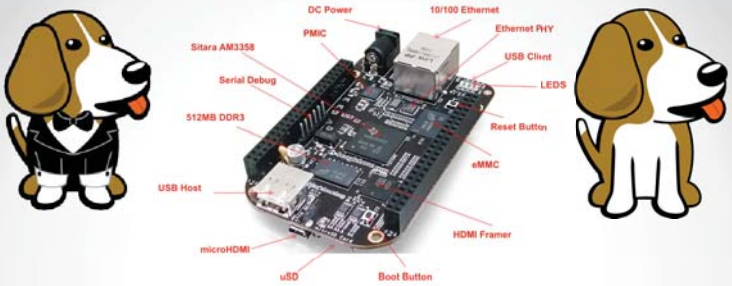

The Beagle Bone

by Mark A. Yoder
Mark.A.Yoder@Rose-Hulman.edu

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Overview

- Me - Out-of-the-box
- You – Out-of-the-box
- Introductions
  - Me
  - Black Bone
- Technical Details
- You – More Labs
- Teaching with the Bone
- Questions and Wrap Up

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Boris

- ...speaks for himself
- Watch carefully

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You – Out-of-the-box

Getting Started

1. Plug the BeagleBone into your computer via USB.
2. Open the new drive that appears.
3. Open **START.htm** with Chrome or Firefox.
4. Install driver for your OS. (You'll have to click Install several times.)
5. Return to browser window with **START.htm** and scroll down to **Step 3** to find http://192.168.7.2 and click on it.
6. Explore.
7. Click on the title Cloud9 IDE (http://192.168.7.2:3000).
8. Continue with lab handouts.

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What did you see?

- Small Size
- Powered by USB
- Fast to boot
- Easy to add audio
- Network over USB
- USB drive
- Web server
- Integrated Development Environment
- Speech synthesis
- Linux command line

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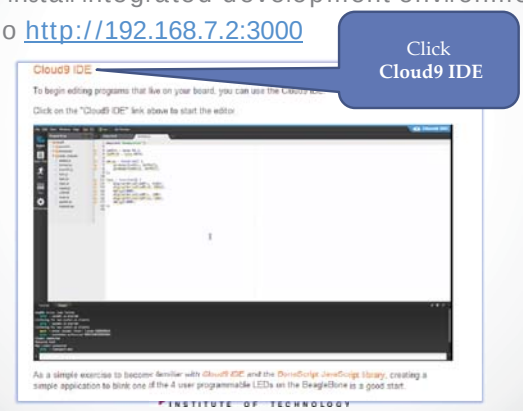
Cloud 9 IDE

- Zero-install integrated development environment
- Go to http://192.168.7.2:3000



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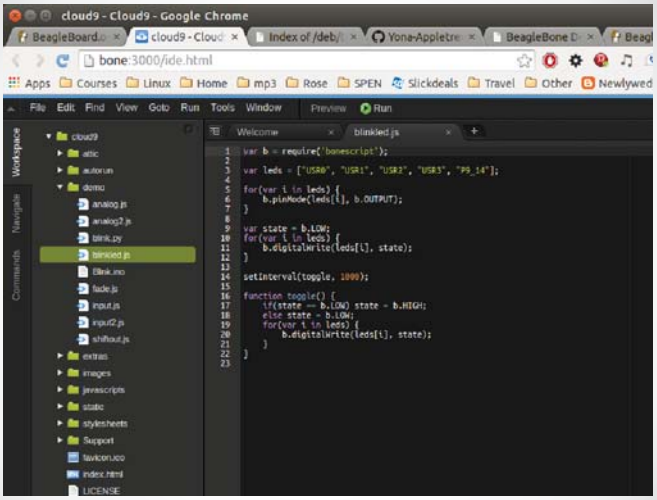

- http://www.youtube.com/watch?feature=player_embedded&v=blvkerJr5wE

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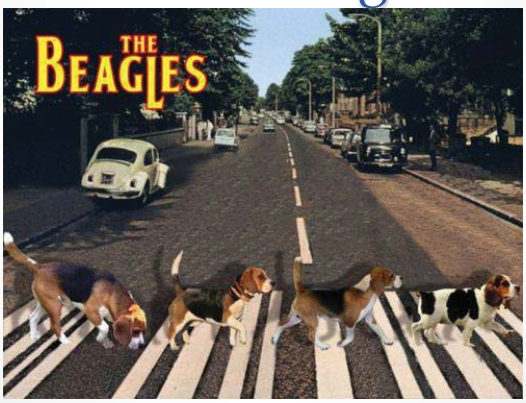
BeagleBone Family

	BeagleBoard	BeagleBoard-xM	BeagleBone	BeagleBone Black
Board				
Quick summary	The original open hardware, ARM-based development board	All features of the original BeagleBoard with extra memory	Low-cost, open-source community platform with plug-in board expansion	Next-generation BeagleBone featuring 1-GHz processor
Memory	256KB L2 cache	512MB DDR2	256MB DDR2	512MB DDR3
Special features	2D/3D graphics accelerator, HD video capable, USB powered	1-GHz processing power, Four- port hub with 10/100 Ethernet	USB-powered, 10/100 Ethernet, USB JTAG	2G/4G eMMC, onboard HDMI, USB, Ethernet and HDMI interfaces
Price ($U.S.)	$129	$149	$89	**$45/$55**

