

The Investible Microprocessor Landscape: 2009 and Beyond

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Disclosures

1. All opinions are my own.
2. I currently have a long position in INTC and no AMD position.

Outline



- Key Takeaways in 2009 and Beyond

- Lightning 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 than 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

Graphics 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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