



# Fast Footwork

Heeltoe's Notes on the Embedded World

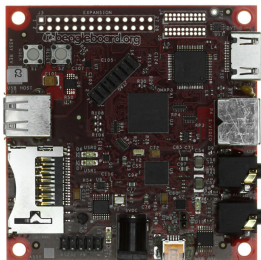
Fall 2009

---

## News...

Heeltoe worked on many interesting projects in 2009. We helped verify a new multi-core MIPS CPU by booting linux in co-simulation, we brought up a new OMAP 3525 design, we helped debug a PCI card and built a new PDP-11 in Verilog from scratch.

We spent a lot of time this year simulating designs and have become sold on co-simulation FPGA and ASIC designs.



Beagleboard OMAP 3530

## Interesting New Hardware:

- TI OMAP 35xx CPU with TPS959xx
- Multicore MIPS cpu
- PDP-11 CPU
- PCI bus

## Interesting New Software:

- Co-simulation with Verilog
  - Verilator
  - Simh simulator
- 

## What we do...

Heeltoe Consulting provides hardware services, software services and consulting for embedded systems. We specialize in Linux on a variety of platforms and CPUs such as the PowerPC, ARM, NIOS, MIPS and x86. We also design and develop for small microprocessors such as PIC and Atmel.



SiCortex SC5832, using MIPS CPUs

Heeltoe uses flexible design and development teams with an interdisciplinary approach. We can help with any software and hardware design and system level issue.

## What does 'Heeltoe' Mean?

The phrase "heel-toe" is a term used in automobile racing. It's a speed technique used to go fast. See our web site (<http://www.heeltoe.com>) for more details.

---

## Recent Projects

- *TI OMAP 3525 New board, diagnostics, Linux port, debugging*

We brought up a new board, ran diagnostics and ported the Linux kernel to a TI OMAP 3525/TPS69930 based system with multiple cpu's and FPGA. We wrote initial diagnostics, completed a u-boot port, wrote system diagnostics and added go/no testing. This included a new file system and driver support. The system includes built-in diagnostics and automatic firmware loading.

- *MIPS kernel port, new multicore MIPS cpu, linux port, co-simulation*

We ported the linux kernel to a new 12-core MIPS CPU chip (still in design), participated in the co-simulation with verilog and a behavioral model. We booted linux in co-simulation environment on multiple cpu's.

- *PCI Card, debugging of new memory window*

We helped to debug a 32 bit PCI card after a new memory window was added. We wrote a Linux driver and some simple utilities to aid in the debug effort. We also performed some basic Verilog simulation and various Chipscope debugging.

- *PDP-11 CPU in Verilog, co-simulation, synthesis*

As a “fun” project we created a PDP-11/34 in verilog and did co-simulation with a known-good behavioral model. We created PLI models for various parts of the system and booted the RT-11 operating system. Once the simulation was working we synthesized the design into a Xilinx Spartan 3 part and booted the same operating system from a real IDE disk drive.

*YOUR PROJECT HERE*

---

### Contact Information:

*Embedded Hardware and Software Solutions featuring Linux:*

**Heeltoe Consulting**  
**661 Massachusetts Ave, Suite #2**  
**Arlington MA 02476**  
**<http://www.heeltoe.com>**  
**781-483-3101**