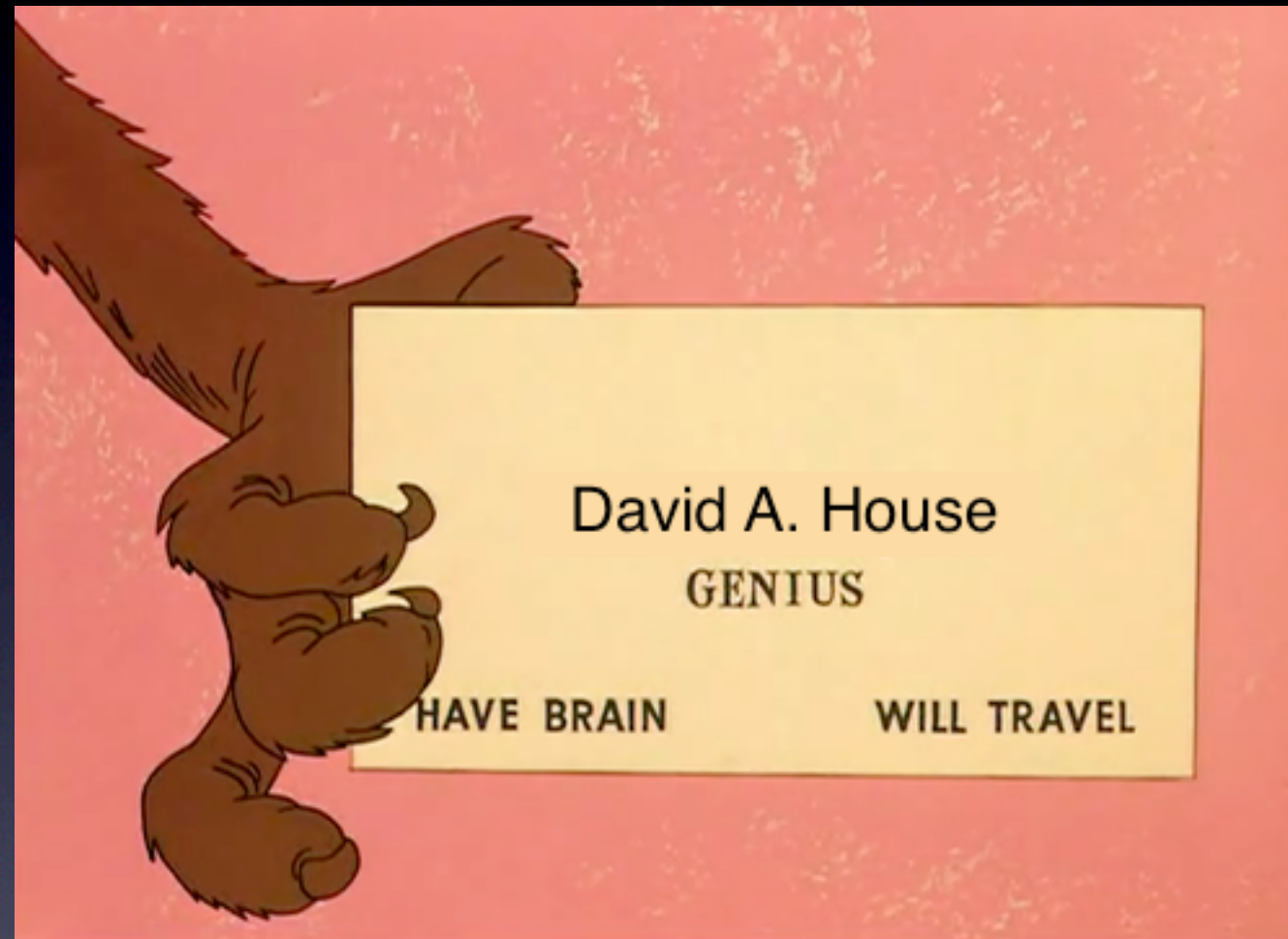


iOS & Arduino

Let's get physical... physical...





