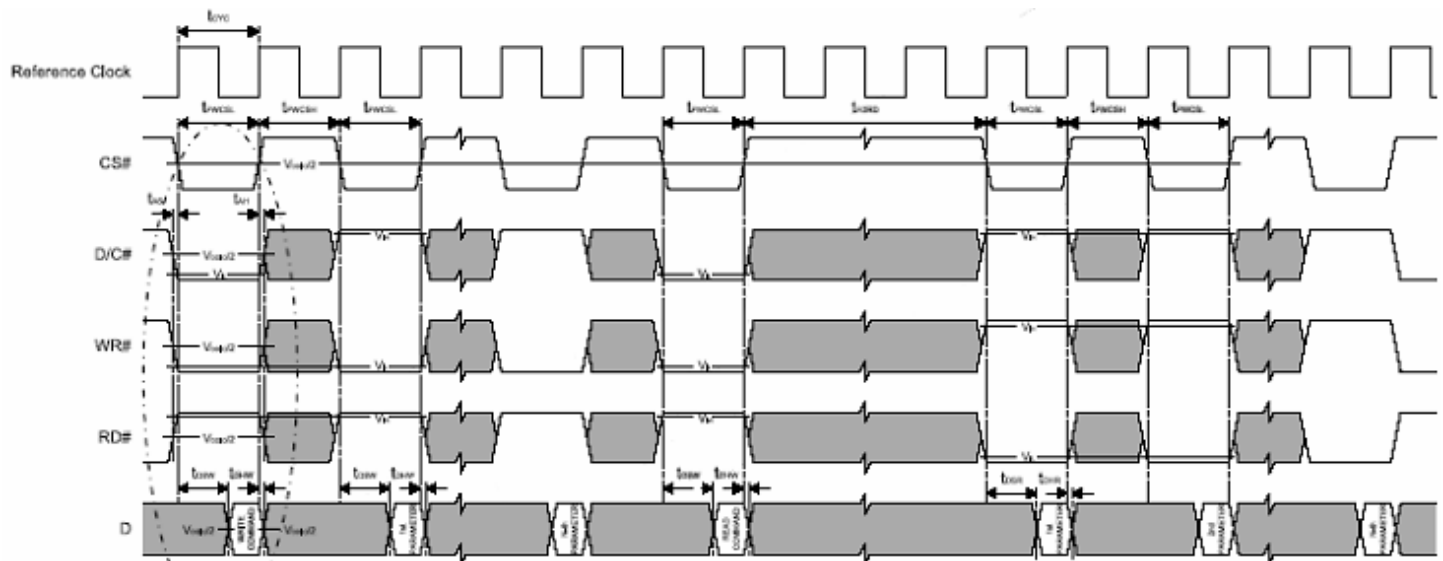
Controller Information

Built-in SSD1963

For specific timing and color information, please download specification at http://www.newhavendisplay.com/app_notes/SSD1963.pdf

8080 Mode Timing:

| Symbol | Parameter | Min | Typ | Max | Unit |
|--------------------|----------------------------|-----|-----|-----|------------------|
| t _{cy} | Reference Clock Cycle Time | 9 | - | - | ns |
| t _{PWCSL} | Pulse width CS# low | 1 | - | - | t _{CYC} |
| t _{PWCSH} | Pulse width CS# high | 1 | - | - | t _{CYC} |
| t _{FDRD} | First Read Data Delay | 5 | - | - | t _{CYC} |
| t _{AS} | Address Setup Time | 1 | - | - | ns |
| t _{AH} | Address Hold Time | 1 | - | - | ns |
| t _{DSW} | Data Setup Time | 4 | - | - | ns |
| t _{DHW} | Data Hold Time | 1 | - | - | ns |
| t _{DSR} | Data Access Time | - | - | 5 | ns |
| t _{DHR} | Output Hold time | 1 | - | - | ns |



Pixel Data Format

Both 6800 and 8080 support 8-bit, 9-bit, 16-bit, 18-bit and 24-bit data bus. Depending on the width of the data bus, the display data are packed into the data bus in different ways.

Pixel Data Format :

| Interface | Cycle | D[23] | D[22] | D[21] | D[20] | D[19] | D[18] | D[17] | D[16] | D[15] | D[14] | D[13] | D[12] | D[11] | D[10] | D[9] | D[8] | D[7] | D[6] | D[5] | D[4] | D[3] | D[2] | D[1] | D[0] |
|----------------------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|------|------|
| 24 bits | 1 st | R7 | R6 | R5 | R4 | R3 | R2 | R1 | R0 | G7 | G6 | G5 | G4 | G3 | G2 | G1 | G0 | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |
| 18 bits | 1 st | | | | | | | R5 | R4 | R3 | R2 | R1 | R0 | G5 | G4 | G3 | G2 | G1 | G0 | B5 | B4 | B3 | B2 | B1 | B0 |
| 16 bits (665 format) | 1 st | | | | | | | | | R5 | R4 | R3 | R2 | R1 | G5 | G4 | G3 | G2 | G1 | G0 | B5 | B4 | B3 | B2 | B1 |
| 16 bits | 1 st | | | | | | | | | R5 | R4 | R3 | R2 | R1 | R0 | X | X | G5 | G4 | G3 | G2 | G1 | G0 | X | X |
| | 2 nd | | | | | | | | | B5 | B4 | B3 | B2 | B1 | B0 | X | X | R5 | R4 | R3 | R2 | R1 | R0 | X | X |
| | 3 rd | | | | | | | | | G5 | G4 | G3 | G2 | G1 | G0 | X | X | B5 | B4 | B3 | B2 | B1 | B0 | X | X |
| 9 bits | 1 st | | | | | | | | | | | | | | | | R5 | R4 | R3 | R2 | R1 | R0 | G5 | G4 | G3 |
| | 2 nd | | | | | | | | | | | | | | | | G2 | G1 | G0 | B5 | B4 | B3 | B2 | B1 | B0 |
| 8 bits | 1 st | | | | | | | | | | | | | | | | | R5 | R4 | R3 | R2 | R1 | R0 | X | X |
| | 2 nd | | | | | | | | | | | | | | | | | G5 | G4 | G3 | G2 | G1 | G0 | X | X |
| | 3 rd | | | | | | | | | | | | | | | | | B5 | B4 | B3 | B2 | B1 | B0 | X | X |

X: Don't Care

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 10 cycles | |
| Vibration test | Endurance test applying vibration to simulate transportation and use. | 10-55Hz , 15mm amplitude. 60 sec in each of 3 directions X,Y,Z For 15 minutes | 3 |
| Static electricity test | Endurance test applying electric static discharge. | VS=800V, RS=1.5kΩ, CS=100pF 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

Warranty Information and Terms & Conditions

http://www.newhavendisplay.com/index.php?main_page=terms