XTX™
Embedded Modules

Not a new Standard

- XTX™ is an expansion and continuation of the well-established and highly successful ETX® standard.

- 100% backwards-compatible to ETX® (when not using the ISA bus)

- XTX™ - open industrial standard
Use of logo and name is free for members
Membership is free of charge

- Supported by many leading companies

Facelift for ETX®

- XTX™ offers the newest I/O technologies on a proven form factor
- High speed buses such as PCI Express and Serial-ATA are replacing the ISA bus at the ETX® connector X2
- Serialized ISA bus (LPC) is available for slow speed extensions
- All other signals found on connectors X1, X3 and X4 will remain the same in accordance to the ETX® standard (Rev. 2.7)

Simulation of PCI Express

- ## High speed analog simulation
  - Complete PCI Express signal path
    - XTX CPU module
    - Hirose connector
    - Carrier board
    - Add-in card
- ## Result
  - Large signal headroom even in worst case conditions
  - Successful verification of the XTX design guide

PCI Express Measurement
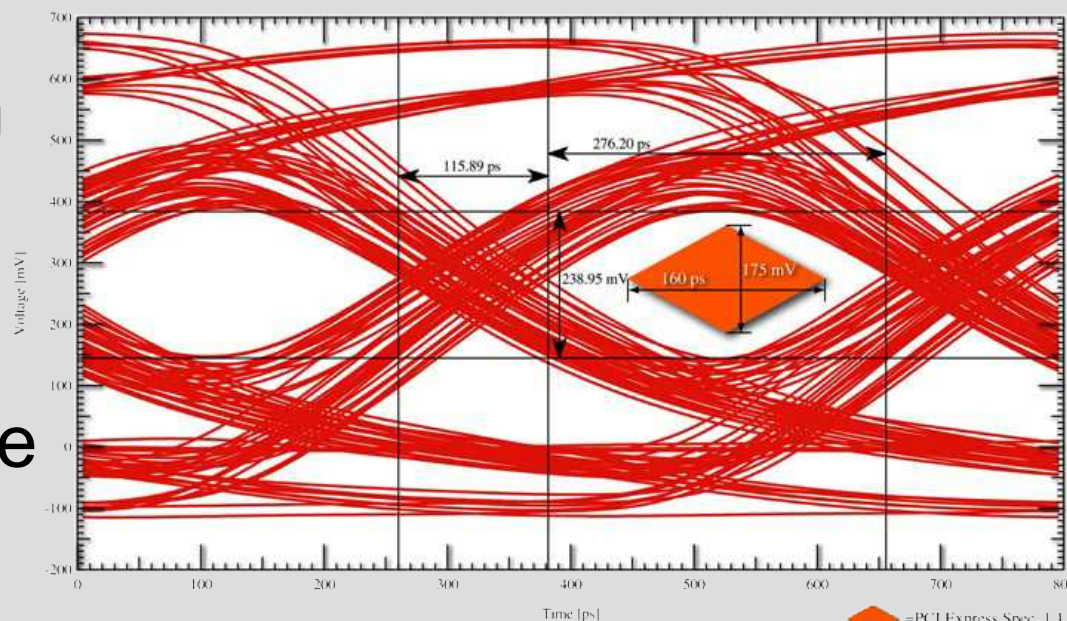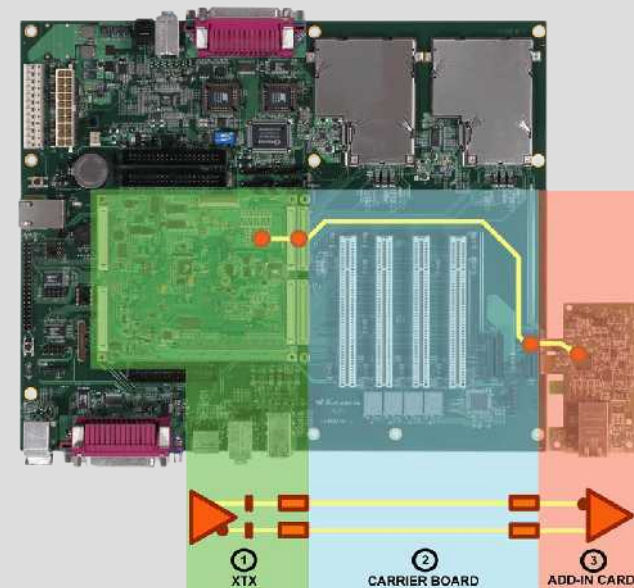
- Simulation is verified by the
  PCI Express Compliance Test
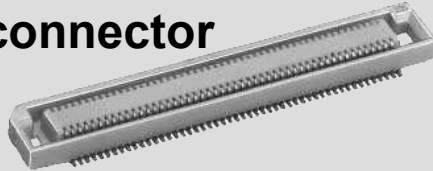
Features
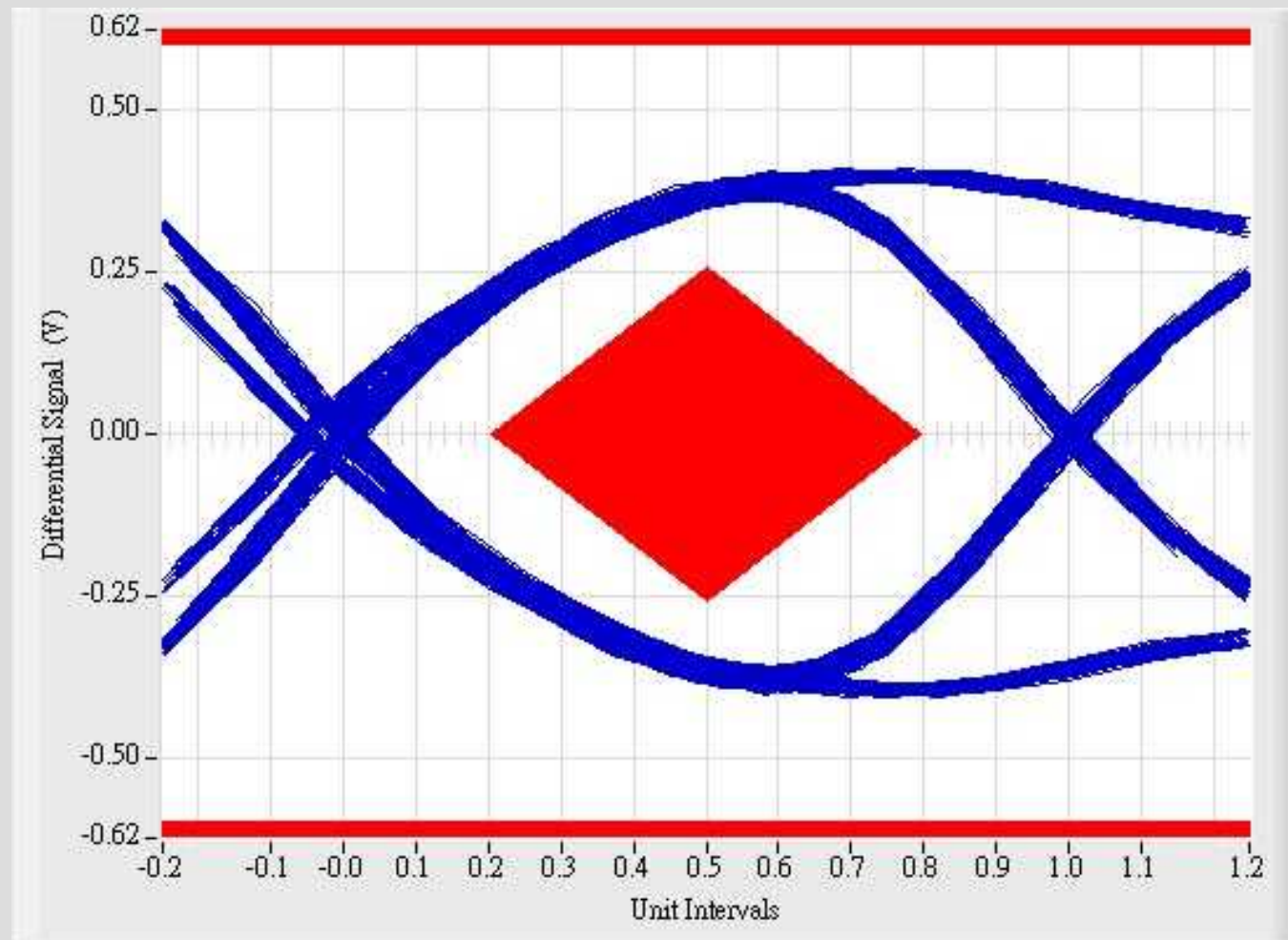
ETX®-X1, X3 and X4
connector
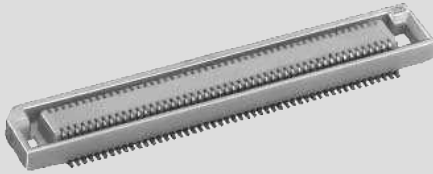
- Signals on connectors X1, X3, and X4 will remain the same in accordance to the ETX® Specification (Rev. 2.7)
  - X1: PCI, USB, Sound
  - X3: VGA, LCD, TV, COM/IrDA, LPT/Floppy, Mouse/Keyb.
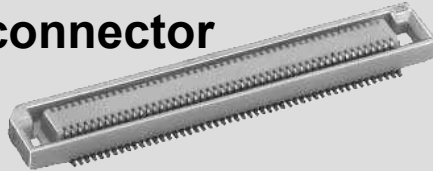 - X4:   IDE, LAN, I²C, miscellaneous
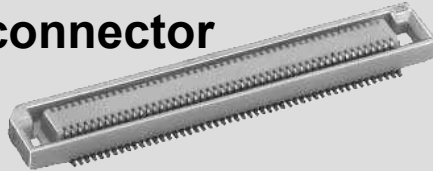
Features

