

# NHD-7.0CTP-CAPE

## 7.0" BeagleBone Black Cape User Guide

NHD-	Newhaven Display
7.0-	7.0" Diagonal
CTP-	Capacitive Touch Panel with Controller
CAPE-	BeagleBone Black Cape

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## Document Revision History

Revision	Date	Description	Changed by
0	02/16/17	Initial Release	PB

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## Overview

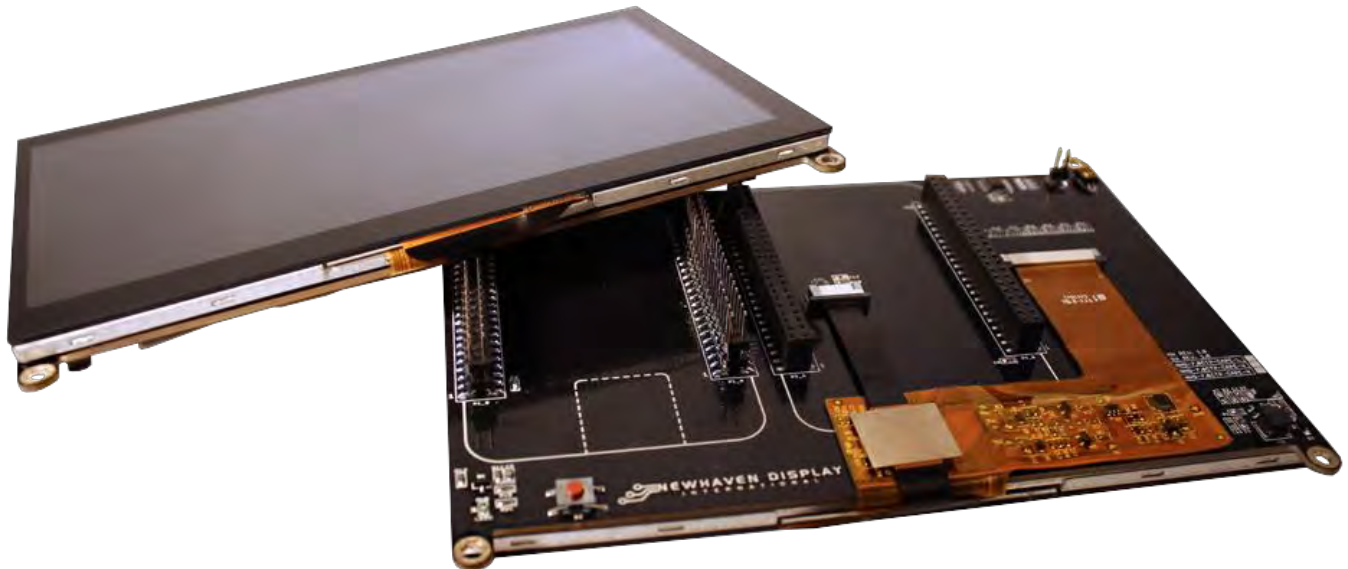


When paired with a BeagleBone Black board, the 7" BeagleBone Capes offer a streamlined approach to touch development. Capacitive 5-point multi-touch functionality is standard on these products, enabling the use of built-in touch functions when developing with operating systems like Android or Linux.

The Newhaven Display 7" BeagleBone Cape product line features three Capes. Each one is mounted to either a Standard, Premium, or Sunlight-Readable 7-inch Newhaven Display TFT and are designed for use with a BeagleBone Black board (created & sold separately by [beagleboard.org](http://beagleboard.org)). Engineered and assembled in Elgin, IL USA, these new Capes make display prototype developing easy for both current and aspiring BeagleBone users. The simple "plug and play" structure allows you to get right to development – even with Android or Linux operating systems.

The 7" BeagleBone Capes' use of BeagleBone development technology means the user can utilize the BeagleBone community and open source resources to facilitate the design process. In addition to the BeagleBone community resources, Newhaven Display provides Operating System images (OS images) written specifically for use with the 7" Cape's featured TFT display. The Capes also have a secondary Cape slot present to supplement your BeagleBone development with any other Capes you may need. The amazing BeagleBone community, along with these specially designed Capes, creates a realm of endless possibilities.

