The Evolution of Computer on Modules

At ADLINK, We CARE

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ADLINK TECHNOLOGY INC.

Why does the industry need computing building blocks?

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Why building blocks?

- Key facts driving customers buying building blocks
  - Increasing complexity of technologies
    - Memory & bus speeds up to 1666 MHz
      - Signal and power integrity issues
    - Complex PCB design
      - Impedance controlled PCB design & production
      - HDI technology mandatory for high density designs
    - Multi core CPU´s
      - Complex OS design (Virtualization, Windows 8 , Android)
    - Complex supply chain with multiple partners
  - TTM challenges
    - Intel is introducing new platforms in a 12 months cadence
    - ARM SoCs are even updated faster approx. twice a year

Why building blocks?

- Key facts driving customers buying building blocks
  - Lack of knowledge & experience
    - R&D teams had been focused on core competencies
    - BIOS and UEFI firmware design became very complex
    - x86 and ARM designs mostly don’t have high synergies
  - Validation & certification is time consuming and expensive
    - High investments in measurement equipment
    - Global certifications are driving costs

Why building blocks?

- Key facts driving customers buying building blocks
  - Ease the efforts to adopt vertical markets specific requirements
    - Flexible carrier board design to adopt vertical market specific I/O
      - Fieldbuses
      - FPGAs
      - Security & Safety (SIL)
  - COMs are key building blocks for Systems
    - Significant reduction of certification efforts and costs
    - Allows fastest Time to Market
    - Keeping up with technology cadence
    - Create economy of scale in production and purchase
  - Computer on Modules are the fastest and most efficient solutions to manage the increasing complexity of technologies

The history of Computer on Modules from the late 80s

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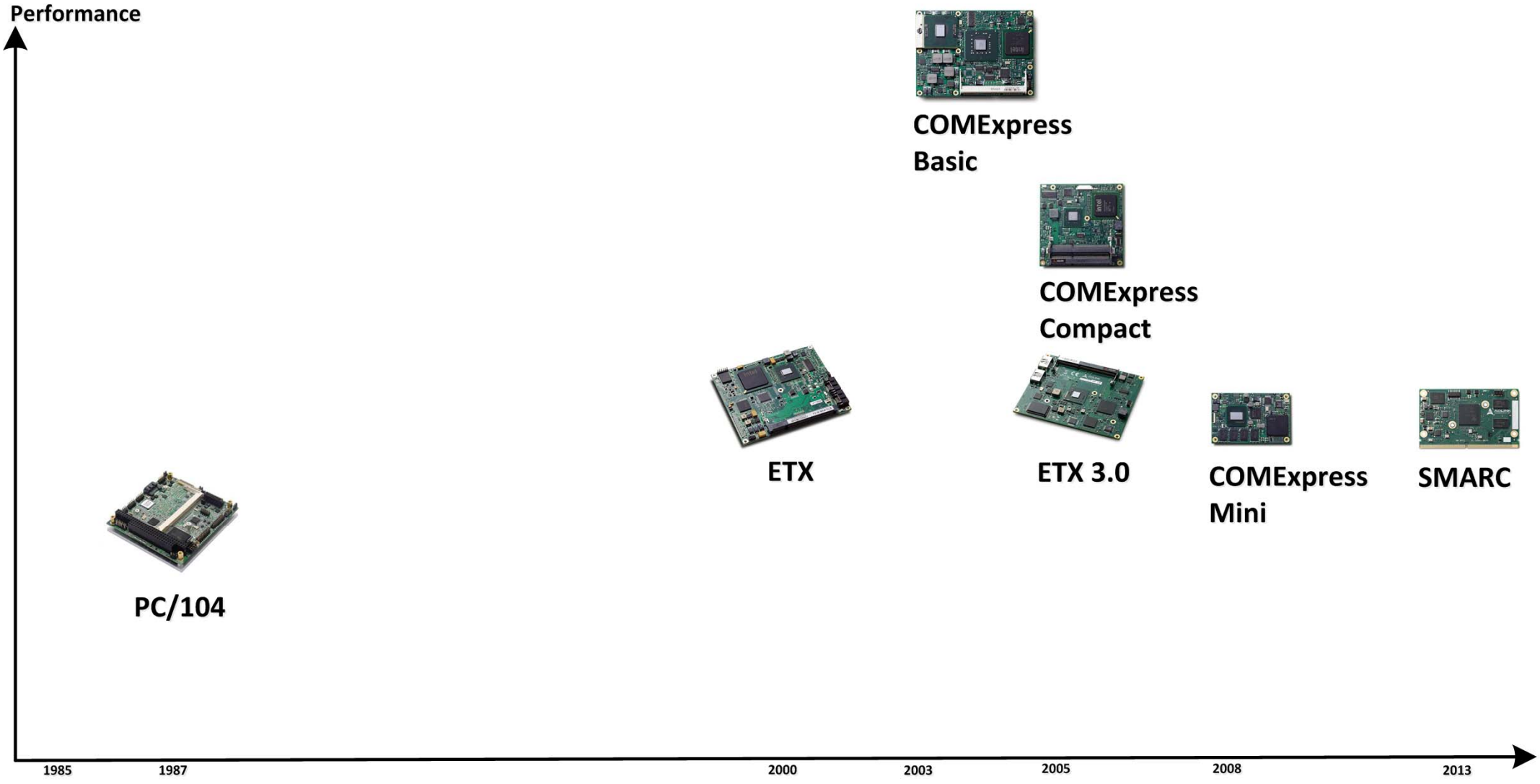
The History of Computer on Modules



