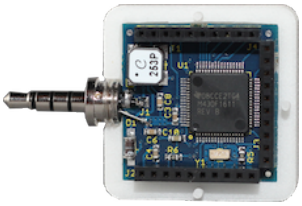


Project HiJack

Hijacking power and bandwidth from the mobile phone's audio interface.
Creating a cubic-inch peripheral sensor ecosystem for the mobile phone.

News

What's new with the HiJack project:

- 10/26/2012: Energy Micro **App Note** shows HiJack on EFM32.
- 10/21/2012: **C support** for TI's Wolverine MCU. And Android OS libs/app!
- 06/04/2012: Berkeley students build **Dr. Chi** with HiJack.
- 05/30/2012: Berkeley students build **Diabeats** with HiJack.
- 04/11/2012: **Video** showing HiJack support in **techBASIC 2.0**.
- 08/21/2011: Nice HiJack **tutorial** by War Bear.
- 06/29/2011: Can now **buy** the **HiJack** hardware from **Seeed Studio**.
- 06/16/2011: **HiJack** featured on TI University Program **homepage** and **website**.
- 05/27/2011: **Nokia** donates mobile phones to the project.
- 05/02/2011: HiJack Oscilloscope **demo application** is now on iTunes.
- 03/15/2011: **Google** donates Android phones to the project.
- 02/24/2011: **NSF** to **support** HiJack project.
- 02/18/2011: **Microsoft** donates Windows Phone 7 phones to the project.
- 01/14/2011: HiJack wins **Michigan Mobile Applications Challenge**.
- 07/02/2010: HiJack wins 1st-place in the **ISLPED'10** Design Contest.

Overview

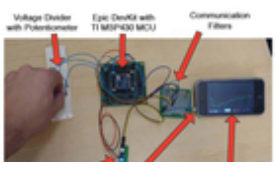
HiJack is a hardware/software platform for creating cubic-inch sensor peripherals for the mobile phone. HiJack devices harvest power and use bandwidth from the mobile phone's headset interface. The HiJack platform enables a new class of small and cheap phone-centric sensor peripherals that support plug-and-play operation. HiJack has been tested with the iPhone 3G/3GS/4G, iPod Touch, and iPad devices.

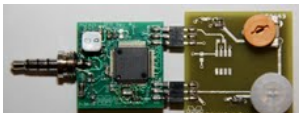
Power. The HiJack energy harvester can supply 7.4 mW to a load with 47% power conversion efficiency when driven by a 22 kHz tone from the output from a single audio channel on the iPhone 3GS headset port, all using electronic components that cost just $2.34 in 10K volumes. We are exploring other approaches for achieving higher conversion efficiencies.

Data. The HiJack communications layer offers two data transfer schemes. The first allows 300 baud data transfer using Bell 202 FSK signaling. The second offers 8.82 kbaud using a Manchester-encoded, direct-digital communication using hardware accelerators on the HiJack microcontroller and a software-defined, digital radio modulator/demodulator on the phone. The first scheme is described in the ISLPED'10 Design Contest entry (below). The second scheme is described in the DEV'10 paper below.

Sensing. We envision a range of sensorboards including ozone, carbon monoxide, DVM, blood pressure, blood glucose, and others. But today, we only have four daughterboards: (1) a simple demo board with temperature/humidity sensors, PIR motion sensor, and potentiometer used on the early HiJack prototypes; (2) a 3-lead EKG sensor; (3) a basic soil moisture sensor; (4) a breakout board for fast prototyping on the latest generation of HiJacks.

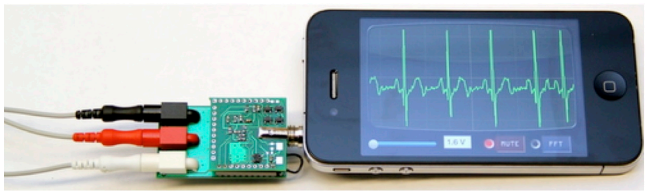
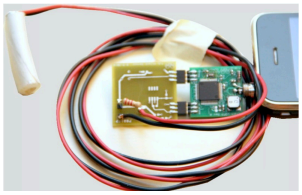
Gallery



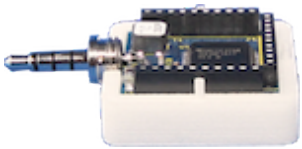




(a) Harvester prototype. (b) System breadboard. (c) Integrated + sensorboard.

