

# NHD-7.0CTP-CAPE-V

## Color TFT Liquid Crystal Display Module + BeagleBone Black Cape

|       |                                                                         |
|-------|-------------------------------------------------------------------------|
| NHD-  | Newhaven Display                                                        |
| 7.0-  | 7.0" Diagonal                                                           |
| CTP-  | Capacitive Touch Panel with Controller                                  |
| CAPE- | BeagleBone Black Cape                                                   |
| V-    | Display: NHD-7.0-800480EF-ASXV#-CTP, Premium MVA Type, Wide Temperature |

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## Document Revision History

| Revision | Date     | Description     | Changed by |
|----------|----------|-----------------|------------|
| 0        | 09/22/16 | Initial Release | PB         |

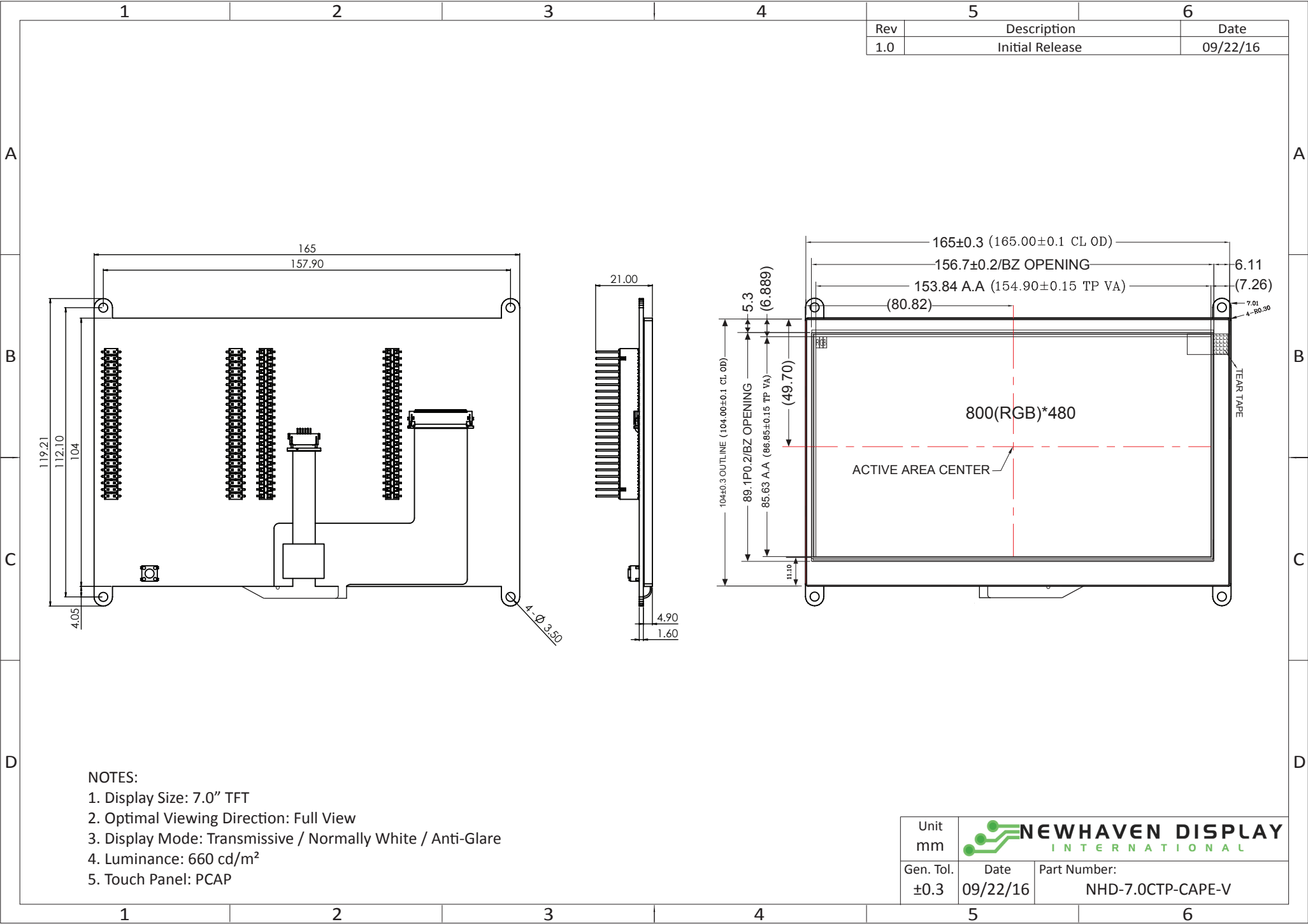
## Functions and Features

- 800xRGBx480 resolution, up to 16.7M colors
- Wide viewing angle from all sides
- PWM backlight control
- EEPROM w/ on-board dip switches: Supports four cape addresses
- Secondary cape slot
- 4 x 3.5mm mounting holes
- Assembled with NHD-7.0-800480EF-ASXV#-CTP
- Capacitive touch panel with controller
  - 5 point multi-touch input
  - Gesture input
    - Zoom In/Out
    - Swipe Up/Down/Left/Right

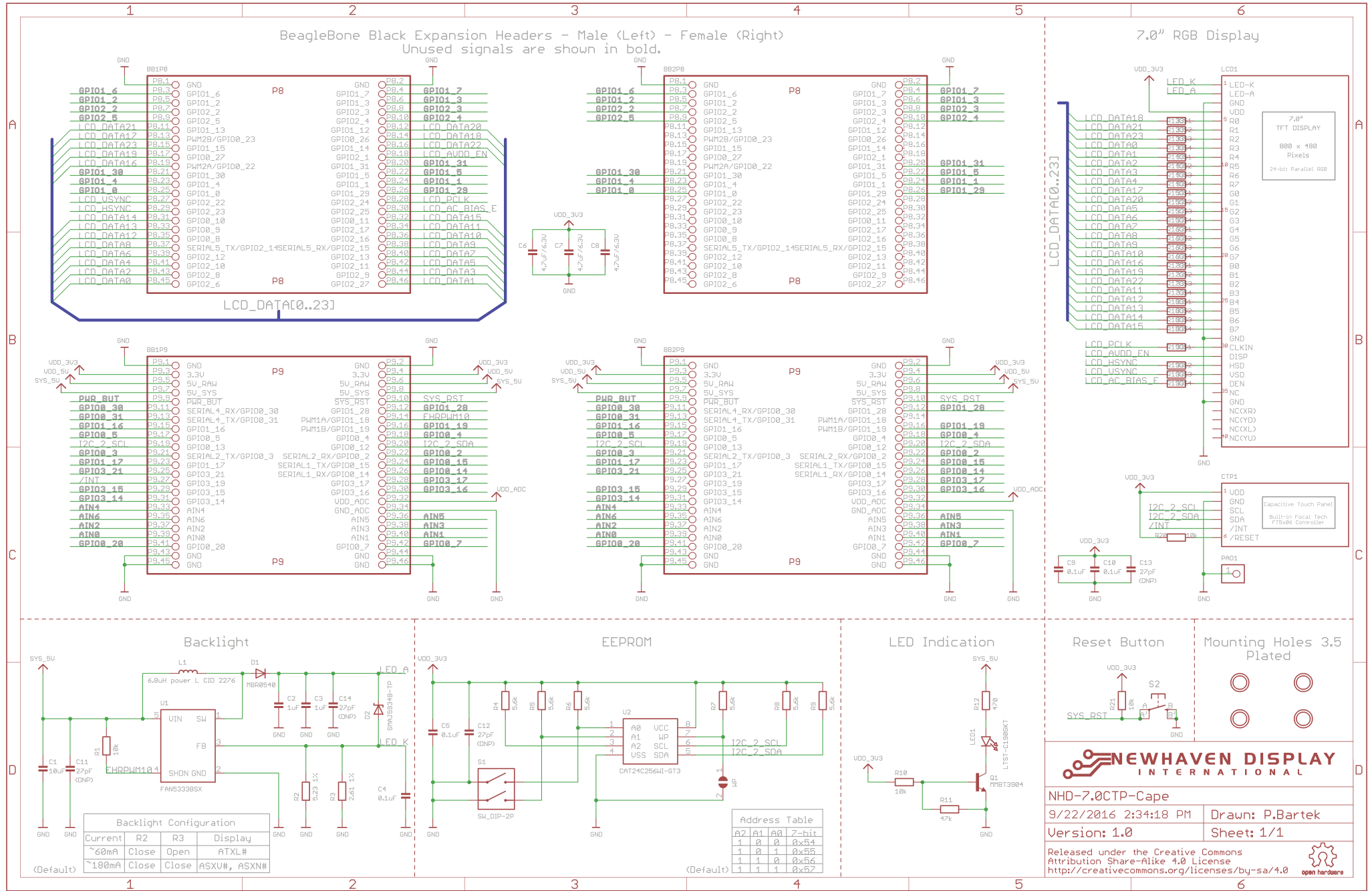
## User Guide:

