

Product Specification

NHD-10.1-1024600BF-ASXP

TFT Liquid Crystal Display

| | |
|-----------------|--------------------------------------|
| NHD- | Newhaven Display |
| 10.1- | 10.1" Diagonal |
| 1024600- | 1024xRGBx600 Pixels |
| BF- | Model |
| A- | RGB Interface |
| S- | High Brightness, White LED Backlight |
| X- | TFT |
| P- | IPS, Wide Temperature |

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Additional Resources

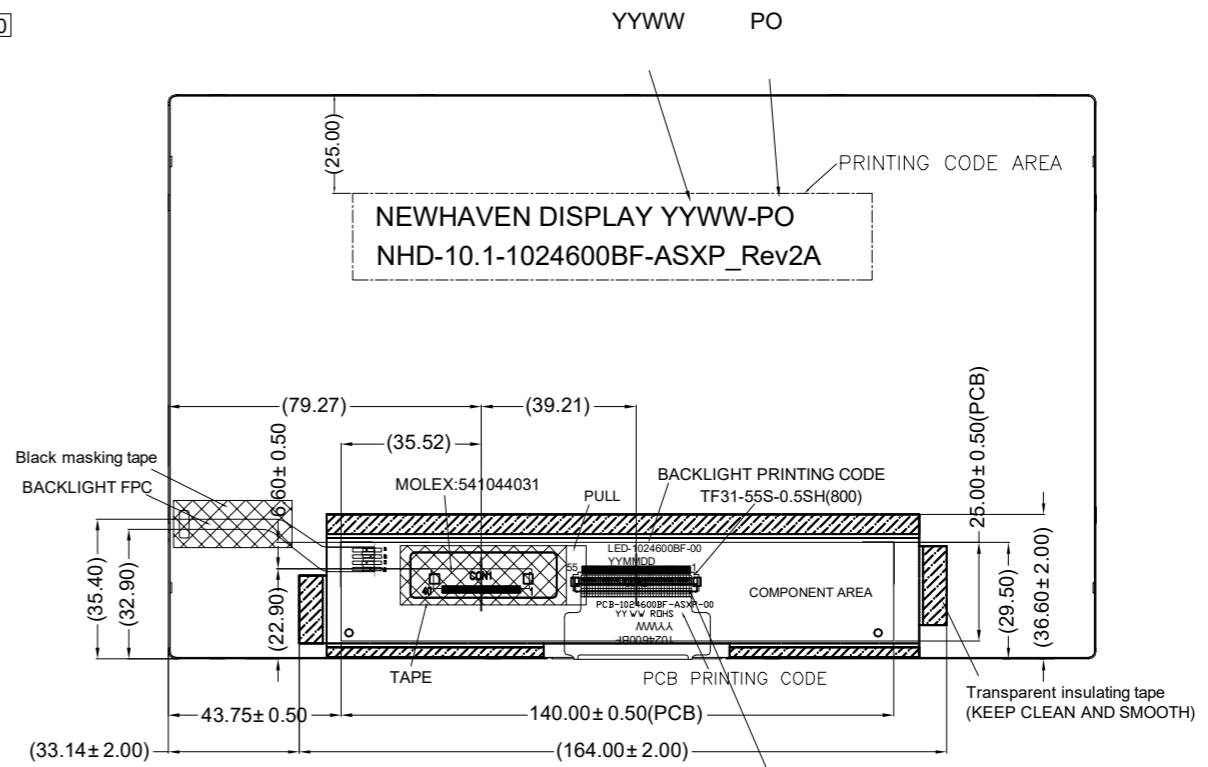
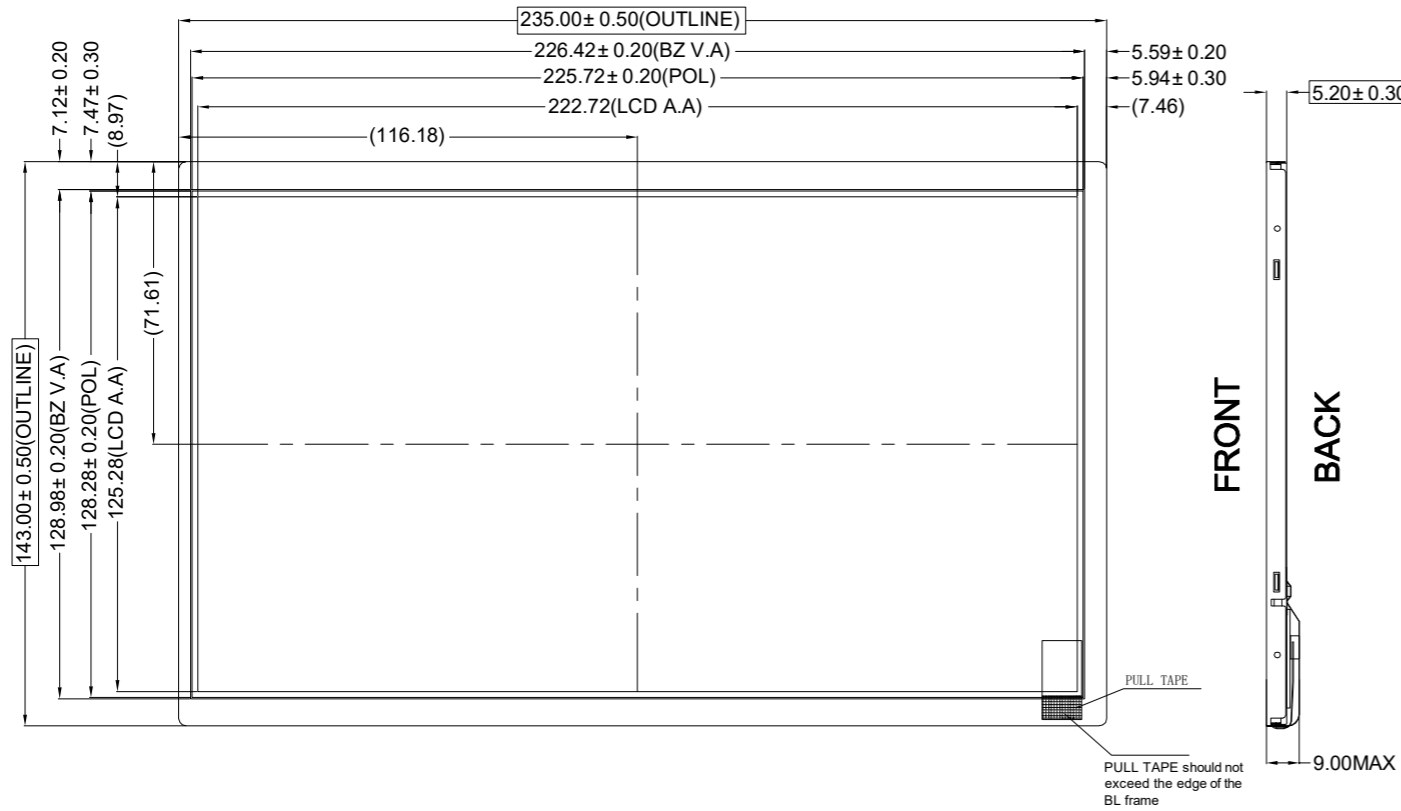
- **Support Forum:** <https://support.newhavendisplay.com/hc/en-us/community/topics>
- **GitHub:** <https://github.com/newhavendisplay>
- **Example Code:** <https://support.newhavendisplay.com/hc/en-us/categories/4409527834135-Example-Code/>
- **Knowledge Center:** https://www.newhavendisplay.com/knowledge_center.html
- **Quality Center:** https://www.newhavendisplay.com/quality_center.html
- **Precautions for using LCDs/LCMs:** <https://www.newhavendisplay.com/specs/precautions.pdf>
- **Warranty / Terms & Conditions:** <https://www.newhavendisplay.com/terms.html>