David A. House
GENIUS

HAVE BRAIN

WILL TRAVEL

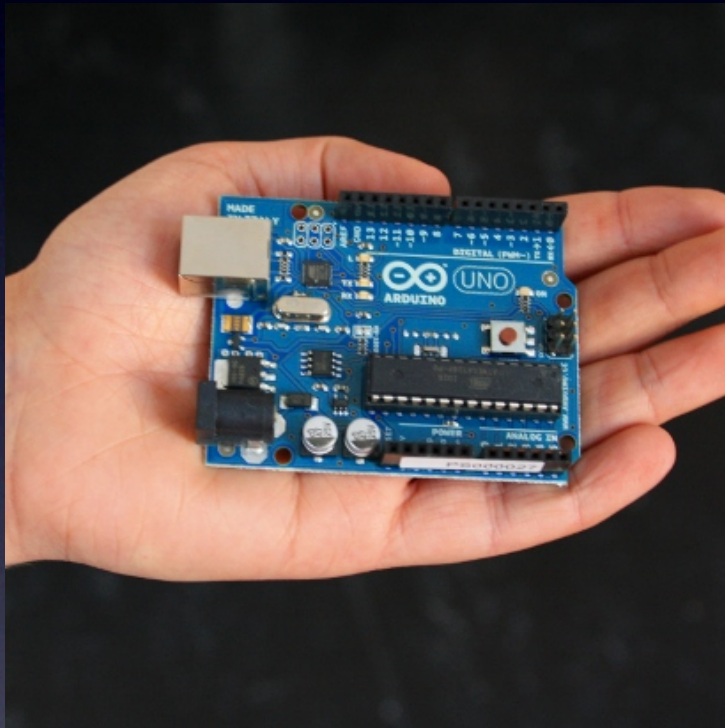
iOS Accessory Program

- Official SDK from Apple
- You need a lawyer and you must sign a NDA to get all the details
- Gives you options for 30-pin connector and Bluetooth

The hobby approach

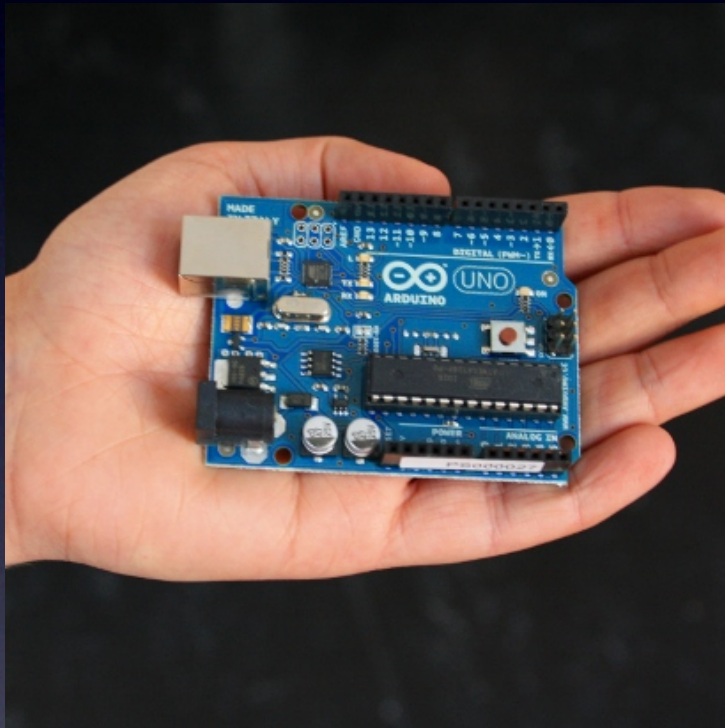
- Talk to external hardware
- Don't want to pay lawyers
- Don't want to jailbreak
- Just for fun

What is an Arduino?



- Easy to program microcontroller
- Low cost & OPEN SOURCE!
- Extreme hobby friendly

Why it's awesome



- Program in C
- Can load code right from your Mac after compiling
- Easy to interface to other electronics like LEDs, buttons, sensors, etc

Where do we start?

the beginning of
course...

Direct methods

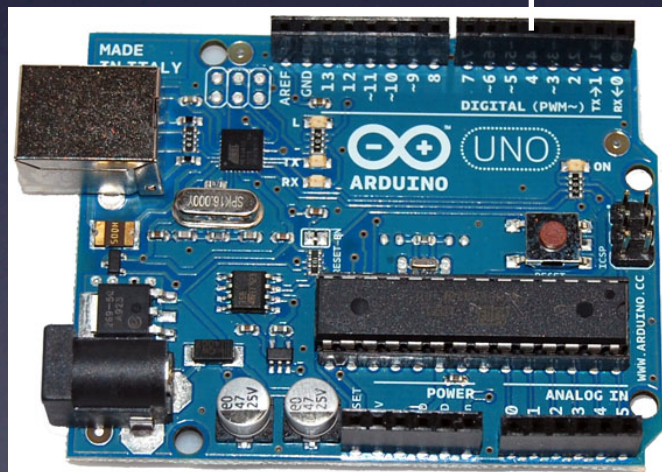
- Infrared

Honey, where did you put the remote?



