

COM Express

The Next Big Trend in Embedded Computing Small Form Factors

Presenters

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

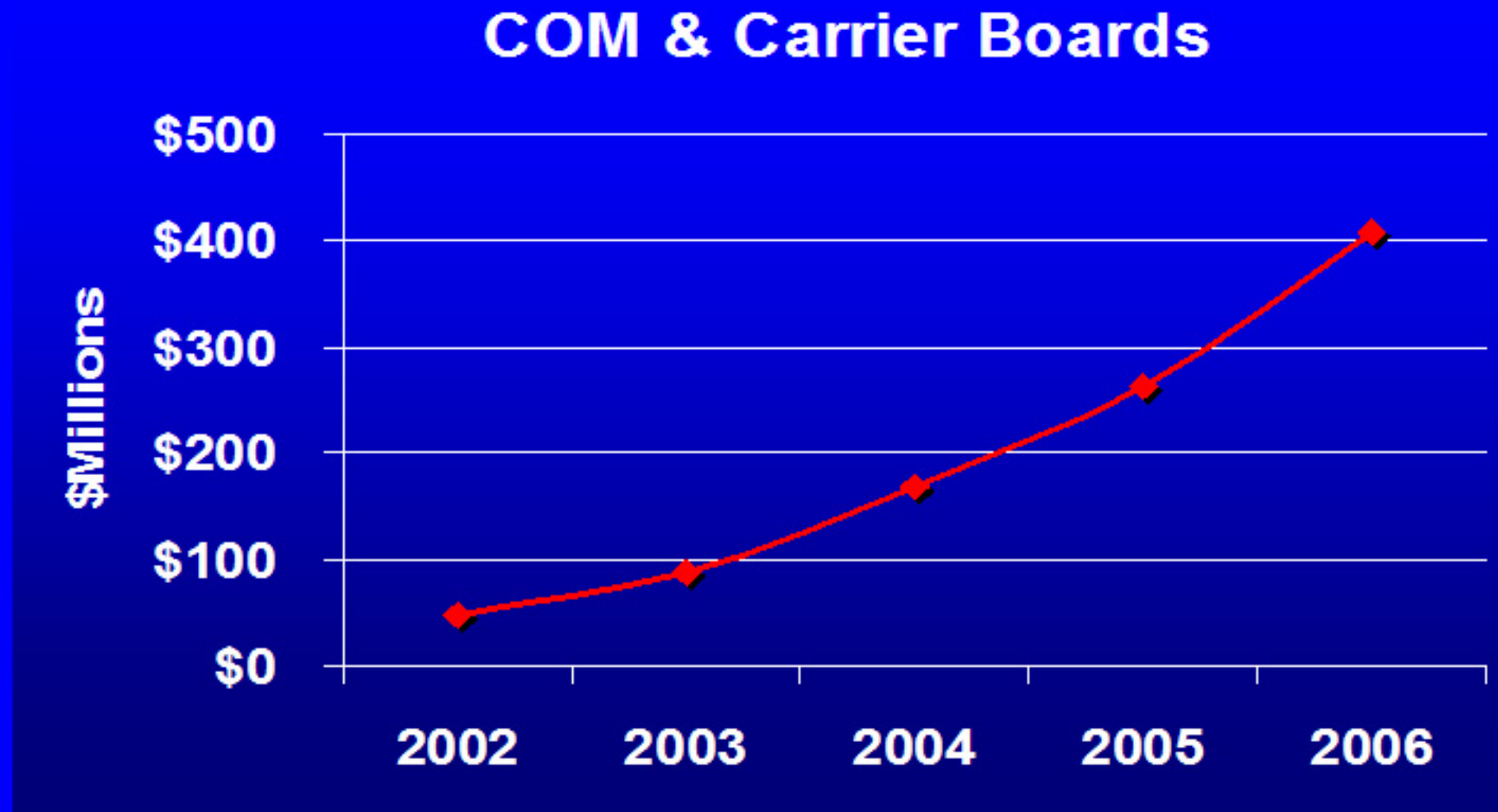
What is COM?

