UEFI on Intel Open Hardware

UEFI Plugfest – September 19-20, 2013

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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

- Test 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”)

• Works w/ 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
• Offers performance, flexibility and standards based interfaces
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
- $199 & works “out of the box”
  - Includes power supply and OS on microSD card
UEFI Features

• Default firmware (UEFI 2.3.1c binary)
  – Downloadable from uefidk.com
  – Based on EDK II @ tianocore.org

• Debugging Capabilities for Firmware
  – 4MB SPI Flash with DediProg SPI header
  – Debug output with USB-to-serial (mini USB)
  – Open hardware = open schematics
Firmware Options

Available Now!

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

Coming Soon!

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://uefidk.com/
  Twitter: @intel_uefi

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