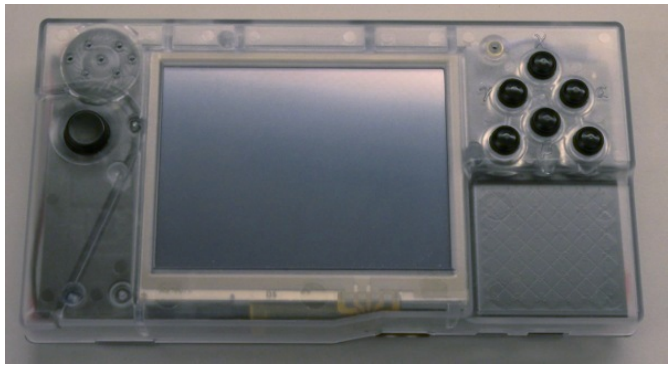
Lessons Learned Designing an Open Source UMPC

Ben Goska and Tim Harder
Oregon State University



What is the OSWALD?

- Project history
- Design considerations
- Hardware
- Firmware/Bootloaders
- Kernel
- Software
- Educational usage

Development team

- Working with a small team of students
- Moving the project forward

Noteworthy events in the project's short history

- Concepts/ideas leading to the project
  - OSU Platforms for Learning
- Paired with Beaversource
  - Combining social networking and coding — Elgg + Trac
  - Less intimidating introduction to open source communities
- Timeline
  - Project started in June 2008
  - First prototypes release in December 2008
  - First deployment in April 2009
  - Large-scale deployment in October 2009

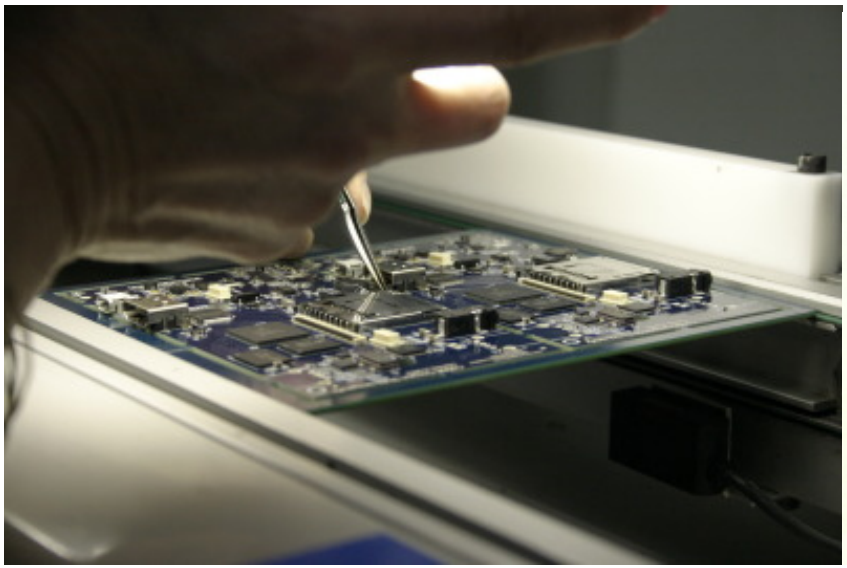
Design considerations

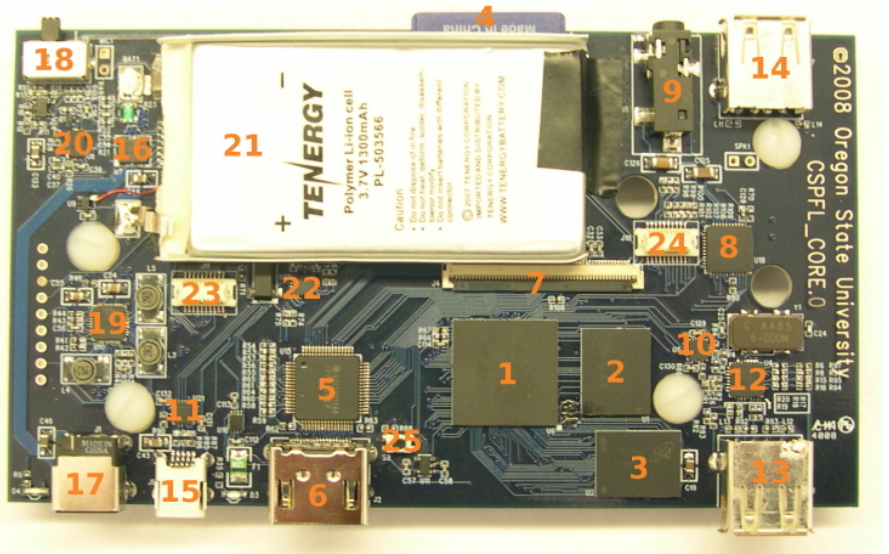
- Price
- Flexibility
- Manufacturability
- Openness

Hardware specifications

- OMAP 3530
- 128 MB DDR-SDRAM (266 MHz)
- 256 MB NAND
- 3.5" QVGA (320x240) 24 bit color LCD
- Resistive touchscreen
- DVI out (up to 1024x768)
- TI TLV320AIC33 stereo audio codec
- IEEE 802.15.4 wireless with IP over 802.15.4 support
- Touchpad
- 3 axis accelerometer
- 5-way rocker switch
- 6 general purpose buttons
- Speaker
- Microphone
- Built-in 1300mAh Polymer Li-ion battery

Manufacturing process





Low-level software

- atmega48
- Cypress
- cc2431 802.15.4 wireless system
- Das U-Boot
  - Flashing
  - Display options
  - Boot selection

Merging our efforts with the linux-omap branch

- 2.6.31-omap1 + OSWALD patches
- Hacking around hardware problems
- Adding functionality – battery monitor
- Developing new drivers – 802.15.4 wireless

Distro creation with OpenEmbedded

- Radix
- Using the OE development branch
- Many extra packages and version bumps available through package repos

A hands-on approach to computer science

Classes

- Last spring 162
- Fall 161
- Future

Non-curricular activities

- OSU Robotics club
- Games

Extremely small development team

- Pros
- Cons

Building a community

- Finding more developers
- Inspiring students to contribute
- Operating on a shoestring budget

Small quantities available to the open source community in November

Questions?

Project page: http://beaversource.oregonstate.edu/projects/cspfl
Git repos: https://code.oregonstate.edu/git