COM Express
The Next Big Trend in Embedded Computing Small Form Factors

Presenters
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September 9, 2004
Agenda

- Embedded Computing Small Form Factor (ECSFF)
- Computer-On-Module (COM)
- Market Environment and Trends
- COM Express*
Big Growth in Small Boards

- How small is small?
  - $<0.03 \text{ m}^2 (<170 \times 170 \text{ mm} / <6.75'' \times 6.75'\prime$)

- Need for a balanced platform
  - Performance – I/O – Thermal – Size
  - Broad range of options (price, performance, thermal)

- Steps…
  - Awareness
  - Roadmap gaps
  - Standardization / technology interception
  - Long term roadmap alignment
What is COM?

- Computer-On-Module
- Highly integrated
- System expansion and customization through application-specific carrier boards
- Small, rugged designs fit where other solutions don’t
  - mechanically, economically & functionally
- Based on industry and proprietary standards of mechanical & electrical interface characteristics
- Ideal solutions for a host of embedded applications
Market Environments & Trends
COM market is predicted to grow at a 54% CAGR from 2002 through 2006

Source: VDC, January 2004
Forces Behind COM Growth

- OEMs recognize key COM methodology benefits
  - Fast Time-To-Market
  - Fast Time-To-Revenue
  - Focus on core business & core competence
- Rapidly respond to demand fluctuations
  - Rapid demand fluctuations are a reality in today’s business
  - OEMs can efficiently modify existing designs
- The need to rapidly respond to competitive forces
  - OEMs can easily afford to broaden their product portfolios
  - OEMs can choose from a large base of COM suppliers
- Rapid response to new technologies
COM Express Overview
Platform Positioning

- **Problem Statement**
  - Applications require increasingly higher performance and I/O bandwidth in extremely compact form factors

- **Platform Characteristics**
  - Complementary to PCI
  - High End of Embedded Industry
  - Follow-on to PCI-X and AGP with PCI Express* with a smaller foot print
  - Enables graphics in Small Form Factor (SFF)

**Performance Density**

(+)

**I/O Density**

(-)
The new PICMG standard for Computer-on-Modules (COMs) is based on serial differential signaling technology.

COM Express incorporates interfaces including PCI Express*, Serial ATA, USB 2.0, LVDS and Serial DVO.

Delivers highest performance available on the smallest state of the art embedded module.

COM Express safeguards R&D investment and lowers total cost of ownership (TCO).
Benefits of COM Express

- Enables faster time-to-market and cost-effective customization alternatives
- Improved form-fit-function, minimizing current and future design risks
- Lower product lifecycle costs through module scalability and interchangeability
- Smooth transition from legacy to legacy free
  - (PCI, IDE) + (PCI Express, SATA) \(\rightarrow\) (PCI Express, SATA)
- Headroom for growth of emerging technologies
  - (2.5GHz PCI Express, SATA-150) \(\rightarrow\) (5GHz PCI Express, SATA-300)
    - Promotes innovation
- PICMG embedded standard
Target Market Segments

- Retail & Advertising
- Medical
- Test & Measurement
- Gaming & Entertainment
- Industrial Automation
- Military/Government
- Security
Timeline – Spec and Product

- Sept. ’03: COM Express initiative started w/ Kontron, Intel, RadiSys, PFU
- Feb. ’04: COM Express Working Group established
- June ’04: PICMG involvement
- Aug/Oct ’04: Specification in review
- Nov/Dec ’04: Specification released
- Q1/Q2 ’05: Products launched

Timeline:
2003 → 2004 → 2005 → 20XX
Call to Action

- Promote the COM methodology in your customer base and in your company
- Assess the benefits of COM Express in your embedded solutions
- Attend the Bus & Board Conference in Jan ’05 for first product demos
Additional Information
Why Standardize?

- Cost reductions through commoditization
- Keeping pace with technology
- Broad industry participation
- Continued innovation through competition

* Other names and brands may be claimed as the property of others.
# AMC Vs. COM Express

<table>
<thead>
<tr>
<th>Attribute</th>
<th>AMC</th>
<th>COM Express</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Segment Focus</td>
<td>Telco/Data</td>
<td>Industrial Automation, Medical, Test &amp; Measurement, Military/Aerospace, Security, Storage, Transportation,…</td>
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<tr>
<td>Carrier boards</td>
<td>ATCA primary</td>
<td>Any &amp; Not Req.</td>
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<tr>
<td>Application Focus</td>
<td>HA</td>
<td>Flexible - Diverse</td>
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<td>System Management</td>
<td>IPMI</td>
<td>Not specific</td>
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<tr>
<td>High Speed Optical</td>
<td>Sized for Optical</td>
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<tr>
<td>Average price</td>
<td>~$1.5K</td>
<td>~$250</td>
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<tr>
<td>Gfx</td>
<td>No</td>
<td>Yes</td>
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<td>Defined Interface for market segment</td>
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<td>No</td>
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<tr>
<td>Hot Swap</td>
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<td>No</td>
</tr>
<tr>
<td>High Bandwidth Interconnect</td>
<td>Multiple 12Gb/s lanes</td>
<td>0.5 - 4.0Gb/s total</td>
</tr>
<tr>
<td>I/O</td>
<td>Network Line Interface</td>
<td>Internal Chipset Interface</td>
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SBC/EMB Market Growth

VDC projects less than 1% CAGR from 2002 thru 2006 for the traditional SBC market

Source: VDC, January 2004