- **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 Segment Growth



**COM market is predicted to grow at a
54% CAGR from 2002 through 2006**

Forces Behind COM Growth

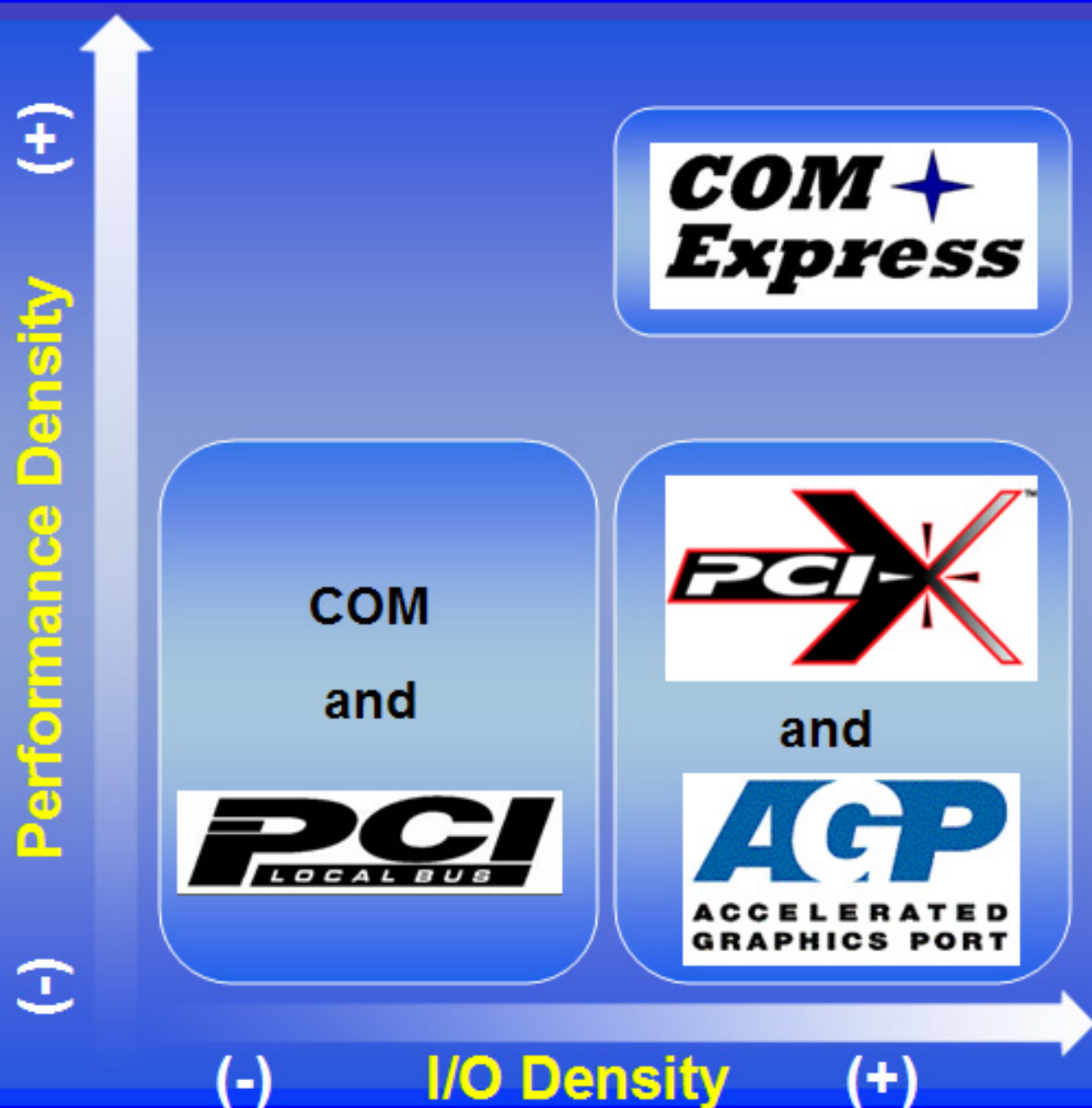
- **OEMs recognize key COM methodology benefits**
 - Fast Time-To-Market
 - Fast Time-To-Revenue
 - Focus on core business & core competence
- **Rapidly respond to demand fluctuations**
 - Rapid demand fluctuations are a reality in today's business
 - OEMs can efficiently modify existing designs
- **The 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