PC/104 History

- PC/104 is a family of embedded computer standards which define both a physical form factor and computer bus.
- The PC/104 concept was originally devised by Ampro (now ADLINK) in 1987, and later standardized by the PC/104 Consortium in 1992.
- The name PC/104 comes from the ISA (or PC/AT) bus and the 104 pins on the connector.

What has been driving the evolution?

- ISA to PCI
- 10MBit to 100 MBit Ethernet
- DRAM to SDRAM
- 486 to Pentium

ETX History

- ETX, standing for Embedded Technology eXtended, is a highly integrated and compact (3.7 × 4.9 inches) (95 × 125 mm) computer-on-module (COM) form factor . Each ETX COM integrates core CPU and memory functionality, the common I/O of a PC/AT (serial, parallel, etc.), USB, audio, graphics, and Ethernet. All I/O signals as well as a full implementation of ISA and PCI buses are mapped to four high-density, low-profile connectors on the bottom side of the module.

- The ETX concept was originally introduced by JUMPtec (now Kontron) in 2000.

ETX®

ETX 3.0 History

- As technology evolves, the ETX standard has undergone further development in scalability and performance. In April 2006, the members of the ETX Industrial Group released the latest generation of the ETX 3.0 specification. Members of the ETX Industrial Group include ADLINK Technology , Kontron , Advantech, MSC Vertriebs GmbH and others.

- The main difference between ETX and ETX 3.0 is an addition of SATA ports.

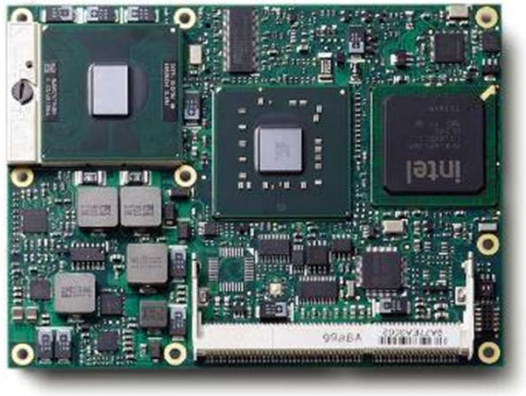
What has been driving the evolution?

- PCI to PCIe
- Higher performance per Watt
- New display interfaces (DVI, HDMI , Displayport)
- SDRAM to DDR
- Increased bandwidth requirements, e.g.
  - 100MBit to 1GBit Ethernet

COMExpress History

- COM Express, a computer-on-module (COM) form factor, is a highly integrated and compact PC that can be used in a design application much like an integrated circuit component. Each COM Express Module COM integrates core CPU and memory functionality, the common I/O of a PC/AT, USB, audio, graphics (PEG), and Ethernet. All I/O signals are mapped to two high density, low profile connectors on the bottom side of the module.

- The COMExpress concept was originally introduced by Kontron, Advantech and ADLINK Technology in 2003, and later standardized by the PICMG Consortium in 2005.



COM Express

PICMG
Open Modular Computing Specifications

What´s driving the next evolution?

- The paradigm shift in the IT industry to use decentralized. wireless, and battery powered devices to process information faster and more efficient
- The Internet of things
  - Machines have to exchange data with a lot of intelligent devices
- Energy costs are increasing significantly
  - Strong government back up of green energy programs
- The lack of an accepted and well defined form factor for ARM & low power SoC.
  - Customers are confused by the numbers of proprietary standards around ARM, this put investments at risk.

SMARC History

- The Smart Mobility ARChitecture, also known as SMARC, is a highly integrated Computer on Module for ARM and SoC silicon. Its definition is targeted to support the next generation ultra low power cpu architectures for the increasing demand of mobile applications with lowest power consumption. SMARC uses one 314 pin MXM3 SMT edge connector to connect all power and signal lanes to the carrier board.

- The SMARC concept has been introduced and driven by ADLINK Technology and Kontron in 2012 and later standardized by the SGet Consortium in March 2013.

- The first and truly global defined ARM & SoC form factor!

SMARC

SGeT STANDARDIZATION GROUP FOR EMBEDDED TECHNOLOGIES

ADLINK Technology is a standard setter in the Computer on Modules market!

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Thank You

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