Infrared
Module

Infrared
Detector



- Use a 3rd party infrared module for iOS
- Simple to detect infrared signal on Arduino using an IR detector

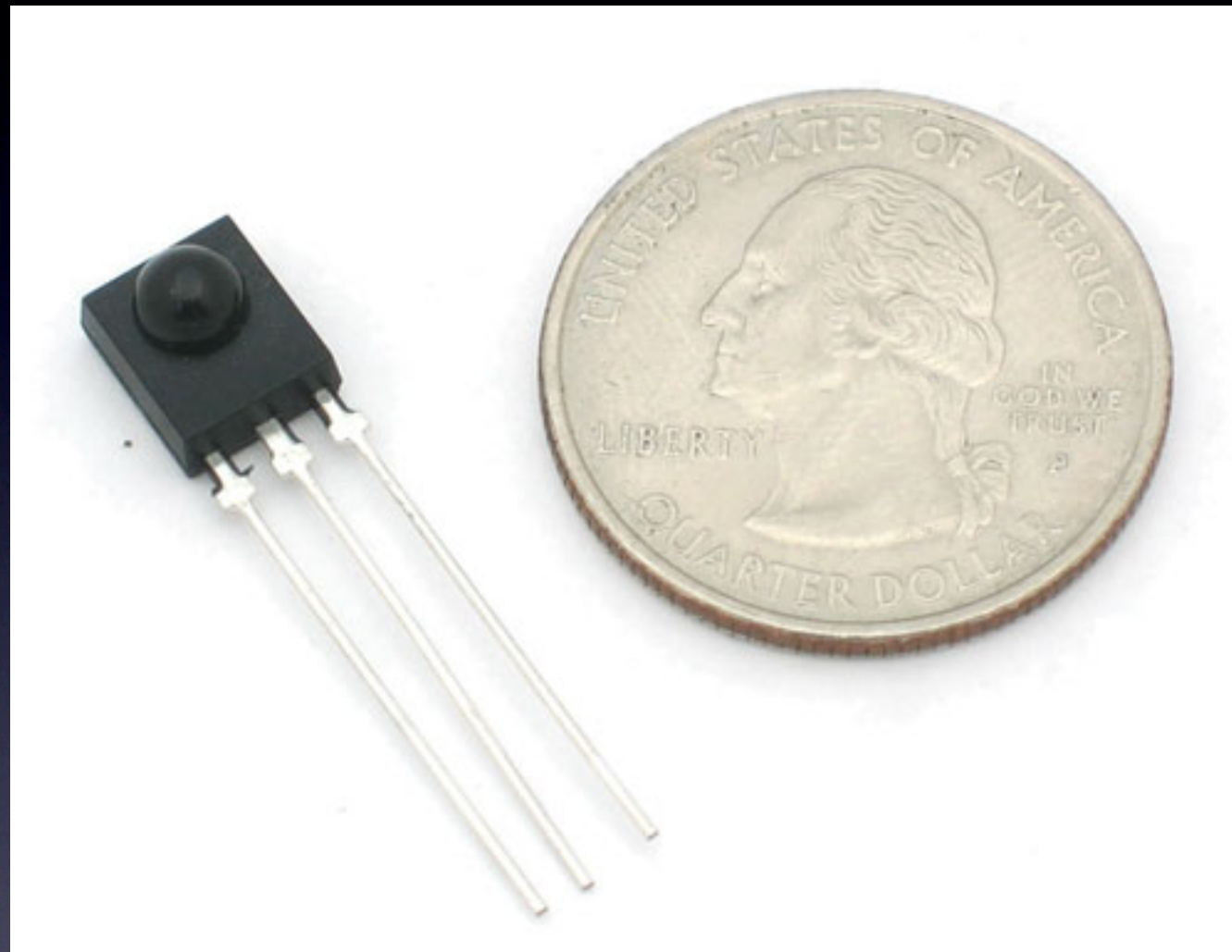


Image from adafruit.com

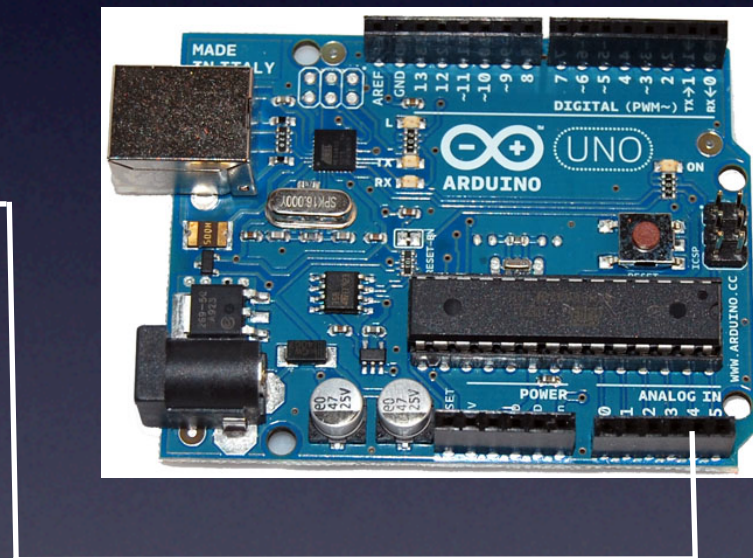
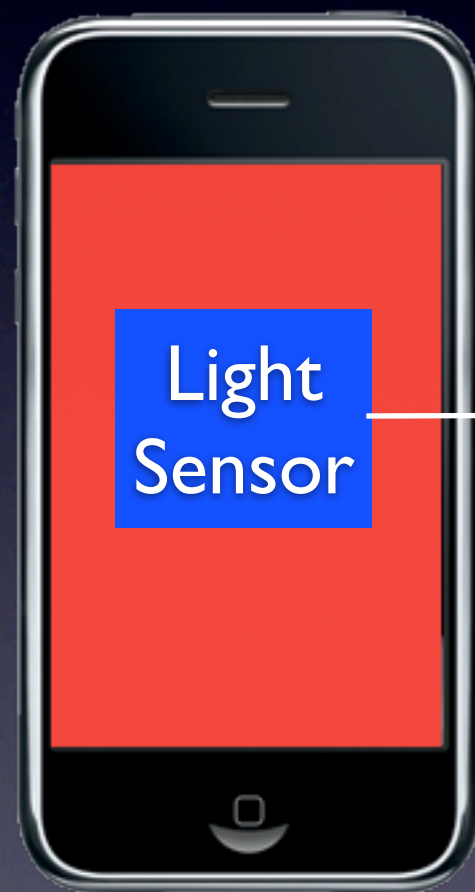