## Product Features

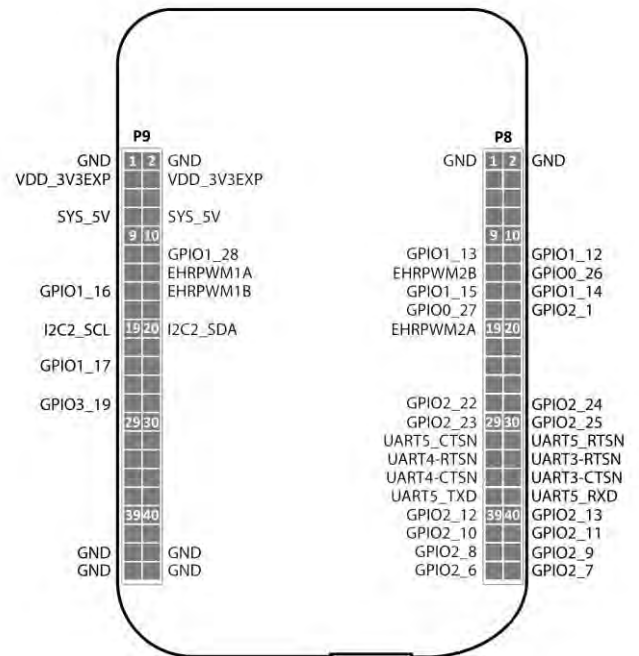


- 800xRGBx480 resolution, up to 16.7M colors
- Standard, Premium MVA and Sunlight Readable TFTs
- PWM backlight control
- Open Source Hardware and Software
- EEPROM w/ on-board dip switches: Supports four cape addresses
- Secondary cape slot
- 4 x 3.5mm mounting holes
- On board LCD backlight LED driver
- Capacitive touch panel with controller
  - 5 point multi-touch input
  - Gesture input
    - Zoom In/Out
    - Swipe Up/Down/Left/Right

# BeagleBone Black Signal Usage

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

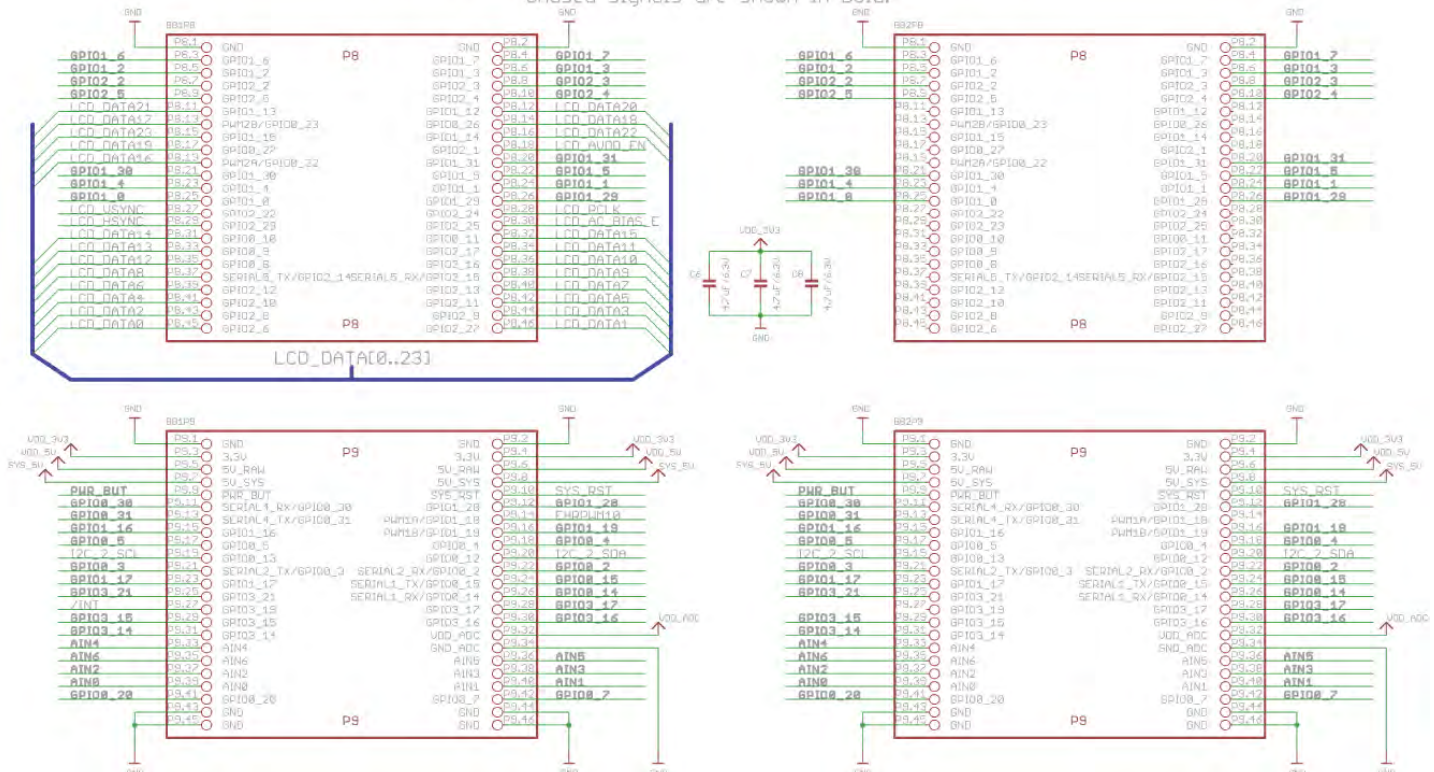
- VDD\_3V3EXP
- SYS\_5V
- DGND
- GPIO1\_28
- EHRPWM1A
- GPIO1\_16
- GPIO1\_19
- I2C2\_SCL
- I2C2\_SDA
- GPIO1\_17
- GPIO3\_19
- LCD\_VSYNC
- LCD\_HSYNC
• LCD\_PCLK
- LCD\_DATA[0..23]
- LCD\_AC\_DATA\_EN
- GPIO2\_1