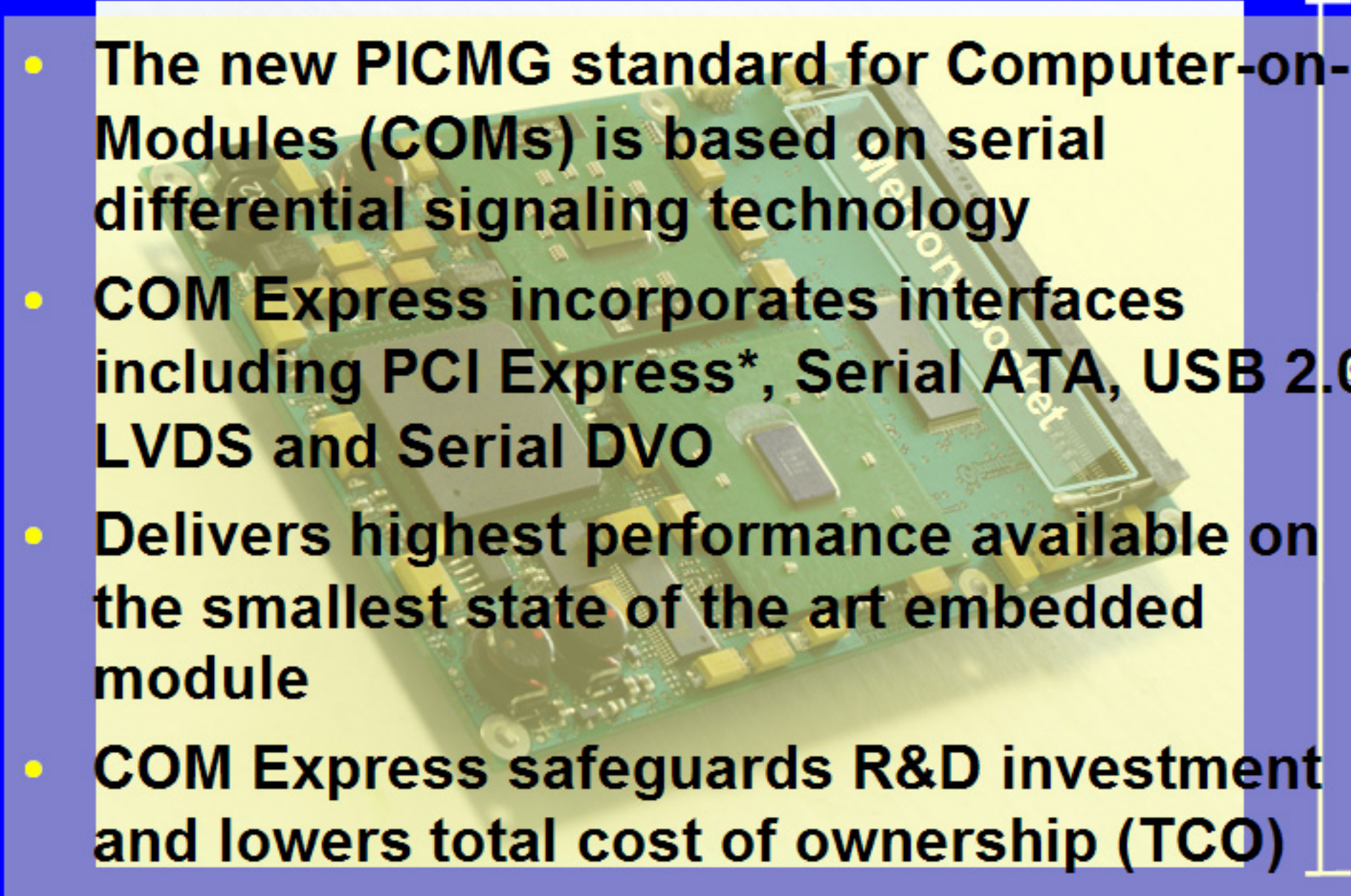


Platform Positioning

- **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)



COM Express

- 
- 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)

125 mm

15 mm

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) → (PCI Express, SATA)
- **Headroom for growth of emerging technologies**
 - (2.5GHz PCI Express, SATA-150) → (5GHz PCI Express, SATA-300)
 - Promotes innovation
- **PICMG embedded standard**