Please download the User Guide at [http://www.newhavendisplay.com/userguides/NHD-7.0CTP-CAPE\\_User\\_Guide.pdf](http://www.newhavendisplay.com/userguides/NHD-7.0CTP-CAPE_User_Guide.pdf)

Mechanical Drawing



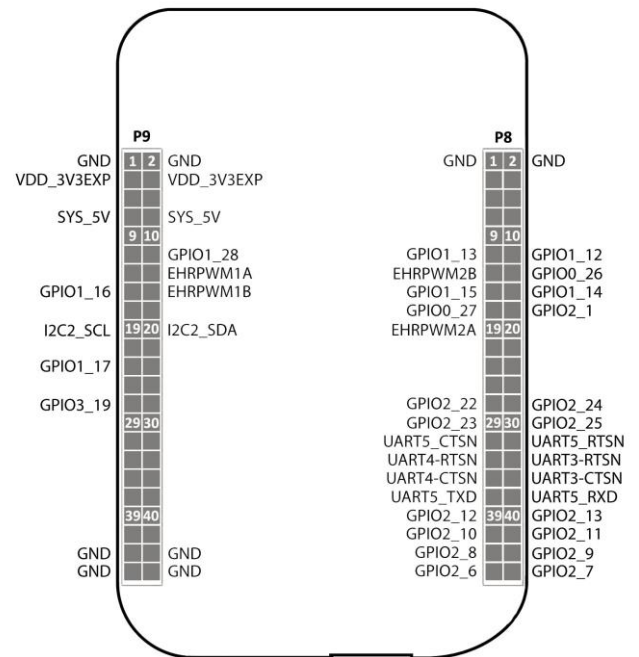
Schematic



## Signal Usage

The BeagleBone Black NHD-7.0CTP-CAPE uses 40 signals including:

- VDD\_3V3EXP
- SYS\_5V
- DGND
- GPIO1\_28
- EHRPWM1A
- GPIO1\_16
- GPIO1\_19
- I2C2\_SCL
- I2C2\_SDA
- GPIO1\_17
- GPIO3\_19
- LCD\_VSYNC
- LCD\_HSYNC
- LCD\_PCLK
- LCD\_DATA[0..23]
- LCD\_AC\_DATA\_EN
- GPIO2\_1



## EEPROM

On the NHD-7.0CTP-CAPE there is an EEPROM which is used to configure the BeagleBone Black with the appropriate configuration in order to use the Cape.

| EEPROM Details |                  |
|----------------|------------------|
| EEPROM Support | Yes              |
| Board Name     | nhd7cape         |
| Version        | 00A0             |
| Manufacturer   | Newhaven Display |
| Part Number    | NHD-7.0CTP-CAPE  |
| Pins Used      | 40               |

### Note:

Some EEPROM content refers to LCD7 00A3 which is made by CircuitCo and the nh7cape 00A0 which is made by Cembsoft. This is due to how the BBB identifies the CAPE and what drivers to apply to it.

All references to CircuitCo (LCD7) and Cembsoft (nh7cape) remain the property of CircuitCo and Cembsoft. They are not affiliated to Newhaven Display in any way.