**Note:**

If using with other cape's, ensure the NHD-7.0CTP-CAPE is not conflicting pin wise to any other cape installed.

BeagleBone Black Expansion Headers - Male (Left) - Female (Right)  
Unused signals are shown in bold.



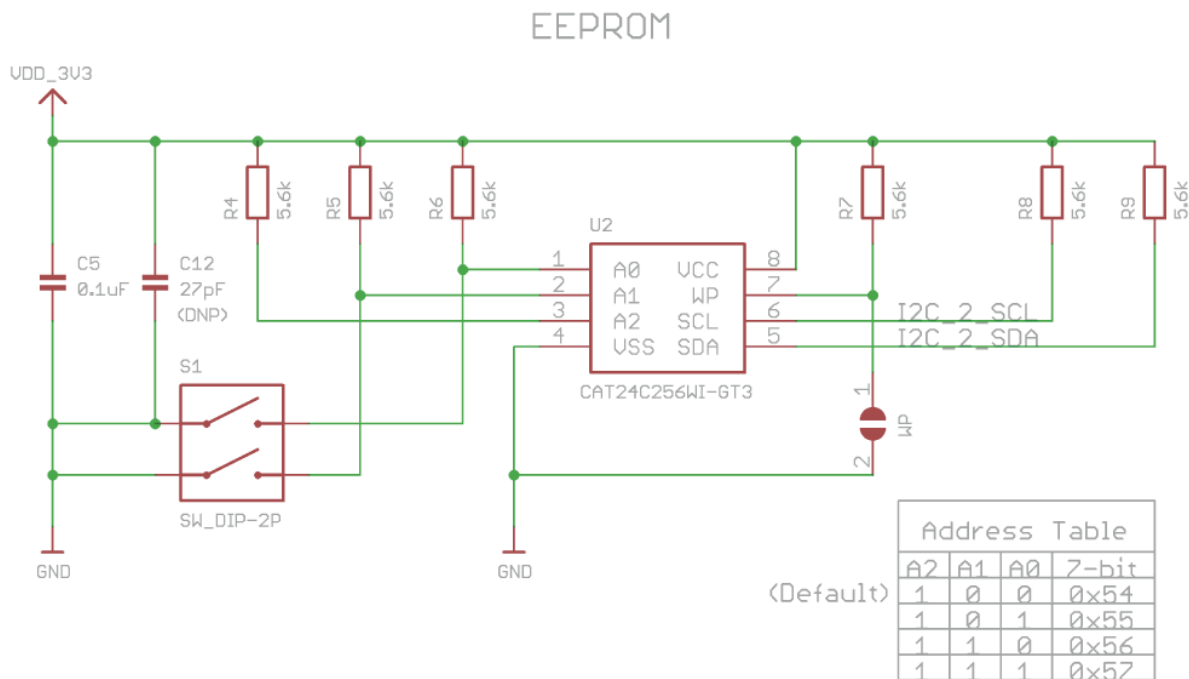


## EEPROM Details

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. The cape EEPROM is read by the BeagleBone Black during boot. It can then automatically setup the pins for use.