(d) EKG monitor. (e) Soil moisture sensor.



(f) HiJack in case. (g) HiJack in full case. (h) HiJack + USB Programmer (**bottom**).

Code The source code and schematics are available on Google Code:
http://code.google.com/p/hijack-main/

We currently have an example application for iOS, and are working on Android and Microsoft applications. The code for the microcontroller, a TI MSP430, is also available.

Availability HiJack hardware is available from **Seeed Studio**.

~~**They're all gone. Sorry!**~~

~~If you are interested in getting a HiJack board for your own project, then please send us a short (1 page) proposal of your project idea. The project requirements:~~

- ~~Phone and HiJack code must be made available under an Open Source license (BSD-style prefered).~~
- ~~We are allowed to link to your project from this website and/or include a picture of your project in the photo gallery.~~

~~We currently have 20 HiJacks available to give away. Depending on your project, we can also provide you with a programmer and a breakout board.~~

~~Please email your project proposal to **hijack.project@gmail.com**. in **PDF format**, and don't forget to put your physical address and email on the top of your summary page.~~

Videos On **Vimeo** (Integrated).
On **Vimeo** (Breadboard).
On **Vimeo** (EKG Monitor).
On **Vimeo** (Soil Moisture).

Demos At **Mobicom'10** in Chicago.
At **Sensys'10** in Zurich.
At **DEV'10** in London.
At **IPSN'12** in Beijing.

Publications Sonal Verma, Andrew Robinson, and Prabal Dutta, **AudioDAQ: Turning the Mobile Phone's Ubiquitous Headset Port into a Universal Data Acquisition Interface**, *Sensys'12: Proceedings of the 10th ACM Conference on Embedded Networked Sensor Systems*, Nov 2012.

Prabal Dutta, **Sustainable Sensing for a Smarter Planet**, *XRDS: Crossroads: The ACM Magazine for Students*, Summer 2011, Vol. 17, No. 4, pgs 14-20, 2011.

Ye-Sheng Kuo, Sonal Verma, Thomas Schmid, and Prabal Dutta, **"Hijacking Power and Bandwidth from the Mobile Phone's Audio Interface"**, *First Annual Symposium on Computing for Development (DEV'10)*, Dec. 2010

Computing for Development (DEV'10), Dec. 2010.

Ye-Sheng Kuo, Thomas Schmid, and Prabal Dutta, **"Hijacking Power and Bandwidth from the Mobile Phone's Audio Interface"**, *International Symposium on Low Power Electronics and Design (ISLPED'10) Design Contest*, Aug. 2010. **First Place Award.**

People

Andrew Robinson
Brad Campbell
Ye-Sheng Kuo
Sonal Verma
Thomas Schmid (Faculty)
Prabal Dutta (Faculty)

Press

"Turn Your iPhone into a Plant Moisture Sensor"
By Mike Westfield, pp 42-48, Jun 2012.

"techBASIC 2.0 brings sensor data collection, analysis, and visualization to iOS"
By Steven Sand, Apr 18, 2012.

"HiJacking the iPhone's Headset Port"
Posted by Soulskill, Jan 14, 2011.

"HiJack Sucks Power And Data From Your iPhone's 3.5mm Audio Jack"
By Devin Coldewey, Jan 14, 2011.

"Project HiJack Wants to Make iPhone Accessories Cheaper (and Easier) to Produce"
By Adrian Covert, Jan 14, 2011.

"Project HiJack uses iPhone audio jack to make cheap sensors"
By Chris Foresman, Jan 15, 2011.

"iPhone headset socket hijacked to power DIY peripherals (video)"
Posted by Sean Hollister, Jan 17, 2011.

"HiJack power and bandwidth from iPhone headset port"
Posted by Adam Flaherty, Jan 18, 2011.

"HiJack Lets You Interface With The iPhone Through the Headphone Jack"
Posted by Mike Senese, Jan 28, 2011.

Support

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