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# 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

Rev	Description	Date
1.0	Initial Release	09/22/16

A

B

C

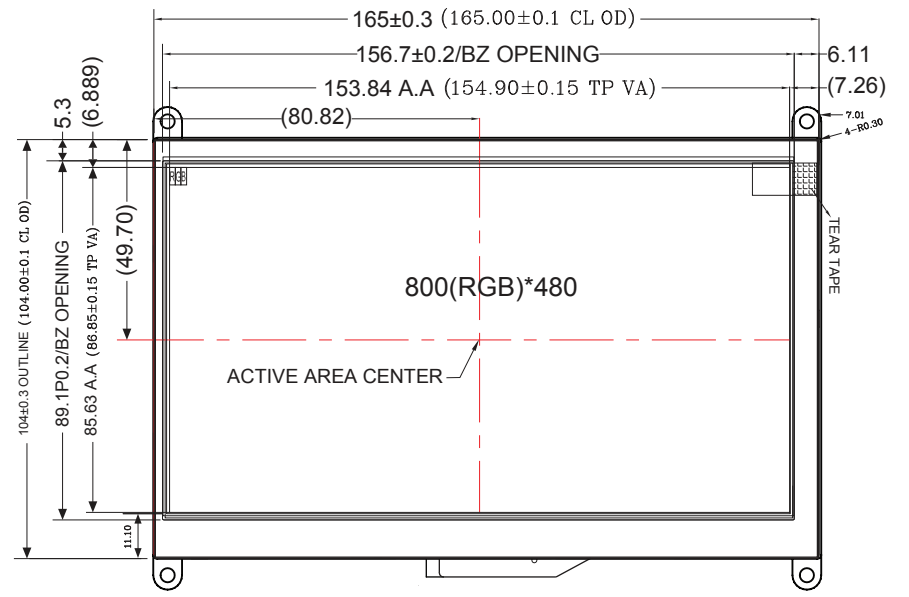
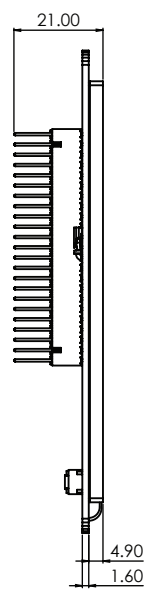
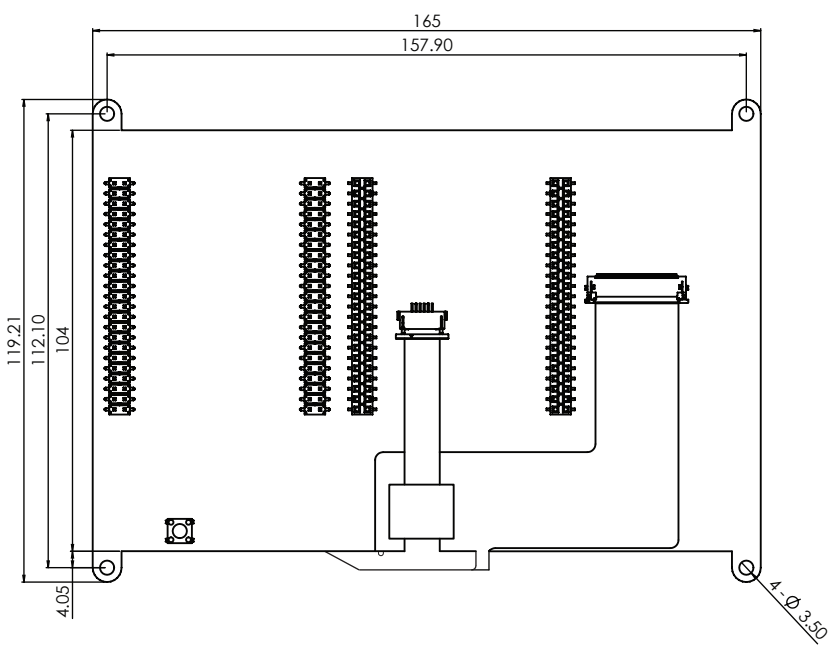
D