ETX®-X2 connector

- 4 PCI Express™ Lanes
  - Increased Performance & Bandwidth
    - 500 MB/s per lane (theoretical bandwidth of PCI Bus: 133MB/s)
    - Scalable bus widths: x1, x2 and x4
  - Pin reduction by Serial Differential Interface (LVDS)
  - Advanced Power Management to reduce power consumption and emission
  - Hot Plug/Hot Swap capability
  - Point-to-point serial interconnections between devices
  - 100% compatible with PCI Software

Features

ETX®-**X2**
connector

- 4 Serial ATA® Interfaces
  - SATA is a high-speed serial link replacement for PATA
    - 150 MB/s transfer rate (300/600 MB/s envisioned for the future)
  - Lower signaling voltages and reduced pin count (LVDS)
  - 4 SATA Hard disks can be used on XTX
  - Point-to-Point connection allows easy cable routing within a system
  - Hot Plug capable
  - Completely software compatible with parallel ATA

Features

ETX®-X2
connector

2 Hi-Speed USB ports
  - In addition to the standard 4 USB ports, XTX™ will also offer 2 more USB ports bringing you a total number of 6 USB ports for your embedded designs.
 - Data transmission up to 480 Mb/s (60 MByte/s)

XTX Features

ETX®-**X2** connector
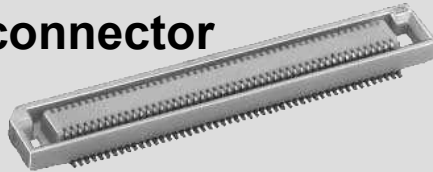
ExpressCard™

- Support for 2 ExpressCards™
  - ExpressCard next generation of 'plug-in' I/O cards
  - ExpressCard takes advantage of the scalable, high-bandwidth serial PCI Express and USB 2.0 interfaces
  - Smaller, faster and less expensive than PC Card Solution
  - Lower System Complexity
    - less signal lines
   - no additional controller required