Platform Lineage

COM Express



PCI EXPRESS



Intel®
Pentium® M
Processor



Intel®
Celeron® M
Processor



IDE

E-IDE

UDMA

UDMA/133

ISA

VL-Bus

PCI

AGP

PCI 64/133

Printer
Keyboard
Floppy
Serial

Printer
PS2
Floppy
Serial

USB 1.1
PS2
Floppy
Serial

USB 1.1
USB 1.1
USB 1.1
Serial

Intel® Pentium® II
processor

Intel® Pentium® III
processor

386

486

Intel® Pentium®
processor

Intel® Pentium® III
processor

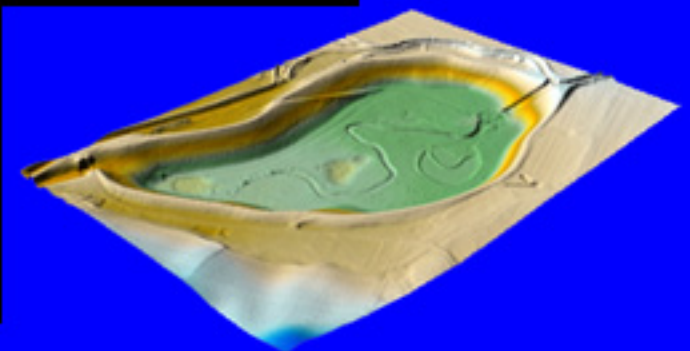
1990

2000

2004

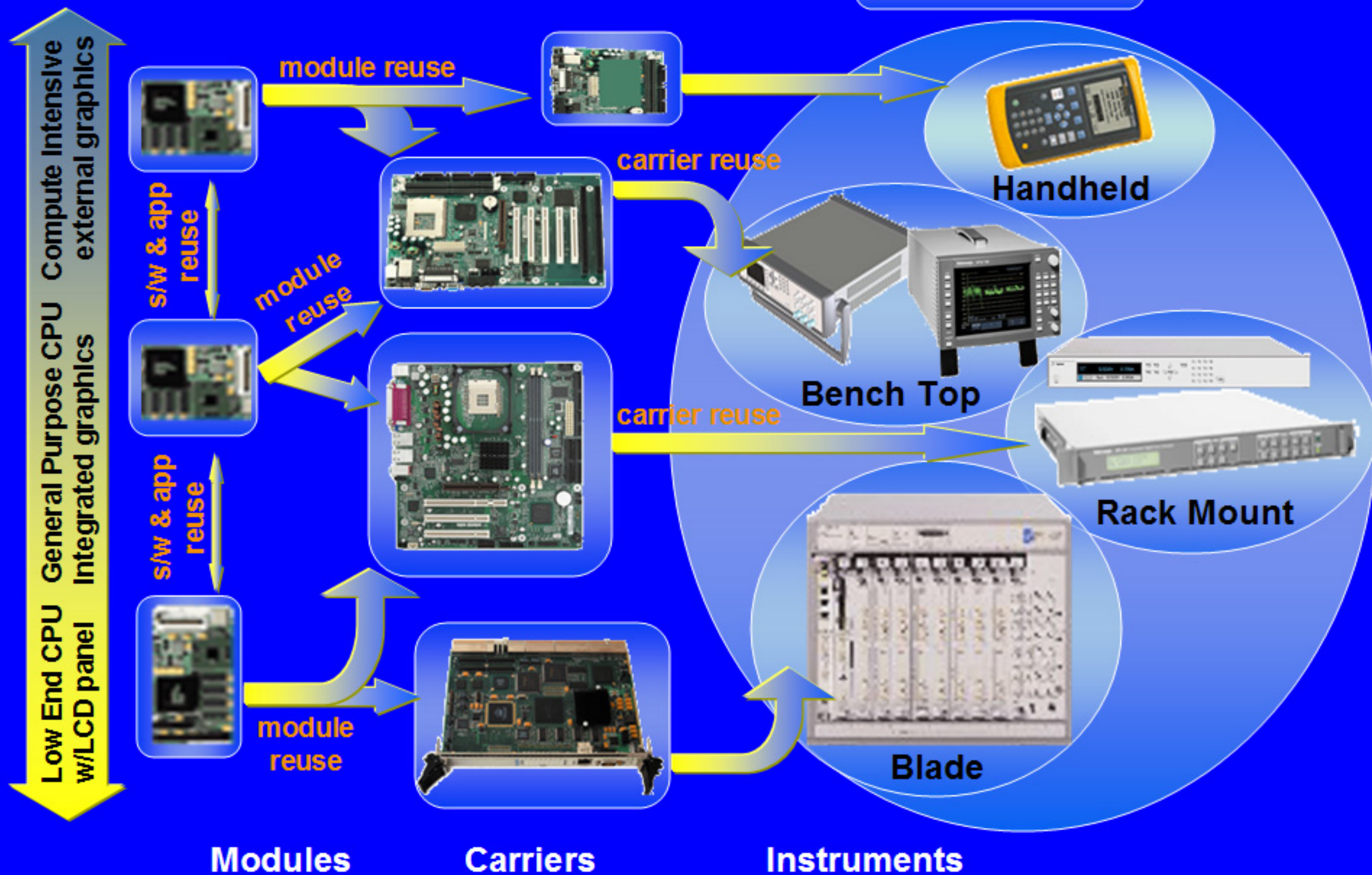
Target Market Segments

- Retail & Advertising
- Medical
- Test & Measurement
- Gaming & Entertainment
- Industrial Automation
- Military/Government
- Security