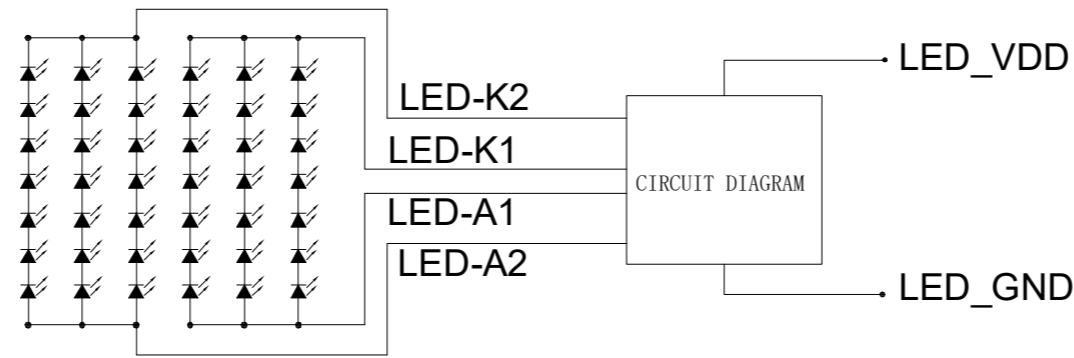
Document Revision History

| Revision | Date | Description | Changed By |
|----------|------------|---|------------|
| 0 | 03/01/2022 | Initial Release | ZP |
| 1 | 04/18/2022 | Included Backlight Driver IC | ZP |
| 2 | 08/04/2022 | Updated the LCD Supply Current, Backlight Enable Voltage and Chromaticity values. | JT |
| 3 | 08/17/2022 | Updated the Operating and Storage temperature range and Quality Information | JT |
| 4 | 09/07/2022 | Added Backlight PWM Frequency Range | JT |
| 5 | 10/12/2022 | Updated Mechanical Drawing Page | JT |
| 6 | 12/27/2022 | Mechanical Drawing Updated | KL |
| 7 | 01/16/2023 | Product Date Code Format Updated | KL |
| 8 | 09/14/2023 | Backlight PWM Frequency Updated from 2000 Hz (Max) to 20,000 Hz (Max) | KL |

Mechanical Drawing



FPC insert PCB shipment



| PIN | Symbol | PIN | Symbol |
|-----|---------|-----|--------|
| 1 | LED-GND | 21 | G4 |
| 2 | LED_VDD | 22 | G5 |
| 3 | LED_VDD | 23 | G6 |
| 4 | LED_VDD | 24 | G7 |
| 5 | LED PWM | 25 | B0 |
| 6 | LED EN | 26 | B1 |
| 7 | GND | 27 | B2 |
| 8 | VDD | 28 | B3 |
| 9 | R0 | 29 | B4 |
| 10 | R1 | 30 | B5 |
| 11 | R2 | 31 | B6 |
| 12 | R3 | 32 | B7 |
| 13 | R4 | 33 | GND |
| 14 | R5 | 34 | DCLK |
| 15 | R6 | 35 | HSD |
| 16 | R7 | 36 | VSD |
| 17 | G0 | 37 | DEN |
| 18 | G1 | 38 | MODE |
| 19 | G2 | 39 | RESET |
| 20 | G3 | 40 | STBYB |

Product Description: 10.1" 1024x600 IPS TFT

1. Driver IC: HX8282-A11, MP3398EGF Backlight
2. Interface: 24-bit Parallel RGB
3. Power Requirement: 3.3V TFT, 12.0V/360mA Backlight
4. Optical Features: Normally Black, Transmissive, Anti-Glare, Full View, 800cd/m²
5. Recommended Cable: 40pin 0.5mm pitch FFC
6. Built-in EMI Filter

| | | |
|---|--|---------------------------|
| Standard Tolerance: (Unless otherwise specified) Linear: ±0.3mm | | |
| | Drawing/Part Number: NHD-10.1-1024600BF-ASXP | Revision: 2A |
| Unless otherwise specified: • Dimensions are in Millimeters • Third Angle Projection | Drawn By: K. Lewis | Approved By: K. Lewis |
| | Drawn Date: 01/16/2023 | Approved Date: 01/16/2023 |
| This drawing is solely the property of Newhaven Display International, Inc. The information it contains is not to be disclosed, reproduced or copied in whole or part without written approval from Newhaven Display. | | |