PCI Express
USB 2.0
System Chipset
PCI Express
USB 2.0

Features
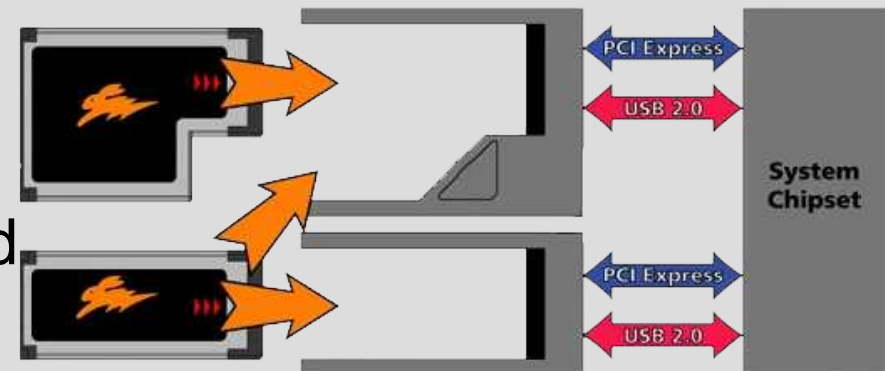
ETX®-X2 connector
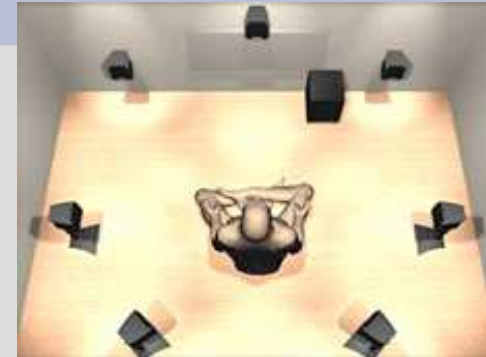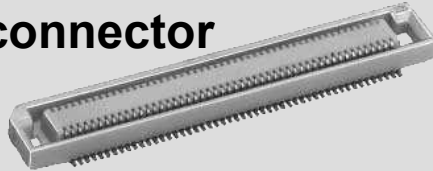
- ## High Definition Audio Interface (HDA)
  - High Definition Audio Codec for:
    - Dolby-quality surround sound (5.1 / 6.1 / 7.1)
    - DVD Audio
    - Telephony (VoIP), Audio Conferencing
    - Enhanced voice capture (higher-quality input for voice recognition)
    - Multi-streaming capabilities (play audio tracks on CD and DVD simultaneously)
    - Dynamic jack configuration
- ## Backwards compatible to AC'97

Features

ETX®-X2 connector
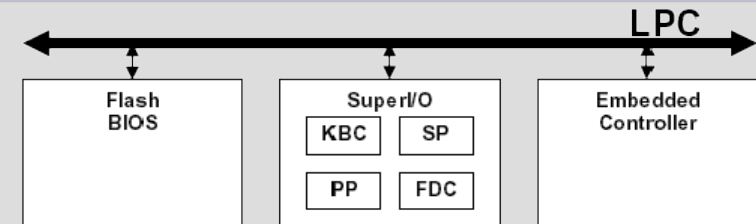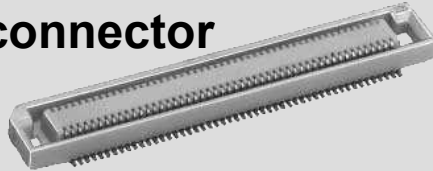
- Low Pin Count Bus (LPC)
  - Serial Bus as replacement for the soon to be obsolete ISA bus
  - Reduced pin count for easier, cost-effective designs (7 signal lines)
  - Examples of devices that can be connected:
    - Super I/O (Floppy, COM, LPT, ...)
    - Audio controller
    - Generic Application Memory
   - Embedded Controller

Features

ETX®-X2
connector
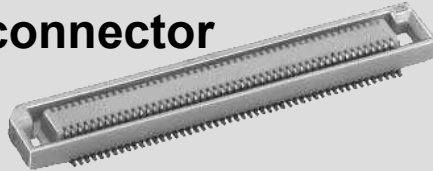
ACPI

• Extended Power Management
  - Fan control via PWM Output and Encoder Input signal
  - Additional Power Management signals for efficient low power designs
  - The standby power driven congatec Board Controller allows system control in soft-off mode

TPM Support

- Trusted Platform Module (TPM) Support
  - Trusted Computing Group (TCG) Specification 2.1
  - TPM hardware on the XTX modules
    - Stores keys, digital certificates, passwords and data securely in hardware
    - Enhances network security
    - Protection against viruses, worms and other malicious attacks
    - Protects digital identities
    - Enables digital signatures for financial and other transactions