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

The default address for the EEPROM is 0x54. You can change it to addresses 0x54 - 0x57 with the selection of the on-board dip switches, labeled “S1”. Changing the address of the cape is important when you are using multiple capes. If you want to prevent users from writing to the EEPROM, you’ll need to place a jumper on the “WP” (Write Protection) pins. The EEPROM contains the cape definition, which is written during manufacturing and testing. If you overwrite it, the cape may not load correctly.



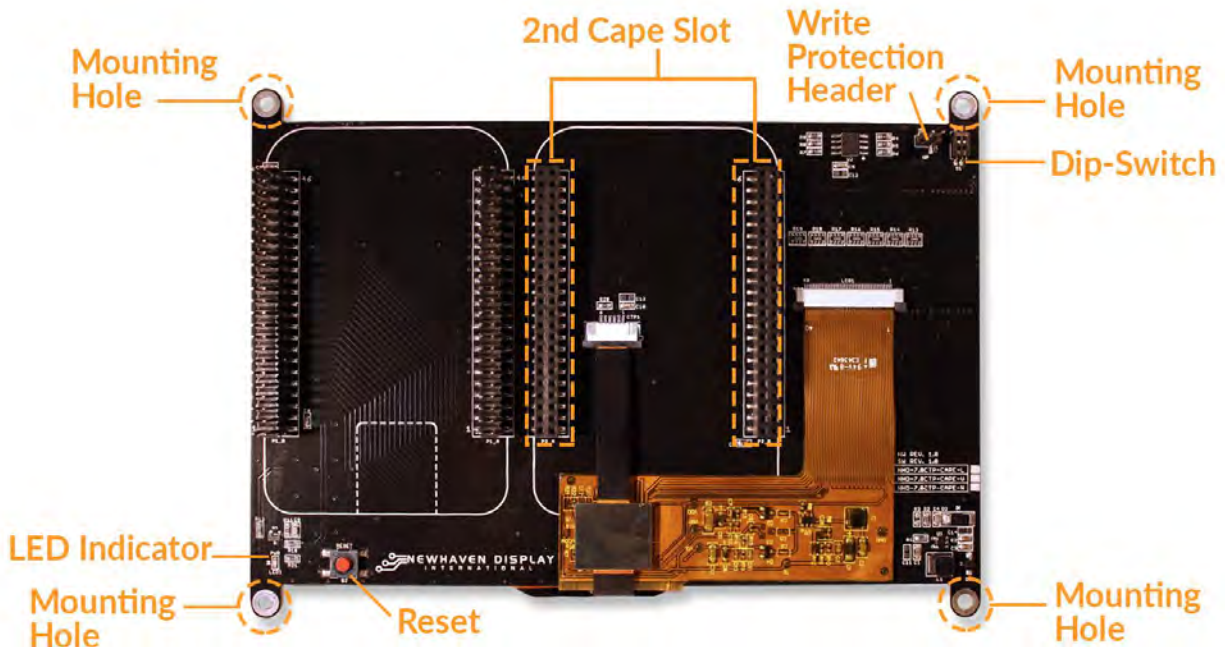
### Note:

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 the respective parties. They are not affiliated to Newhaven Display in any way.

The Beaglebone, Beaglebone Black and Beagleboard remain 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.

## Key Component Locations



## Secondary Headers

The NHD-7.0CTP-CAPE features secondary headers (**P2\_A** and **P2\_B**) for another cape to be attached. Please refer to the schematic located in the datasheet to see which pins/IO from the BeagleBone Black feature on the secondary headers.

It is up to the user to determine which capes are compatible based on which I/O is available.

## Mounting Holes

Mounting of the NHD-7.0CTP-CAPE is achieved with the 4 x 3.5mm mounting holes present on the cape, enabling standard M3 or #6-32 screws to fasten the NHD-7.0CTP-CAPE as required.