Re iPhone Universal Remote Control

Direct methods

- Infrared
- Color sensing via screen

You're allowed a wand



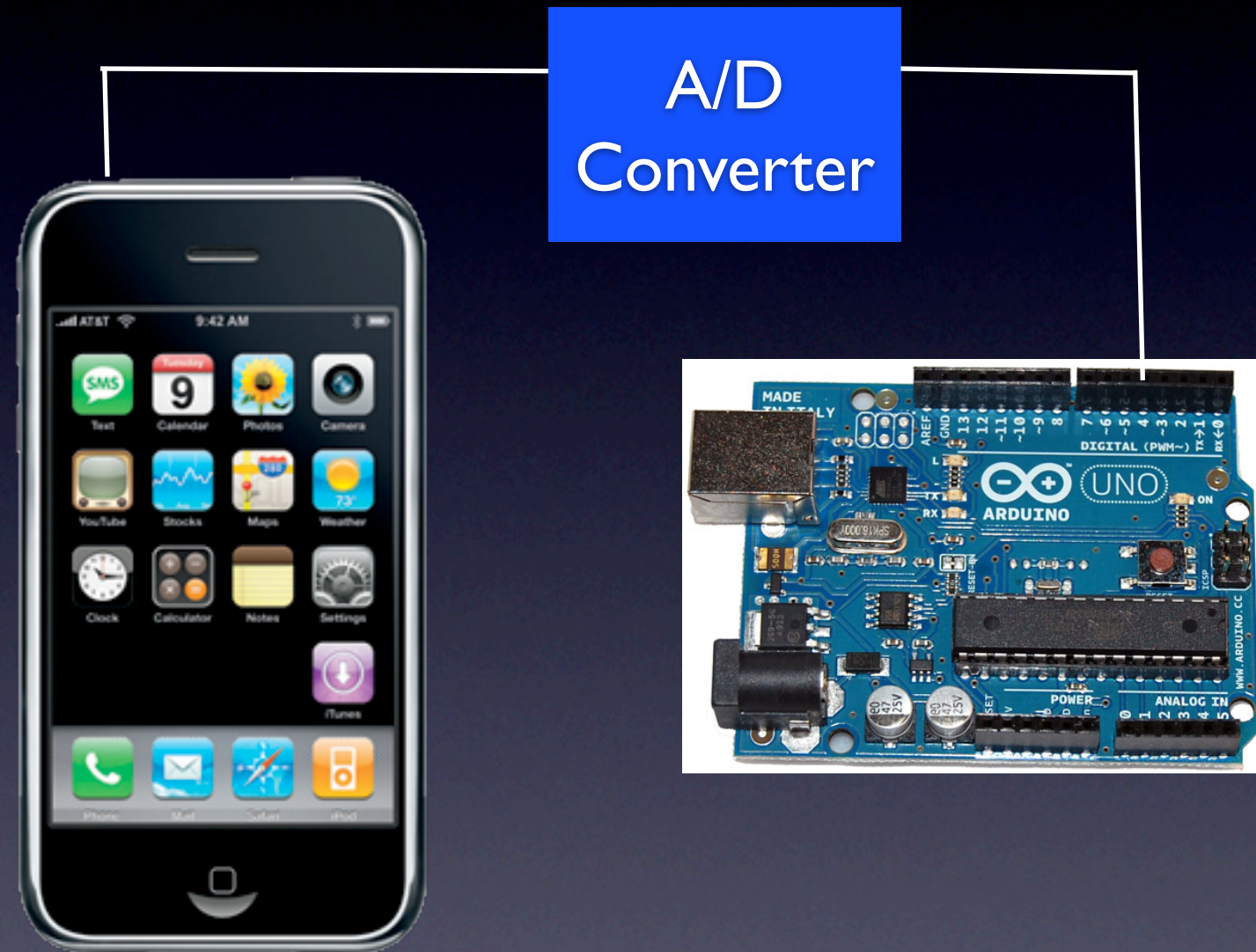
- Use a light sensitive resistor to detect luminance
- Encode serial data in light flashes
- Use a color detector for even more range of values

Demo: Light Sensitive
Resistor
(make some LEDs light
up from iPhone)

Direct methods

- Infrared
- Color sensing via screen
- Audio -> Digital using headphone jack

Turn it up to 11



- Use the headphone jack to convert audio signal
- Use the analog port to convert frequency to some digital equivalent

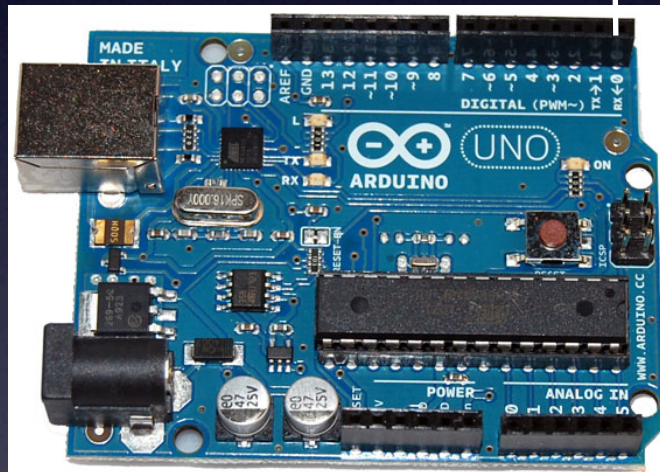
Direct methods

- Infrared
- Color sensing via screen
- Audio -> Digital using headphone jack
- Midi

MIDI like your grandma used to make it



MIDI
Adapter



- Use CoreMidi framework and the USB Camera Kit w/MIDI adapter
- MIDI is just serial input. You can go direct, or get a MIDI Shield