Upgrade

- ETX® Baseboard

Upgrade
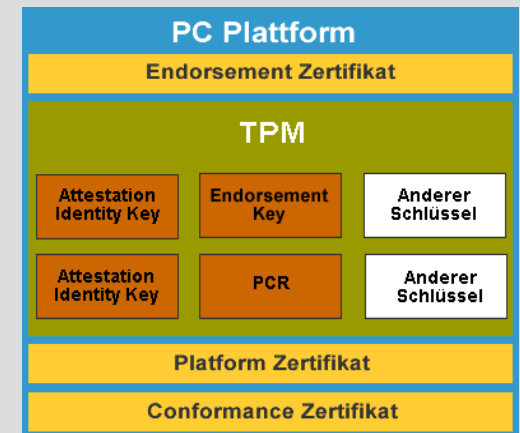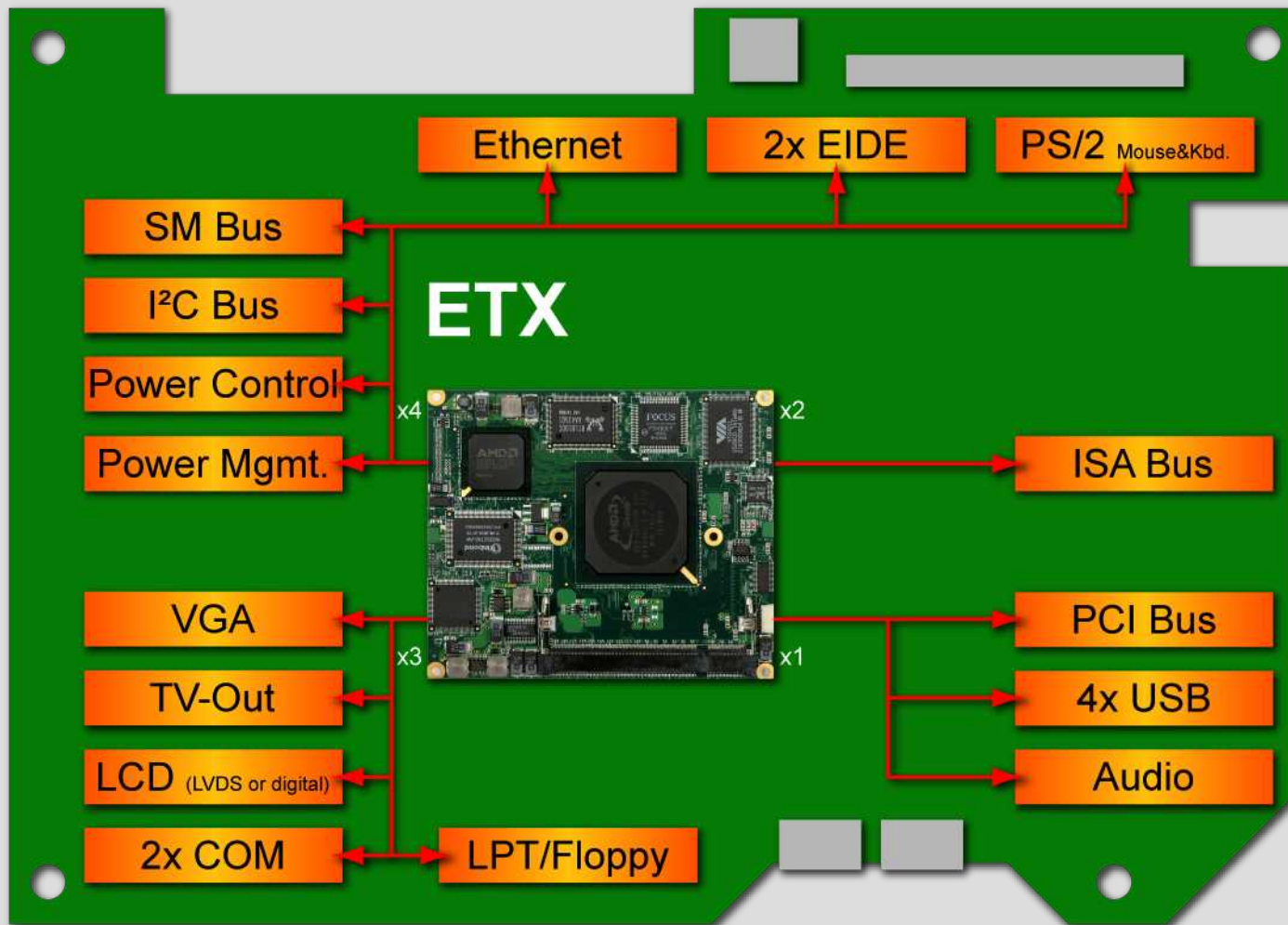
- ## XTX is 100% backward compatible to ETX®