## Reset Button

**S2** is a reset button for the BeagleBone Black, not for the display. This allows access to the BeagleBone Blacks reset button which is covered up when a cape is placed on top of the BeagleBone Black.

## Dip-Switch

The NHD-7.0CTP-CAPE features a 2-position DIP switch (**S1**) for configuring EEPROM I2C address.

## Write Protection Header

If you want to prevent users from writing to the EEPROM, you'll need to place a jumper on the (**WP**) Write Protection pins.

## Power LED Indicator

The NHD-7.0CTP-CAPE features a Green LED (**LED1**) to indicate Power.



# Getting Started

## Requirements

The NHD-7.0CTP-CAPE is designed to work with existing software and drivers already developed for the BeagleBone Black. The Requirements for use are:

- NHD-7.0CTP-CAPE-x
- BeagleBone Black with suitable distribution loaded
- 8GB microSD card
- 5V DC supply suitable for the BeagleBone Black

## How to use the NHD-7.0CTP-CAPE

The following steps should be all that is required in order to use the NHD-7.0CTP-CAPE:

1. Connect the NHD-7.0CTP-CAPE to the BeagleBone Black while the BeagleBone Black is not powered. An outline of the BBB is printed on the back of the NHD-7.0CTP-CAPE as a guide for orientation.
2. If using with other cape's, ensure the NHD-7.0CTP-CAPE is not conflicting pin wise to any other cape installed.
3. Ensure the DIP Switch on the CAPE is set to a different EEPROM ID to any other capes.
4. Ensure your BeagleBone Black is loaded with a suitable Linux distribution. Please see the Software Support section for further details. Other distributions may also be compatible with this display.
5. Connect a 5V supply to the DC jack of the BeagleBone Black. It is recommended to use a 2A supply to ensure sufficient power.
6. Once power is connected, something should be displayed on the NHD-7.0CTP-CAPE as it is booted.
7. Finished! The NHD-7.0CTP-CAPE and is ready for use.

For support of the BBB and various distributions, please seek support from the respective websites associated with the BBB itself or the distributions.

A good place to start for information and support regarding the BBB and various distributions available, is [www.beagleboard.org](http://www.beagleboard.org)

## Software Support

All software relating to the NHD-7.0CTP-CAPE and the BeagleBone Black remain the property of the respective parties, and are not created nor maintained by Newhaven Display International Inc.

Newhaven Display has created the NHD-7.0CTP-CAPE hardware, for support of the BBB and various distributions, please seek support from the respective websites associated with the BBB itself or the distributions.

See the [Getting Started guide](#) and the [Official Wiki Page](#) for hints on loading these images.

Recommended images via microSD card:



Ubuntu 14.04 kernel 3.15



Ubuntu 14.04 kernel 3.8



Android 4.2.2 kernel 3.2



AOSP Android 4.4 kernel 3.2

## Hardware Support

The NHD-7.0CTP-CAPE hardware is supported by Newhaven Display. Any issues regarding the hardware itself, please contact the Newhaven Display Support team via the Newhaven Display website, or on the Newhaven Display Forum (also accessible from the Newhaven Display website). <http://www.newhavendisplay.com/>

## Compatible Hardware

The NHD-7.0CTP-CAPE is not compatible with the previous BeagleBone (BeagleBone White), and can only be used with the BeagleBone Black.

## Power Supply Selection

Since you'll probably be connecting other things to the BeagleBone Black (LEDs, sensors, servos) you should get an adapter that can supply at least 2A, or even 3A. That way you can be sure you have enough juice to make each component of the circuit function reliably.

Our advice is to stick with a 2A @ 5V power supply.

## Download Links

### NHD-7.0CTP-CAPE Datasheets:

NHD-7.0CTP-CAPE-L Datasheet

<http://www.newhavendisplay.com/specs/NHD-7.0CTP-CAPE-L.pdf>

NHD-7.0CTP-CAPE-N Datasheet

<http://www.newhavendisplay.com/specs/NHD-7.0CTP-CAPE-N.pdf>

NHD-7.0CTP-CAPE-V Datasheet

<http://www.newhavendisplay.com/specs/NHD-7.0CTP-CAPE-V.pdf>

### BeagleBone Black Support Resources:

Support Resources

<http://beagleboard.org/support>

### Precautions for using LCDs/LCMs:

See Precautions at <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)