The Investible Microprocessor Landscape: 2009 and Beyond

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Outline

- **Key Takeaways in 2009 and Beyond**

- **Lightening Round**
  - What's on everyone's Mind? RISC Survivors? Cloud Computing? Global Foundries?

- **Audience Questions**

Key Takeaways: 2009 and Beyond

Key Messages

- **AMD Unlikely to Recover**
  - ☐ But Istanbul a temporary bright spot for ~12 months
  - ☐ Intel maintains pricing power -> grows margins

- **Graphics: Market Transitions in 2010/11**
  - ☐ Intel SAM grows; nVidia's and AMD/ATI's SAM shrinks

- **Next Mobile/Server Boom Starts by Mid-2010**

- **New CULV-Subsegment Stalls Netbook Growth**
  - ☐ But, with new products, Netbook growth resumes by mid-2010
  - ☐ Winners: Moorestown, Windows 7
  - ☐ Atom Battles ARM in Smartphones to Netbooks

AMD Unlikely to Recover*

* In the foreseeable future (~3 years)

The Common Wisdom

- Every few years AMD toggles between loss and profitability

- So, catch it at its inflection point, and reap a 10-bagger in 2-3 years
  - E.g., buy at ~4 in 2003 and sell at ~40 in 1H06
  - Its now at ~4, so it must be time to buy, **Right?**

The Uncommon Wisdom

- **Wrong!** *Why?*

- Conditions are not the same as the past

- AMD is **ONLY** profitable, when
  - It has a competitive CPU microarchitecture
  - It is < 6 months behind Intel in process technology

- But these conditions **ONLY** occur when:
  - AMD executes well, AND,
  - Intel screws up in a major way

When will AMD be Competitive? And, When will Intel Screw up?

2009 Processor Landscape

- Nehalem-EP eliminated AMD platform advantage in DP WS/Servers
  - Nehalem-EX in late 2009 will eliminate it in MP servers
  - 2-socket Nehalem comparable in performance to 4-socket Shanghai
  - But 6-core Istanbul will help AMD in MP servers for ~12 months
  - Nehalem-EP (4-core) faster than Istanbul (6-core) in DP servers
  - Nehalem-EX (8-core) faster then Magny-Cours (2x6-core) in MP servers

- In desktop
  - At same frequency, Quad Core 2 is 5+% faster than Phenom II (Shanghai)
  - At same frequency, Core i7 is 25+% faster than Quad Core 2
  - 45nm "real" 2-core AMD CPU announced today vs near 100% for Intel now

- In mobile
  - 1st AMD 45nm CPUs in late Q3 vs near 100% 45nm for Intel now
  - Intel: Nehalem in September; 32nm CPUs in Q4
  - No AMD Netbook CPU on roadmap
  - No AMD 45nm CULV CPU this year

Core Technology Roadmap

- **CPU microarchitecture**
  - ☐ AMD 1+ generation behind Intel, now
  - ☐ Next Intel: Sandybridge 4Q2010
  - ☐ Next AMD: Bulldozer mid-2011

- **32nm Process Technology**
  - ☐ Intel: 4Q2009
  - ☐ AMD: 4Q2010

AMD's Challenges

- 1 Year Behind in Process Technology

- 1+ Generation Behind in CPU Microarchitecture

- Not Competitive in Mobile

- AMD Server Platform Architecture Advantage Eroding

- Discrete Mainstream Graphics is not a growth market

Will Intel Screw-up Again?

- Small ones, yes. Big ones, unlikely

- Long History of none in Process Technology

- CPU Microarchitecture?
  - Tick/Tock strategy to align with process technology
  - Tock's (new microarchitecture) alternate between 2 design teams: Haifa, Israel and Hillsboro, Oregon
  - Separate design (Atom) for ultra-mobile

Therefore

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Graphics
Market Transitions in 2010/11

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Market Transitions in 2010/11

- ## Current State

  - Discrete: AMD/ATI and nVidia offer competitive products. Prices falling and currently not profitable.

  - Integrated: nVidia Ion/9400M took market share from Intel

- ## Future

  - Integrated graphics move to CPU package with Intel 32nm Mobile & Desktop Mainstream CPUs – Starting 4Q09

  - Intel Larrabee in 2010 starts at high-end discrete

  - Result: ***AMD/ATI's and nVidia's SAM declines***

Next Mobile/Server Boom Starts by Mid-2010

Mobile/Server Boom Starts by mid-2010

- **Recessions Delay Business Purchases**
- **Windows 7**
  - ☐ Some businesses skipped Vista
  - ☐ More efficient than Vista -> longer battery life
- **Thinner, lighter, faster laptops**
  - ☐ New sub-segment starting: CULV (Consumer Ultra Low Voltage)
    - ■ Think MacBook Air Inspired Styling at 2X battery life and ½ the price
    - ■ Example: 13.3", 3.5lb, Acer Timeline with 8+ hr battery life, Core 2 ULV, Vista
  - ☐ Arrandale (32nm 2-core Nehalem with on-package graphics)
  - ☐ SSDs replace/supplement hard disk
- **Netbook/MIDs more compelling with Moorestown**
- **Nehalem-EP/EX compelling cost-saving server upgrades**
  - ☐ Shanghai/Istanbul for AMD-based server farms
- **Build-out of 4G**

New CULV Sub-segment Stalls Netbook Growth

Smartphones to Netbooks

- **Netbooks**
  - Holding at ~15% of Netbook+Laptop Market
  - 85+% Windows XP based
  - Currently, no significant competition to Atom
  - % likely to decline (next 9-12 months) due to new CULV sub-segment
- **Next Growth Drivers**
  - Network Operators selling /subsidizing Netbooks
  - Moorestown/Windows 7 compelling (eg longer battery life)
- **Moorestown (2nd gen Atom) vs Qualcomm's Snapdragon (best ARM)**
  - Scenario power & footprint give Snapdragon the edge in Smartphones
  - Performance/Software-base give Moorestown the edge in Netbooks (ARM-version now called Smartbooks)
  - Battleground: Platforms in between, eg MIDs
- **Intel Medfield (32nm – 3rd gen Atom) in 1H2011: Smartphone competitive**
  - But is it too late to be a player?

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Lightning Round

- AMD/Intel Cross License Agreement
- Global Foundries (The AMD spinoff involving Abu Dhabi)
- Taking a Position in AMD – Why? and How?
- RISC, Itanium
- Cloud Computing
- The Antitrust cases

Audience Questions

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