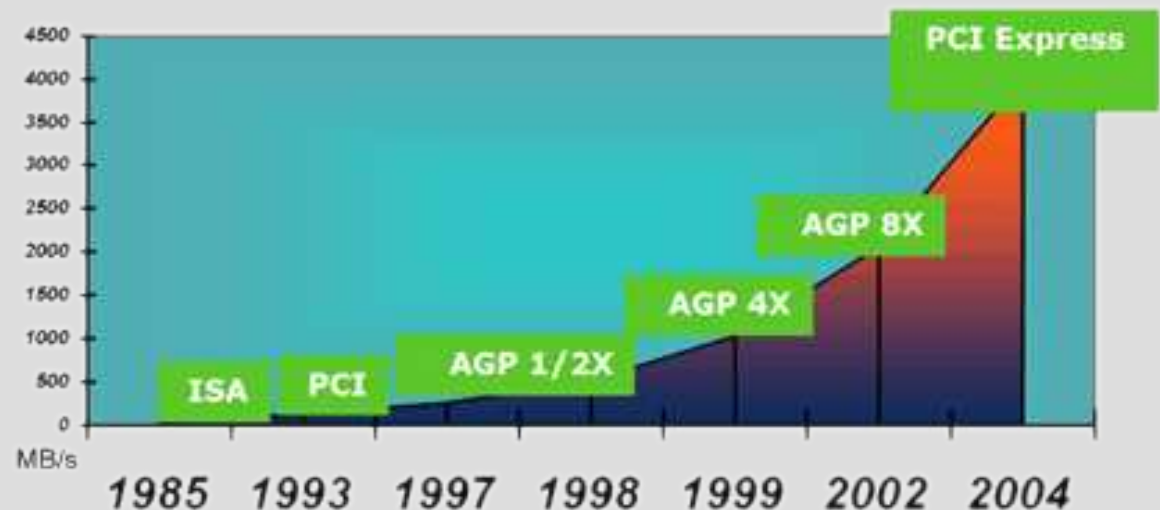 (for all designs that are not using the ISA bus)
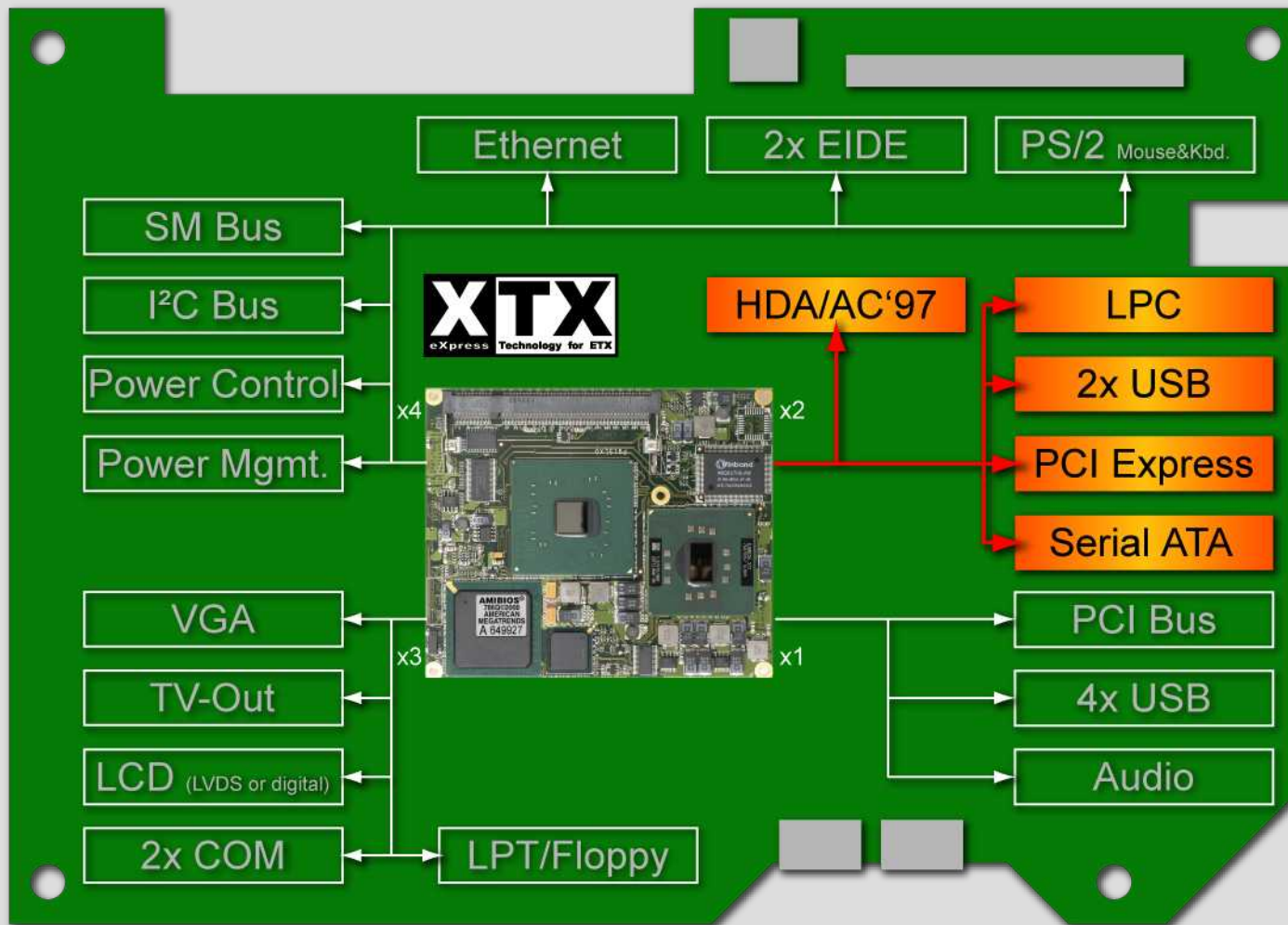
- ## Most baseboards will not need to be redesigned