A

B


C

D



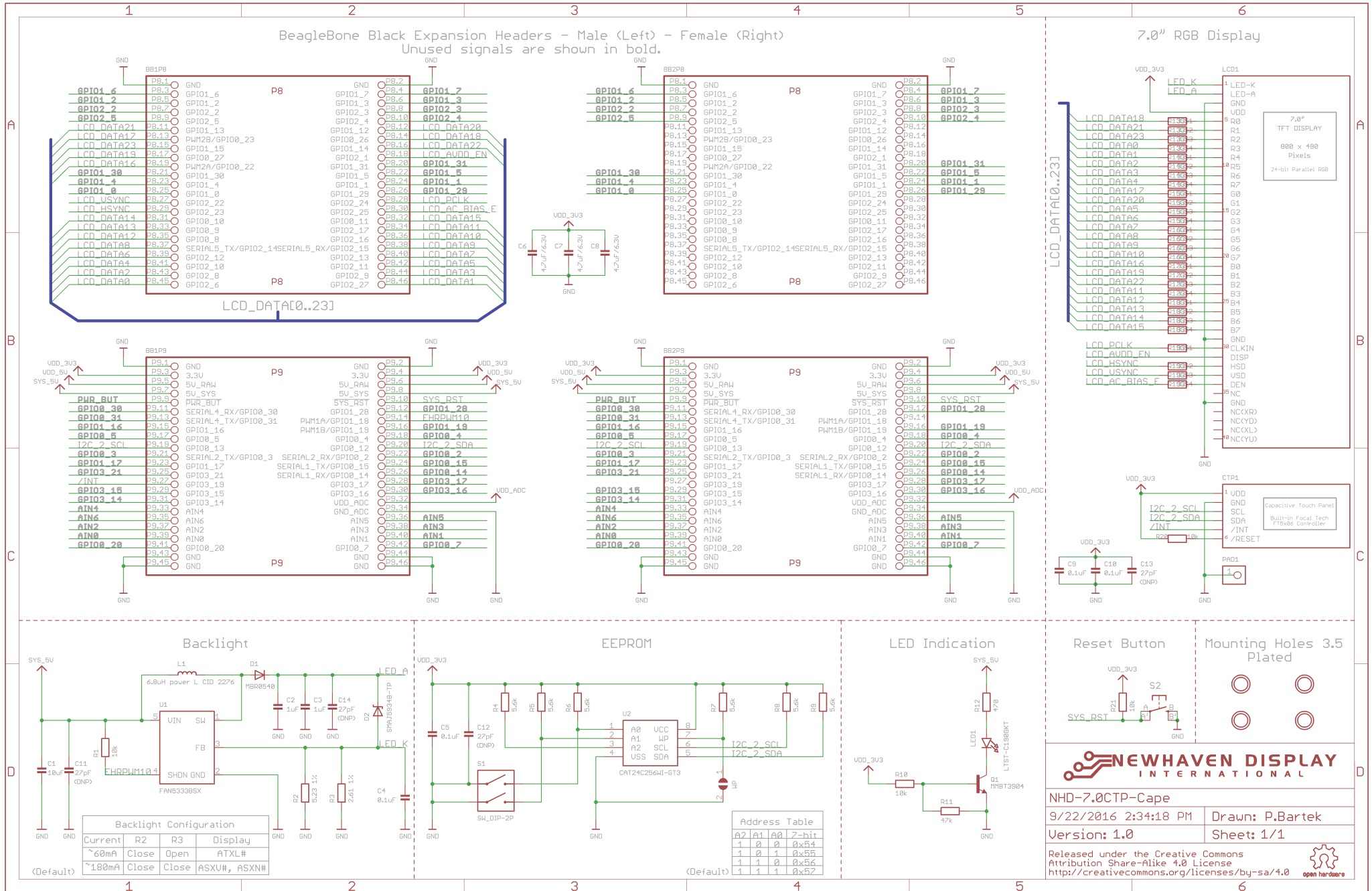
**NOTES:**

1. Display Size: 7.0" TFT
2. Optimal Viewing Direction: Full View
3. Display Mode: Transmissive / Normally White / Anti-Glare
4. Luminance: 660 cd/m<sup>2</sup>
5. Touch Panel: PCAP