Pin Description

TFT:

| Pin No. | Symbol | Connection | Function Description |
|---------|-------------------|--------------|---|
| 1 | LED_GND | Power Supply | Ground for Backlight Driver |
| 2-4 | LED_VDD | Power Supply | Supply Voltage for Backlight Driver |
| 5 | LED_PWM | MPU | Backlight PWM Signal Input (See Table Below) |
| 6 | LED_EN | MPU | Backlight Enable H: Backlight On; L: Backlight Off |
| 7 | GND | Power Supply | Ground |
| 8 | V _{DD} | Power Supply | Supply voltage for LCD (+3.3V) |
| 9-16 | [R0-R7] | MPU | Red Data Signals |
| 17-24 | [G0-G7] | MPU | Green Data Signals |
| 25-32 | [B0-B7] | MPU | Blue Data Signals |
| 33 | GND | Power Supply | Ground |
| 34 | DCLK | MPU | Dot data Clock |
| 35 | HSYNC | MPU | Horizontal sync input |
| 36 | VS _{ync} | MPU | Vertical sync input |
| 37 | DEN | MPU | Data Enable signal |
| 38 | MODE | MPU | DE/SYNC mode select MODE= H: DE mode MODE= L: SYNC mode |
| 39 | RESET | MPU | Active Low Reset Signal |
| 40 | STBYB | MPU | Active Low Standby Signal |

Recommended LCD connector: 0.5mm pitch 40-Conductor FFC.

Recommended Cable: 40 POS FFC

Molex P/N: 15020-0435

Driver/Controller Information

TFT:

Source Driver: HX8282-A11 <https://support.newhavendisplay.com/hc/en-us/articles/4414530594583-HX8282-A11>

Gate Driver: HX8696-A01 <https://support.newhavendisplay.com/hc/en-us/articles/4414548297367-HX8696-A>

Backlight Driver: MP3398EGF



Electrical Characteristics

TFT:

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|--|----------------------|------------------------|-----------------------|------|-----------------------|------|
| Operating Temperature Range | T _{OP} | Absolute Max | -20 | - | +70 | °C |
| Storage Temperature Range | T _{ST} | Absolute Max | -30 | - | +80 | °C |
| Supply Voltage for LCD | V _{DD} | - | 3.0 | 3.3 | 3.6 | V |
| Supply Current for LCD | I _{DD} | V _{DD} = 3.3V | 96.5 | 193 | 240 | mA |
| "H" Level input | V _{IH} | - | 0.7 * V _{DD} | - | V _{DD} | V |
| "L" Level input | V _{IL} | - | GND | - | 0.3 * V _{DD} | V |
| "H" Level output | V _{OH} | - | V _{DD} - 0.4 | - | V _{DD} | V |
| "L" Level output | V _{OL} | - | - | - | GND + 0.4 | V |
| Supply Voltage for Backlight Driver | LED_V _{LED} | - | 5.0 | 12.0 | 22.4 | V |
| Supply Current for Backlight Driver ¹ | LED_I _{LED} | - | 160 | 360 | 1200 | mA |
| Backlight Lifetime ² | - | T _{OP} = 25°C | 30,000 | - | - | Hrs. |
| Backlight Enable Voltage | LED_EN | - | 1.5 | 3.3 | 5.5 | V |
| Backlight PWM Voltage | LED_PWM | - | 1.5 | 3.3 | 5.5 | V |
| Backlight PWM Frequency | - | LED_PWM = 3.3V | 200 | - | 20,000 | Hz |

¹Minimum supply current occurs when supply voltage is at max; maximum supply current when supply voltage is at minimum.