Increased Performance

- ## ISA / PCI / AGP / PCI Express

  - ISA: 8 MByte/s
  - PCI: 132 MByte/s
  - AGP x1: 266 MByte/s
  - AGP x8: 2,1 GByte/s

  - PCI Express x1: 500 MByte/s (bidirectional)
  - PCI Express x4: 2 GByte/s (bidirectional)
  - PCI Express x16: 4 GByte/s (bidirectional)
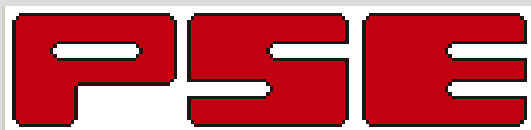
Upgrade

EIDE / SATA / USB

- EIDE
  - PIO Mode 4: 16,6 MByte/s
  - UDMA-66: 66 MByte/s
  - UDMA-100: 100 MByte/s

- SATA
  - SATA: 150 MByte/s
  - SATA-II : 300 MByte/s

- USB
  - Specification 1.0: 1,5 MByte/s
  - Specification 2.0: 60 MByte/s
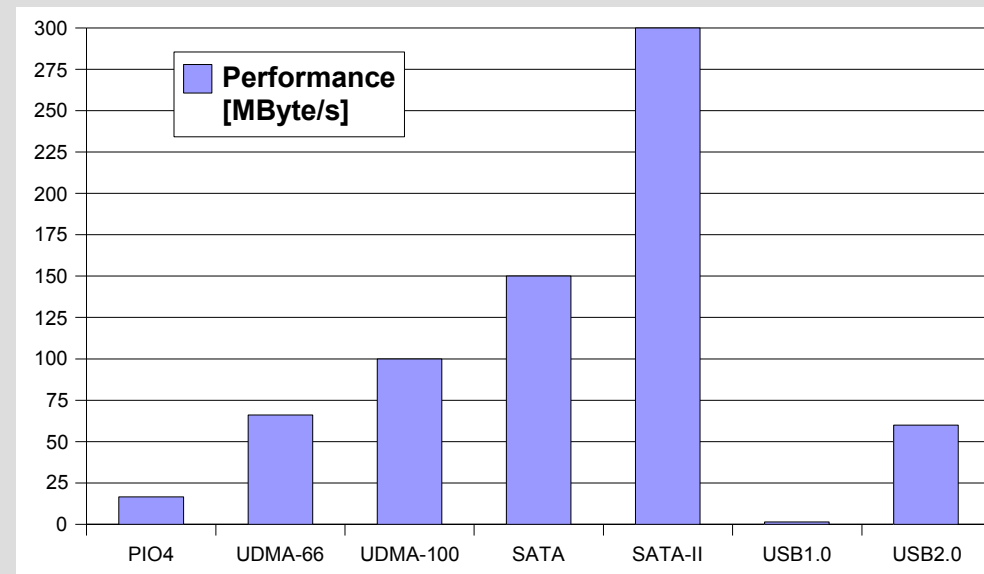
Consortium

- XTX also supported by:

Conclusion

- XTX – increases the life cycle of ETX$^®$

- XTX – open industrial standard

- Companies are welcome to join the XTX Consortium

Thank You