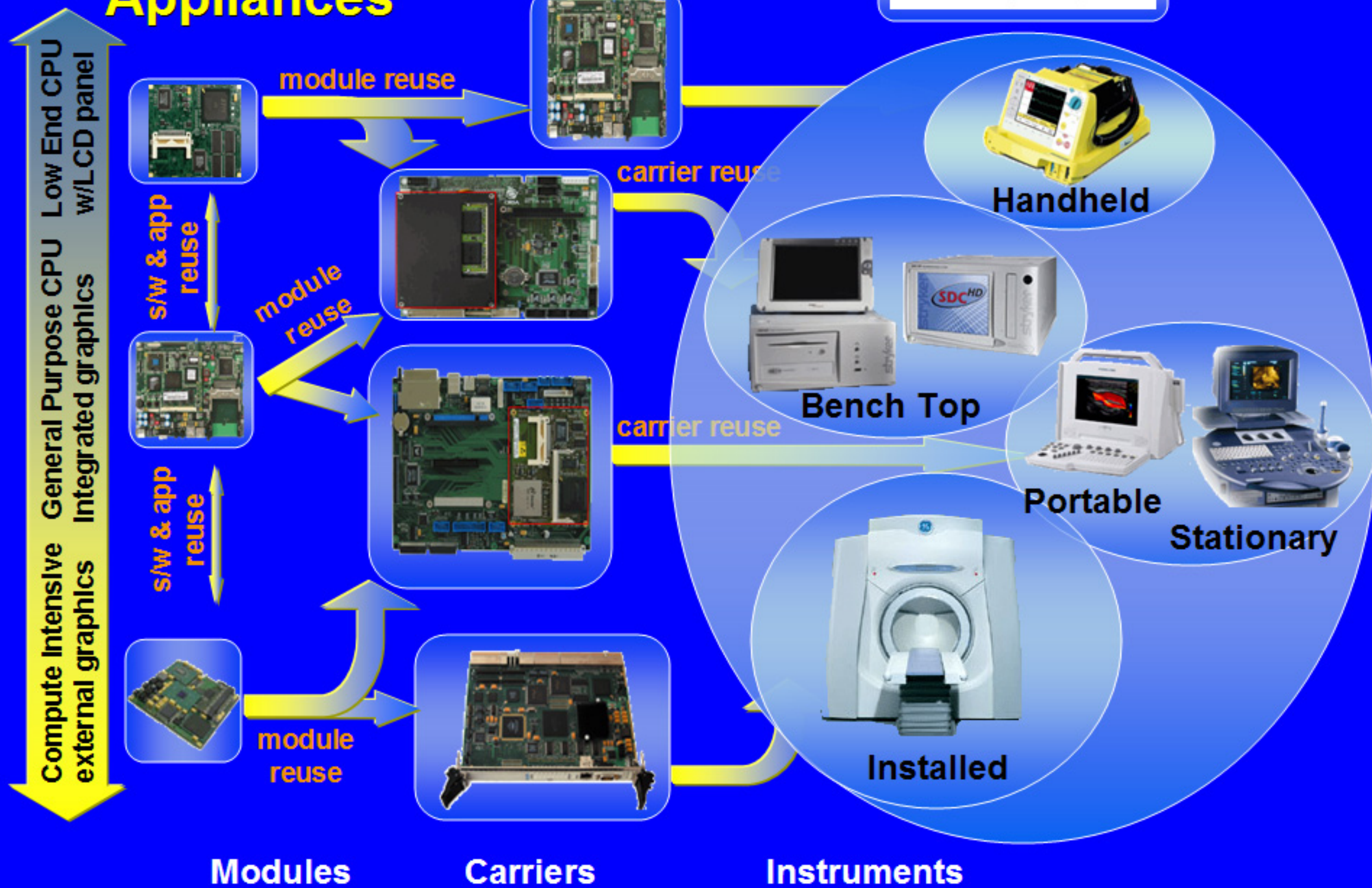


Test & Measurement

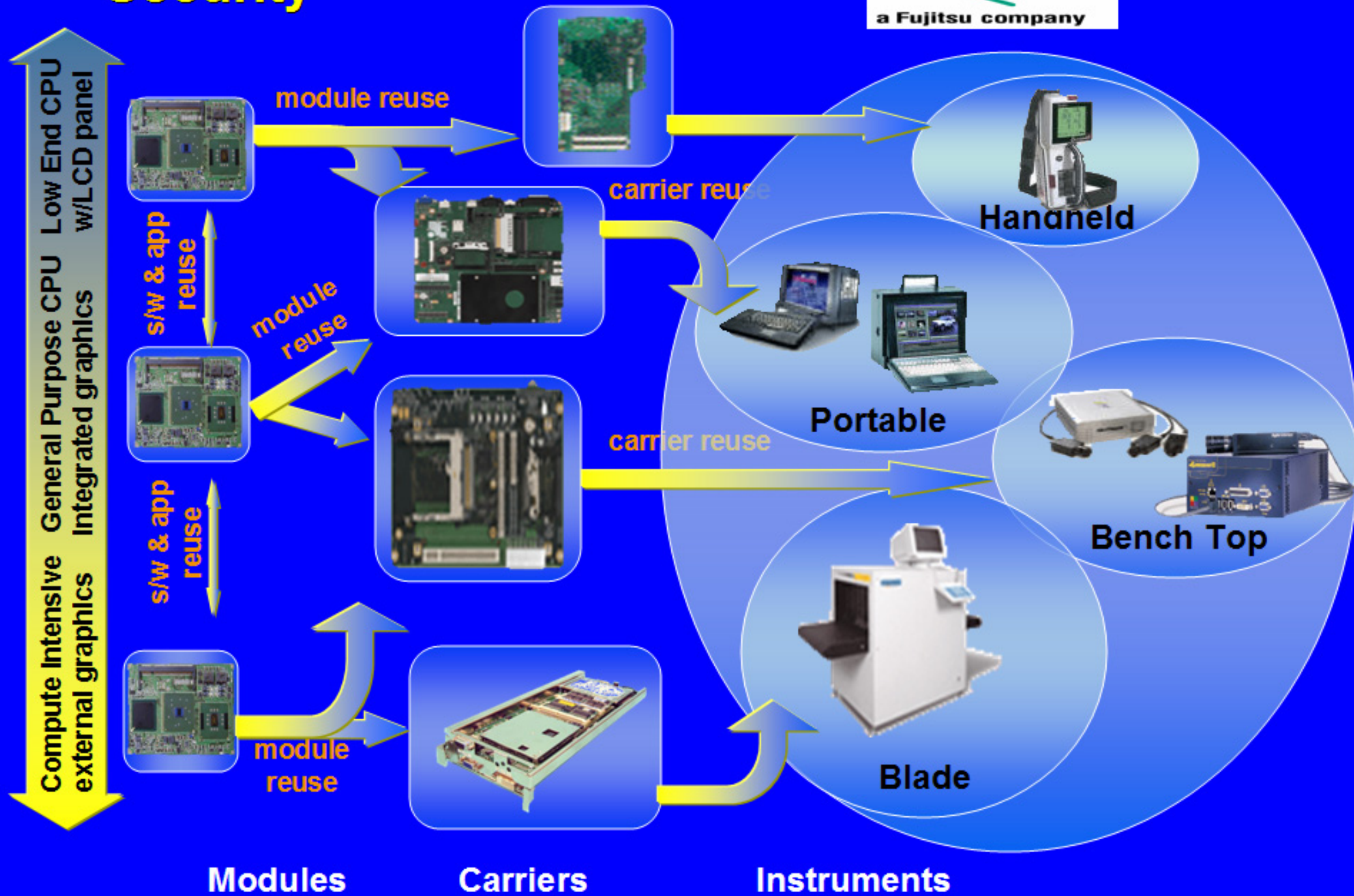
RadiSys
THE POWER OF WE



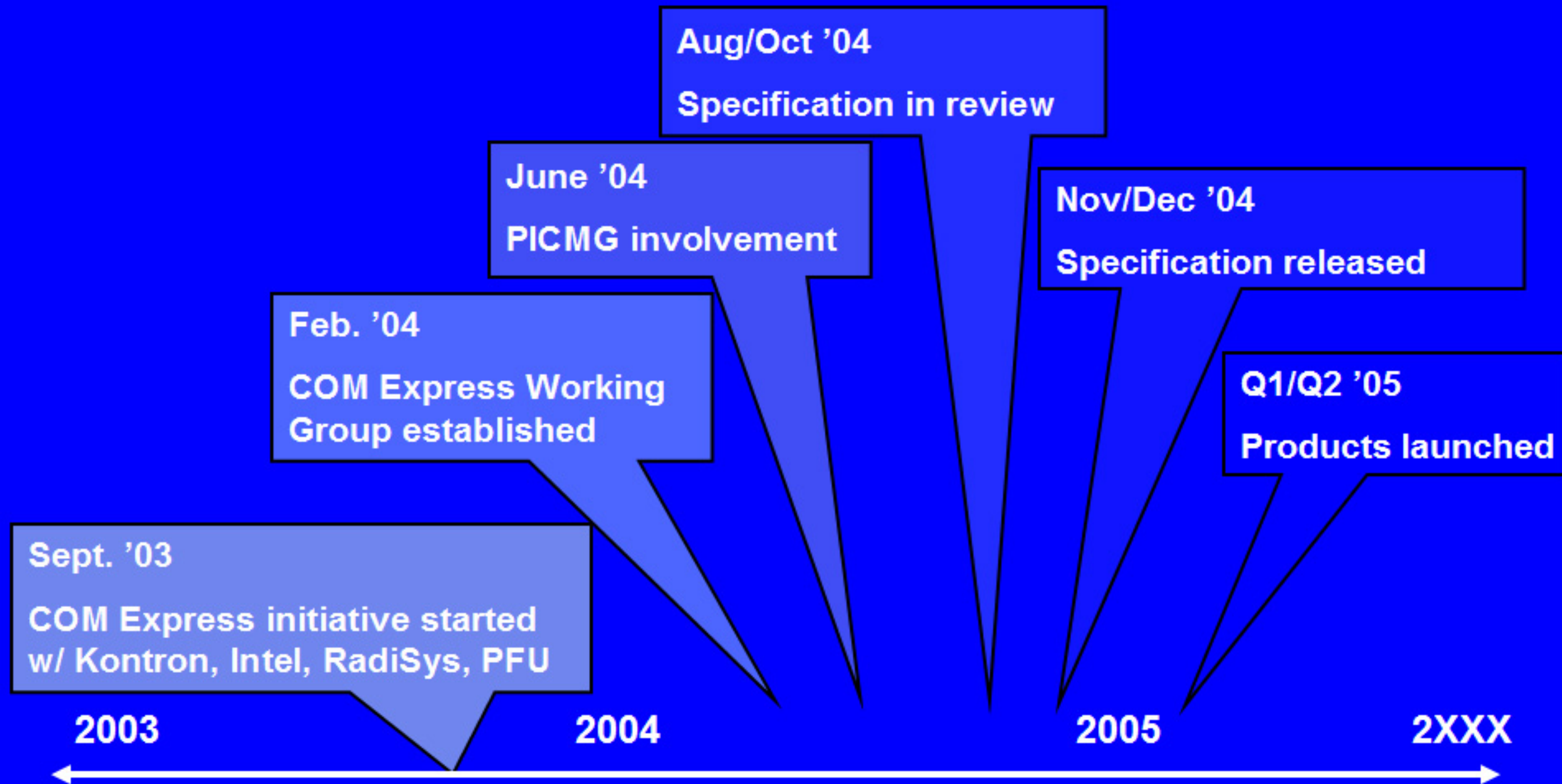
Medical Instruments & Appliances



Security



Timeline – Spec and Product



COM Express PICMG Participation

Sponsors

Kontron*

PFU*

RadiSys*

Intel*

PICMG Subcommittee Members

Abrams Airborne
Advanet
Communication Automation
FCI
Foxconn
Harting
MarekMicro GmbH
Meritec
Nokia
PICMG Japan
Quantum3D, Inc.
Tyco

ADI Engineering
Advantech
Cypress Point Research
Fortinet Technologies
General Micro Systems
Hybricon
Maxim Integrated Products
Microbus
NX Technology
Pigeon Point Systems
SBS Technologies
VISTA Controls
Yamaichi Electronics