Unit mm		
Gen. Tol. ±0.3	Date 09/22/16	Part Number: NHD-7.0CTP-CAPE-V



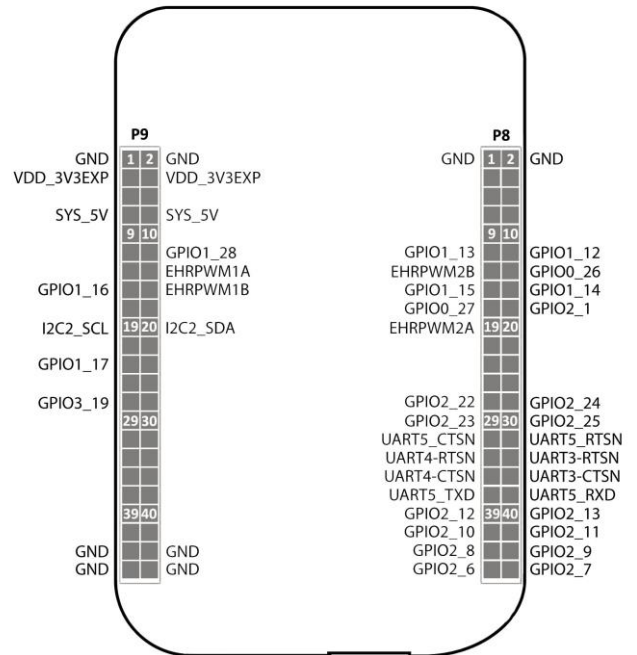
# Schematic



## 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 Cembssoft. This is due to how the BBB identifies the CAPE and what drivers to apply to it.

All references to CircuitCo (LCD7) and Cembssoft (nh7cape) remain the property of CircuitCo and Cembssoft. 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	$T_{OP}$	Absolute Max	-20	-	+70	°C
Storage Temperature Range	$T_{ST}$	Absolute Max	-30	-	+80	°C
Supply Voltage	$V_{DD}$	-	4.8	5.0	5.5	V
Supply Current	$I_{DD}$	$V_{DD} = 5V$	-	1	1.5	A
"H" level input	$V_{IH}$	-	2.2	-	$V_{DD}$	V
"L" level input	$V_{IL}$	-	GND	-	0.8	V

## Optical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	
Optimal Viewing Angles	Top	$CR \geq 10$	-	70	-	°	
	Bottom		-	70	-	°	
	Left		-	70	-	°	
	Right		-	70	-	°	
Contrast Ratio	CR	-	-	400	-		
Luminance	$L_V$	$I_{LED} = 180 \text{ mA}$	530	660	-	$\text{cd/m}^2$	
Response Time	$T_R + T_F$	$T_{OP} = 25^\circ\text{C}$	-	25	35	ms	
Chromaticity	Red	$X_R$	-	0.535	0.585	0.635	-
		$Y_R$	-	0.293	0.343	0.393	-
	Green	$X_G$	-	0.282	0.332	0.382	-
		$Y_G$	-	0.575	0.625	0.675	-
	Blue	$X_B$	-	0.103	0.153	0.203	-
		$Y_B$	-	0.096	0.146	0.196	-
	White	$X_W$	-	0.257	0.307	0.357	-
		$Y_W$	-	0.335	0.385	0.435	-

## Capacitive Touch Panel Material Characteristics:

Property	Requirement	Unit
IC	FT5406EE8	-
ITO Glass thickness	0.55	mm
Surface Hardness	$\geq 6$	H
Light transmission	$83\% \pm 5\%$	-
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 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](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)