The Beaglebone, Beaglebone Black and Beagleboard remains the property of beaglebone.org. All references to the words Beaglebone, Beaglebone Black, Beagleboard are licensed under a Creative Commons AttributionShare Alike 3.0 license.

## Display Information

### TFT:

NHD-7.0-800480EF-ASXV#-CTP - Premium 7.0" TFT, 800x480 Pixels, 24-bit Parallel RGB Interface, w/ Projected Capacitive Touch Panel.

Please download specification at <http://www.newhavendisplay.com/specs/NHD-7.0-800480EF-ASXV-CTP.pdf>

## 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> | -                    | 4.8  | 5.0  | 5.5             | V    |
| Supply Current              | I <sub>DD</sub> | V <sub>DD</sub> = 5V | -    | 1    | 1.5             | A    |
| "H" level input             | V <sub>IH</sub> | -                    | 2.2  | -    | V <sub>DD</sub> | V    |
| "L" level input             | V <sub>IL</sub> | -                    | GND  | -    | 0.8             | V    |

## Optical Characteristics

| Item                   |        | Symbol                         | Condition                 | Min.  | Typ.  | Max.  | Unit              |
|------------------------|--------|--------------------------------|---------------------------|-------|-------|-------|-------------------|
| Optimal Viewing Angles | Top    | φY+                            | CR ≥10                    | -     | 70    | -     | °                 |
|                        | Bottom | φY-                            |                           | -     | 70    | -     | °                 |
|                        | Left   | θX-                            |                           | -     | 70    | -     | °                 |
|                        | Right  | θX+                            |                           | -     | 70    | -     | °                 |
| Contrast Ratio         |        | CR                             | -                         | -     | 400   | -     | -                 |
| Luminance              |        | L <sub>V</sub>                 | I <sub>LED</sub> = 180 mA | 530   | 660   | -     | cd/m <sup>2</sup> |
| Response Time          |        | T <sub>R</sub> +T <sub>F</sub> | T <sub>OP</sub> = 25°C    | -     | 25    | 35    | ms                |
| Chromaticity           | Red    | X <sub>R</sub>                 | -                         | 0.535 | 0.585 | 0.635 | -                 |
|                        |        | Y <sub>R</sub>                 | -                         | 0.293 | 0.343 | 0.393 | -                 |
|                        | Green  | X <sub>G</sub>                 | -                         | 0.282 | 0.332 | 0.382 | -                 |
|                        |        | Y <sub>G</sub>                 | -                         | 0.575 | 0.625 | 0.675 | -                 |
|                        | Blue   | X <sub>B</sub>                 | -                         | 0.103 | 0.153 | 0.203 | -                 |
|                        |        | Y <sub>B</sub>                 | -                         | 0.096 | 0.146 | 0.196 | -                 |
|                        | White  | X <sub>W</sub>                 | -                         | 0.257 | 0.307 | 0.357 | -                 |
|                        |        | Y <sub>W</sub>                 | -                         | 0.335 | 0.385 | 0.435 | -                 |

## Capacitive Touch Panel Material Characteristics:

| Property            | Requirement | Unit |
|---------------------|-------------|------|
| IC                  | FT5406EE8   | -    |
| ITO Glass thickness | 0.55        | mm   |
| Surface Hardness    | ≥6          | H    |
| Light transmission  | 83% ± 5%    | -    |
| Operating Humidity  | 20~90       | RH   |
| Storage Humidity    | 20~90       | RH   |

## 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 , 96hrs                                                                       | 2    |
| Low Temperature storage               | Endurance test applying the low storage temperature for a long time.                                                            | -30°C , 96hrs                                                                       | 1,2  |
| High Temperature Operation            | Endurance test applying the electric stress (voltage & current) and the high thermal stress for a long time.                    | +70°C , 96hrs                                                                       | 2    |
| Low Temperature Operation             | Endurance test applying the electric stress (voltage & current) and the low thermal stress for a long time.                     | -20°C , 96hrs                                                                       | 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>10 cycles                       |      |
| Vibration test                        | Endurance test applying vibration to simulate transportation and use.                                                           | 10-55Hz , 15mm 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

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

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