²Backlight lifetime is rated as Hours until **half-brightness**, under normal operating conditions.

Optical Characteristics

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit | |
|-----------------------------|---------------------------------|------------------------|------|------|------|-------------------|---|
| Optimal Viewing Angles | Top | φY+ | - | 80 | - | ° | |
| | Bottom | φY- | - | 80 | - | ° | |
| | Left | θX- | - | 80 | - | ° | |
| | Right | θX+ | - | 80 | - | ° | |
| Contrast Ratio | CR | - | 600 | 800 | - | - | |
| Luminance | L _V | - | 600 | 800 | 1000 | cd/m ² | |
| Response Time (Rise + Fall) | T _R + T _F | T _{OP} = 25°C | - | 25 | 35 | ms | |
| Chromaticity | Red | X _R | - | 0.57 | 0.60 | 0.63 | - |
| | | Y _R | - | 0.33 | 0.36 | 0.39 | - |
| | Green | X _G | - | 0.30 | 0.33 | 0.36 | - |
| | | Y _G | - | 0.51 | 0.54 | 0.57 | - |
| | Blue | X _B | - | 0.10 | 0.13 | 0.16 | - |
| | | Y _B | - | 0.05 | 0.08 | 0.11 | - |
| White | X _W | - | 0.28 | 0.31 | 0.34 | - | |
| | Y _W | - | 0.30 | 0.33 | 0.36 | - | |