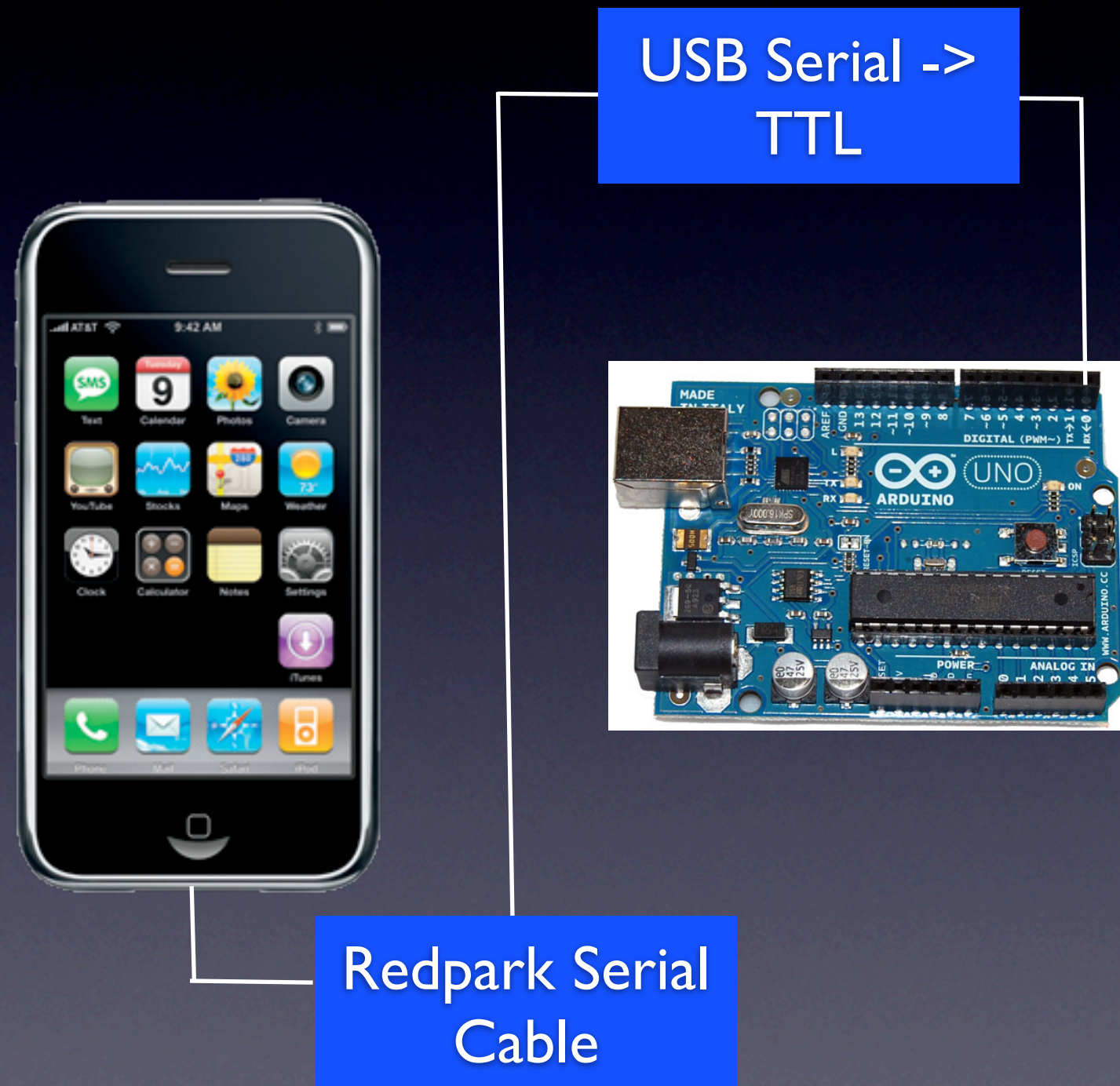
Demo: Midi controlled Rumble Robot



Direct methods

- Infrared
- Color sensing via screen
- Audio -> Digital using headphone jack
- Midi output
- Serial output using Redpark cable

Redpark, bluepark...