New

Introducing…

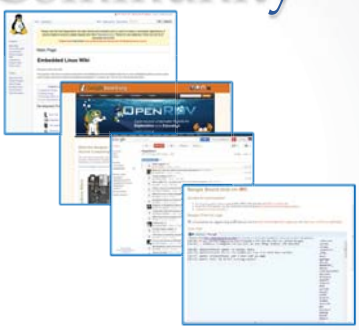


Capes expand BeagleBone

Breadboard	Breakout	LCD 7", 4.3" or 3.5"	DVI-D	CANBus
RS232	RS485	VGA	Battery	Profibus
Proto	RF-CC1101 CC2500 CC2530	Weather	Camera	CAN
DVI-D w/Audio	Audio	BeBoPr 3D Printer	Radar	LVDS

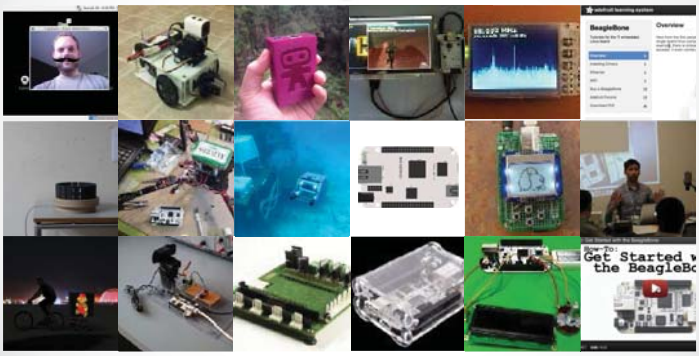
The Community

- eLinux.org
- BeagleBoard.org
- Google Group
- IRC



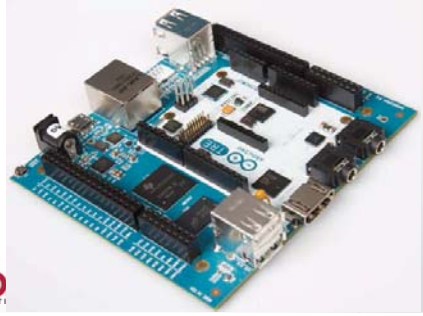
- "OpenROV is a Do It Yourself telerobotics community centered around underwater exploration and education"
- There is an OpenROV Cape http://circuitco.com/support/index.php?title=BeagleBone_ROV

Projects

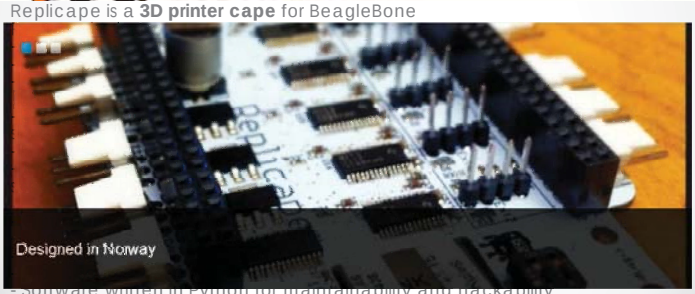


http://www.youtube.com/watch?v=NJk81eCuqu0

- BeagleBoard and Arduio combined



Replicape is a **3D printer cape** for BeagleBone



- Software written in Python for maintainability and hackability.

http://www.youtube.com/watch?feature=player_embedded&v=7Sxl5geo10w

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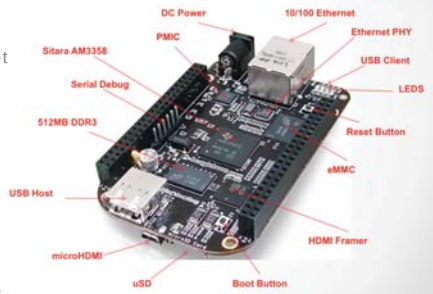
Technical Details

- Hardware
  - System on Chip
  - Pin Outs
- Software
  - Quick to learn – BoneScript
  - Easy to use – Shell Scripts
  - Powerful – C



http://bone/Support/bone101/

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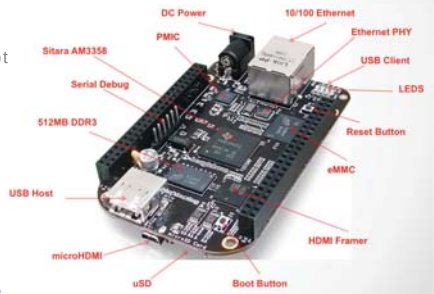

http://bone/Support/bone101/

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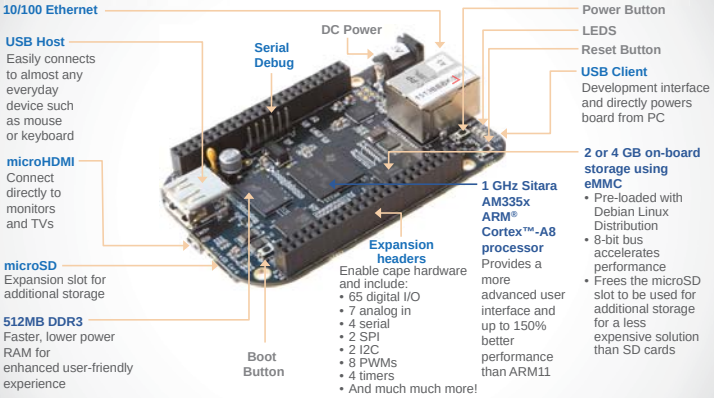
BeagleBone Black-ready to use for $45/$55