ADLink
Chief Land Electronic Co., Ltd.
Diversified Technology
Fourte Design and Development
GNP
JAE Electronics Inc.
MEN Mikro Elektronik GmbH
Molex
Performance Technologies
PMC-Sierra
Trenton Technologies
Xilinx

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

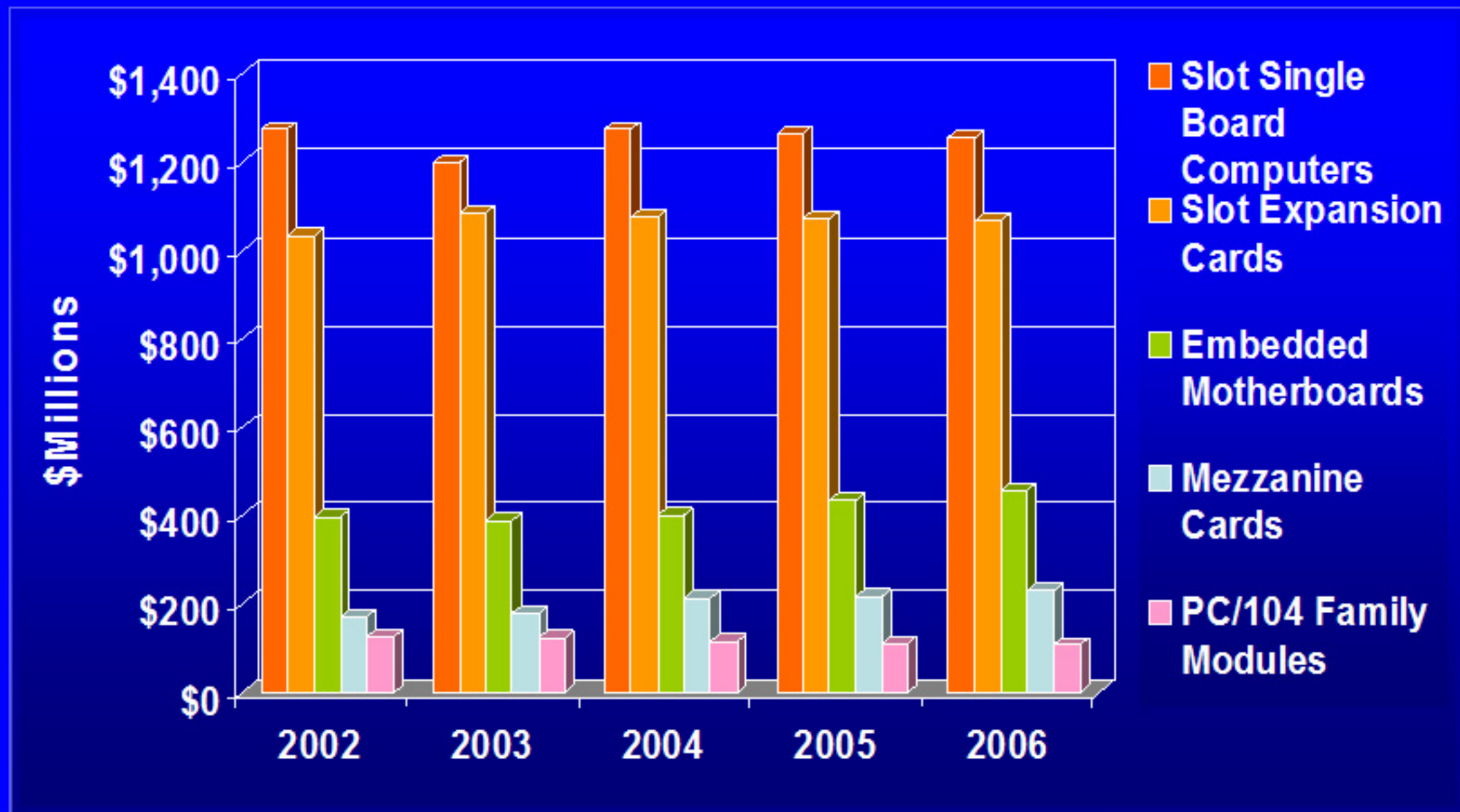
Why Standardize?

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

AMC Vs. COM Express

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

SBC/EMB Market Growth



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

EMB & COM