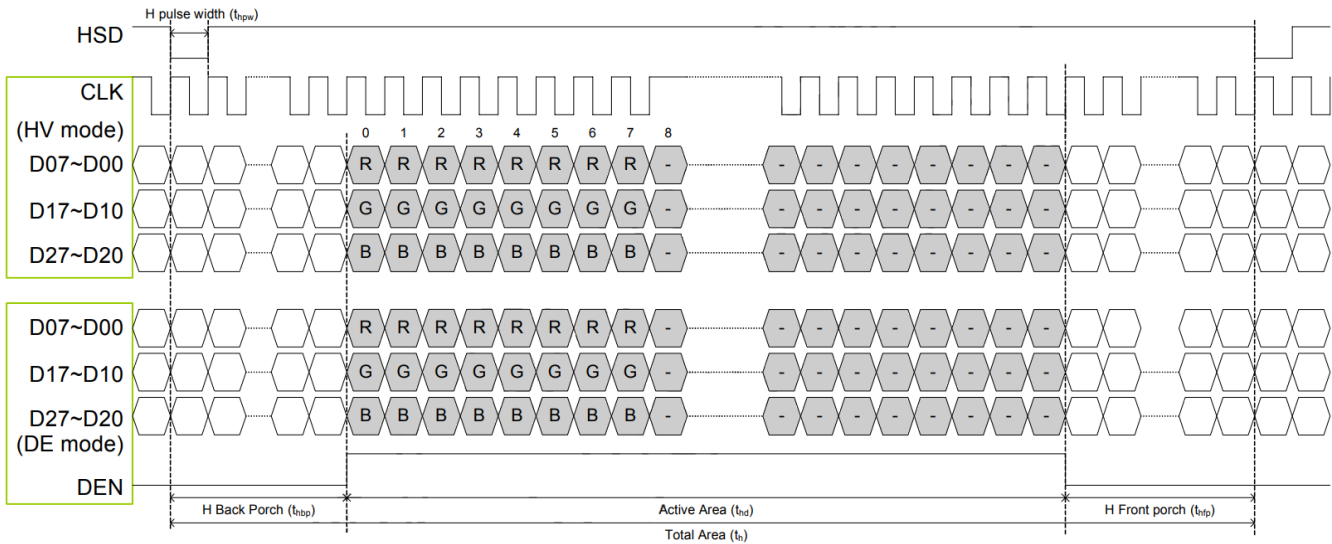
Timing Characteristics – TFT Display

DE Mode

| Parameter | Symbol | Spec | | | Unit |
|-------------------------|------------|------|------|------|------|
| | | Min. | Typ. | Max. | |
| DCLK Frequency | fclk | 40.8 | 51.2 | 67.2 | MHz |
| Horizontal Display Area | thd | 1024 | | | DCLK |
| HSD Period | th | 1114 | 1344 | 1400 | DCLK |
| HSD Blanking | thb+ thfp | 90 | 320 | 376 | DCLK |
| Vertical Display Area | tvd | 600 | | | TH |
| VSD Period | tv | 610 | 635 | 800 | TH |
| VSD Blanking | tvbp+ tvfp | 10 | 35 | 200 | TH |

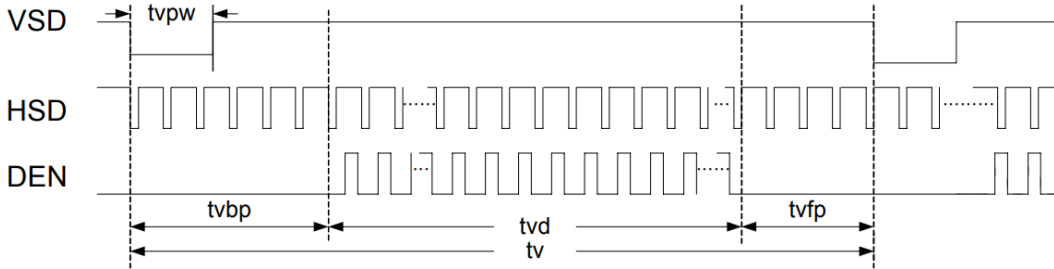
Horizontal Timing

| Parameter | Symbol | Spec | | | Unit |
|-------------------------|--------|------|------|------|------|
| | | Min. | Typ. | Max. | |
| DCLK Frequency | fclk | 44.9 | 51.2 | 63 | MHz |
| Horizontal Display Area | thd | 1024 | | | DCLK |
| HSD Period | th | 1200 | 1344 | 1400 | DCLK |
| HSD Pulse Width | thpw | 1 | - | 140 | DCLK |
| HSD Back Porch | thbp | 160 | | | DCLK |
| HSD Front Porch | thfp | 16 | 160 | 216 | DCLK |



Vertical Timing

| Parameter | Symbol | Spec | | | Unit |
|-----------------------|------------------|------|------|------|------|
| | | Min. | Typ. | Max. | |
| Vertical Display Area | tv _d | 600 | | | TH |
| VSD Period | tv | 624 | 635 | 750 | TH |
| VSD Pulse Width | tv _{pw} | 1 | - | 20 | TH |
| VSD Back Porch | tv _{bp} | 23 | | | TH |
| VSD Front Porch | tv _{fp} | 1 | 12 | 127 | TH |



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, 240 hrs. | 2 |
| Low Temperature storage | Endurance test applying the low storage temperature for a long time. | -30°C, 240 hrs. | 1,2 |
| High Temperature Operation | Endurance test applying the electric stress (voltage & current) and the high thermal stress for a long time. | +70°C, 120 hrs. | 2 |
| Low Temperature Operation | Endurance test applying the electric stress (voltage & current) and the low thermal stress for a long time. | -20°C, 120 hrs. | 1,2 |
| High Temperature / Humidity Storage | Endurance test applying the electric stress (voltage & current) and the high thermal with high humidity stress for a long time. | +50°C, 90% RH, 120 hrs. | 1,2 |
| Thermal Shock resistance | Endurance test applying the electric stress (voltage & current) during a cycle of low and high thermal stress. | -30°C, 30min->25°C, 10min -> 80°C, 30min 10 cycles | |
| Vibration test | Endurance test applying vibration to simulate transportation and use. | Frequency:250r/min Amplitude: 1 inch Time:45min | 3 |
| Static electricity test | Endurance test applying electric static discharge. | Air: V _s =8KV, Contact: V _s =4KV 10 Times | |

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.