Included in price:
- Power supply ~ $10
- USB network cable ~ $3
- 2GB on-board storage $5-$10
- PRU for real-time tasks typically on FPGA ~ $20

BoneScript

- Familiar Arduino function calls…

…exported to the browser

- Buttons will run code in your broswer that will impact the LEDs on your BeagleBone
- The exact code used in the browser is given
  - digitalWrite()
  - digitalRead()
  - analogRead()
  - attachInterrupt()
  - readTextFile()
  - writeTextFile()

http://bone/Support/bone101/

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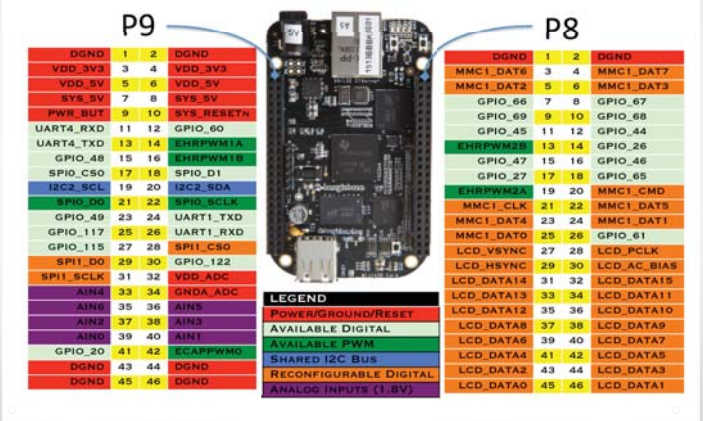
Cape Expansion Headers



Other Languages

- Out-of-the-box the bone can run
  - C
  - C++
  - bash
  - perl
  - Python
  - JavaScript
- Go, Java, Ruby, Erlang and many, many, many more are very easy to install

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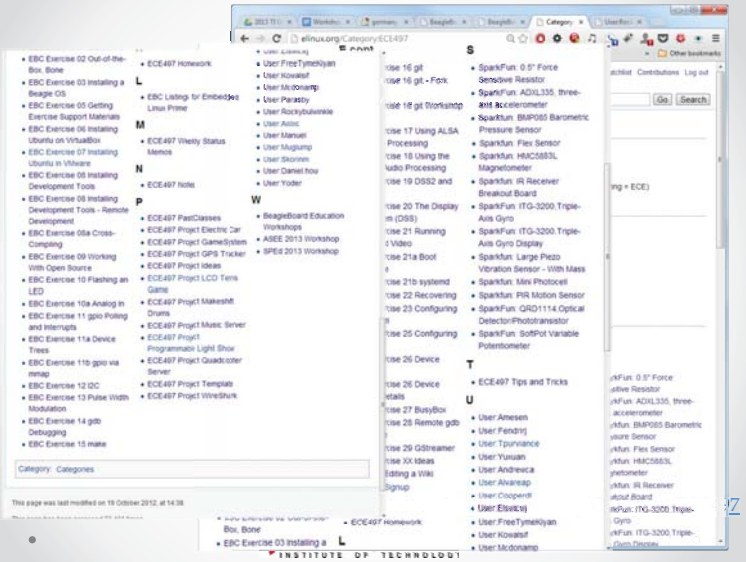
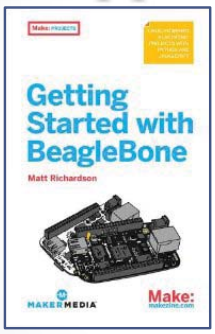
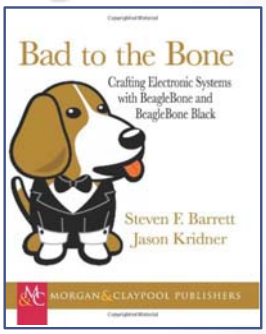


Teaching with the Bone

- How do you get going?
- Attend a tutorial
- Derek Molloy (http://derekmolloy.ie/beaglebone/
- Yoder's wiki (http://elinux.org/Category:ECE497)
- Texts
- Community

Supporting Texts





MORGAN&CLAYPOOL PUBLISHERS

Derek Molloy

http://derekmolloy.ie/beaglebone/

Questions?

- Small
- Inexpensive
- Standard interfaces
- Expandable
- Big support community
- Powerful
- Easy to use
- Low power