Open Hardware for UEFI Development

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Agenda

• State of the Industry
• Gaps in UEFI Development
  – UEFI Development Kits
  – Lower Cost Options
  – Open Source
• Open Hardware Options
• Using Minnow Board for UEFI
• Summary & Questions
State of the Industry

• UEFI adoption is strong in traditional client & server markets

• High adoption rate for operating systems and independent hardware vendors

• However, we’re not quite done yet …
Gaps in UEFI Development

UEFI Development Kits

Lower Cost Options

Open Source
UEFI Development Kits

- Tested on EDK II (UEFI 2.3.1+)
- Includes multiple firmware binaries (release & debug)
- Limited models
- Firmware is binary-only
- Hardware isn’t “hackable”
Lower Cost Options

- UEFI Development Kits aren’t cheap and have limited form factors
- Hobbyist users need more control than the UEFI Development Kit offers
Open Source

☑️ UEFI Development Kit is based on EDK II (tianocore)
☒ Firmware project isn’t available in open source
☒ Open source developers can’t customize firmware (add/remove features)
So where are gaps?

• **Embedded**
  – Small form factor
  – Industrial bus (CAN, I²C)

• **Hobbyist**
  – Lower cost x86
  – Open design (“hackable”)

• **Open Source**
  – Firmware changes w/o NDA
Open Hardware Options

• A number of “open hardware” platforms are already supported in tianocore.org

• However, UEFI isn’t the default firmware

• Intel is changing this with Minnow Board
- Intel® Atom™ CPU
- Intel Architecture for the small and low cost embedded market
- Built for the developer and maker community
- Excellent performance, flexibility, openness and standards for the price
Hardware Features

- **Intel® Atom™ Processor E640** (1 GHz)
- 1 GB DDR2 RAM
- USB, PCIe, SATA & Gigabit Ethernet
- Expansion Bus: I²C, SPI, GPIO, SDIO, CAN
- Stackable & Expandable using “Lures” – Add-on boards for display, wireless & more
- Under $200 & works “out of the box”
UEFI Features

• Default firmware (binary)
  – UEFI 2.3.1c firmware with Fast Boot
  – Based on EDK II @ tianocore.org

• Open hardware = open schematics

• 4MB SPI Flash with DediProg SPI header
Firmware Options

Binary Images:
Multiple pre-built images with different payloads. Update via utility or SPI header.

Source Code:
Build firmware using the Minnow Board open source project (UDK2010 or EDK II)
Summary

• Minnow provides new options for UEFI developers
  – Embedded x86 platform
  – Low cost, easily hackable
  – Open source, open design
  – Customize UEFI firmware
  – Develop without an NDA
Questions?

• General Minnow Information: http://minnowboard.org/
  Twitter: @minnowboard

• Intel UEFI Information: http://uefidi.com/
  Twitter: @intel_uefi

• Brian’s Contact Info: brian.richardson@intel.com
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Thanks for attending the UEFI Spring PlugFest 2013

For more information on the Unified EFI Forum and UEFI Specifications, visit http://www.uefi.org

presented by

Get hooked on minnowboard.org!