- Use Redpark SDK
- Need additional USB Serial to TTL converter
- Arduino treats it like any other serial device

Demo: Autonomous robot using Redpark cable

Direct methods

- Infrared
- Color sensing via screen
- Audio -> Digital using headphone jack
- Midi output
- Serial output using Redpark cable
- Breaking News: BlueTooth 4.0

Bluetooth 4.0 LE

- iPhone 4S & 'The New iPad'
- CoreBluetooth framework
- Not 100% if apps would be approved on the AppStore, but MAYBE
- Need to buy a BT dev kit currently, but Arduino shield coming soon

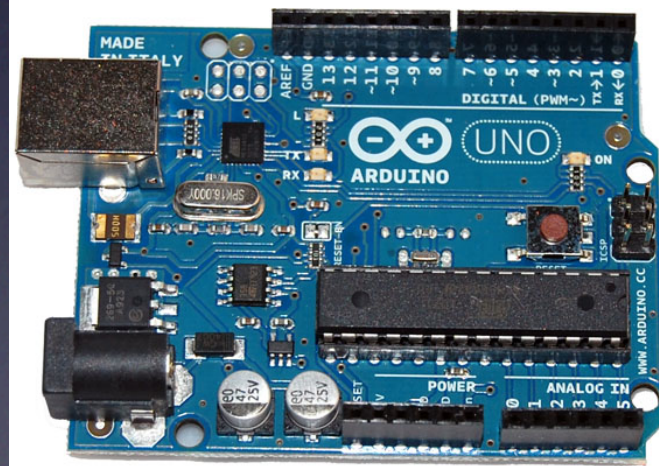
Indirect methods

- Ethernet shield

5 cats walked into a bar...



LAN



- Use CoreNetwork framework as with any network device
- Ethernet shield comes with library for communicating

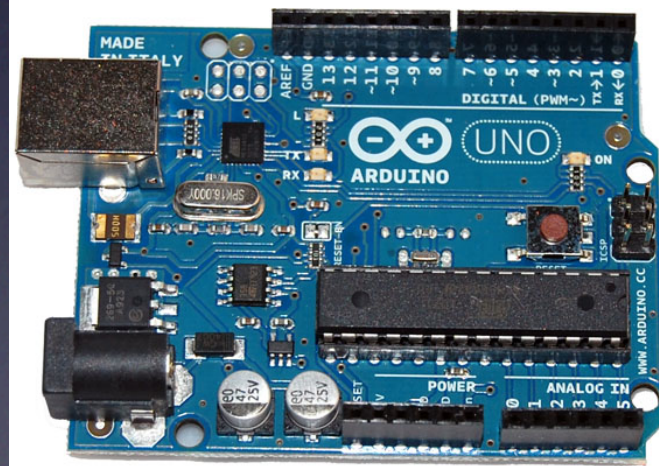
Indirect methods

- Ethernet shield
- Wifi using Wifi shield (regular or ad-hoc)

We don't need no stinking wires



WiFi



- Use CoreNetwork framework as with any network device
- Same as ethernet, just wifi instead

Indirect methods

- Ethernet shield
- Wifi using Wifi shield (regular or ad-hoc)
- Bonjour -> Mac -> Serial
- Bonjour -> Mac -> Bluetooth
- Bonjour -> Mac -> Xbee

Hello Arbiter



WiFi



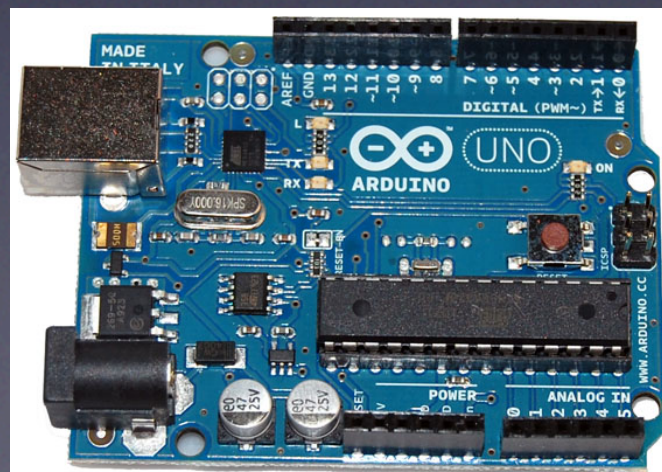
- Basically just use the Mac as a mediator

Serial

BT

Xbee

- Can use serial, bluetooth or xbee to connect to Arduino



References

- www.github.com/davidahouse/iOSduino

References

- <http://programmingiphonesensors.com/redpark/cable.html>
- www.arduino.cc
- www.adafruit.com
- www.sparkfun.com