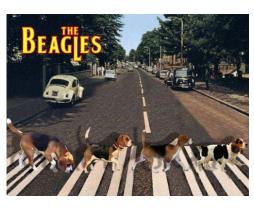
Introducing...



The Beagles





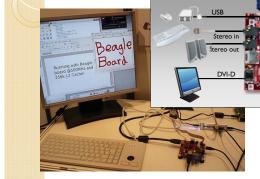


- Original
- 720MHz
- 256M RAM
- I.8V
- \$120
- xM
- IGHz
- 512M RAM
- I.8V
- \$150
- Bone
- 720MHz
- 256M RAM
- 3.3 V
- \$90

The BeagleBoard is...

- A Workstation
- A Microcontroller
- An Audio/Video Processor
- An Embedded Linux System
- A Remote Sensor

Use your BeagleBoard like a desktop



Installing applications

- Many apps (15,000+) are already compiled for the Beagle
- New apps are installed using opkg
- Try:
 - opkg list > /tmp/list
 - o less /tmp/list
- When connected to the network try:
 - opkg install gcc

opkg list

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In Linux, everything is a file

Learning about Linux through SYSFS

Thanks to Bill Gatliff



The file interface abstraction

- What can we do with files?
 - open, read, write, close, delete
- What is an 'ioctl'?
 - Gets you to the hardware!
- What is a virtual file system?
 - Looks like a file, but executes code in the driver
 - Not really storing anything to media
 - A bit like a "ram disk"



What is SYSFS?

- Virtual file system that exposes drivers to userspace
- /sys/devices ← driver hierarchy
- /sys/bus ← links to bus owners
- /sys/class ← common interfaces
- /sys/block ← block interface
- Let's go thru some examples...



What is SYSFS?

- Virtual file system that exposes drivers to userspace
- beagle\$ cd /sys/class
- beagle\$ ls

backlight	firmware	lcd	net	scsi_device	tty
bdi	gpio	leds	power_supply	scsi_disk	udc
block	graphics	mbox	pwm	scsi_generic	usb_device
bluetooth	hwmon	mdio_bus	regulator	scsi_host	vc
bsg	i2c-adapter	mem	rfkill	sound	video4linux
devfreq	i2c-dev	misc	rtc	spi_master	vtconsole
display	input	mmc host	scsi changer	spidev	

Let's go through some examples...



Hands On: Test USR2 LED

beagle\$ cd /sys/class/leds
beagle\$ 1s
beagle\$ cd "beaglebone::usr2"
beagle\$ 1s
brightness device max_brightness
power subsystem trigger uevent
beagle\$ cat brightness
0
beagle\$ echo 1 > brightness
beagle\$ cat brightness



USR2 LED will Turn on and off.

12

Hands On: Test USR0 LED

```
beagle$ cd /sys/class/leds
beagle$ ls
beagle$ cd "beaglebone::usr0"
beagle$ ls
brightness device max_brightness
power subsystem trigger uevent
beagle$ cat trigger
none mmc0 timer [heartbeat]
backlight gpio default-on
beagle$ echo none > trigger
beagle$ echo timer > trigger
beagle$ ls
beagle$ echo timer > trigger
brightness delay_on max_brightness subsystem uevent delay_off device power trigger
```



USR0 LED will Turn on and off.

Reading a Switch

```
$ cd /sys/class/gpio
$ ls
$ echo 7 > export
$ ls
$ cd gpio7
$ 1s
$ echo in > direction
$ cat value
$ ./readgpio.sh 7
press User Button
press <ctrl> C to stop
```





Reading USB Ports

•Read what USB devices are connected to the processor

- \$ cd /sys/bus/usb/devices
- \$ cat usb1/speed
- \$ cat usb?/manufacturer
- \$ lsusb