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From COM Express to COM-HPC: Powering the Next Era of Embedded Intelligence

Why the transition is now and how ARBOR Technology is enabling it.

Written by ARBOR Technology Team

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For over a decade, COM Express has formed the backbone of embedded systems in the industrial, medical and transportation sectors. Its maturity, stability and robust ecosystem have made it the go-to standard.

But the world has changed.

Today's edge devices must handle:
- AI inference and vision analytics
- High resolution imaging
- Real time data processing
- Multiple high-speed interfaces

These new workloads push COM Express to its architectural limits in I/O bandwidth, memory throughput, and power/thermal design.

Why COM-HPC Represents the Next Leap

COM-HPC isn't a small upgrade-it's a new architecture built for the AI driven edge.

Key advantages include:
- PCIe Gen5 up to 65 lanes for GPUs, AI accelerators, and NVMe clusters
- DDR5 memory, up to 1 TB
- Power budgets up to 300W for sustained performance
- 10-25GbE support for high bandwidth networking
- Scalability for future CPU generations

COM-HPC is the natural evolution of modular embedded computing-extending performance from "embedded class" into edge server class computing.

The COM-HPC Family at a Glance

COM-HPC Mini
Ultra compact (95 × 70 mm) yet powerful.
Perfect for small form factor AI devices.
- Up to 76W TDP
- USB4, PCIe Gen5, 10GbE
- Wide 8-20V input

COM-HPC Client (Sizes A/B/C)
The mainstream successor to COM Express.
Ideal for high performance edge computing.
- Up to 49 PCIe lanes
- Up to 128 GB DDR5
- Power up to 251W

COM-HPC Server (Sizes D/E)
Built for edge servers, data aggregation, and distributed AI.
- Up to 8 DDR5 sockets
- Up to 8 × 25GbE KR
- Up to 358W TDP
- GPU/FPGA accelerator-ready

Why COM-HPC Client Size A is the Natural Successor to COM Express

For engineers transitioning from COM Express Type 6, Client Size A (120 × 95 mm) offers the best balance of compatibility, size, and performance:
- Similar footprint philosophy
- Dramatically more PCIe, I/O, and memory bandwidth
- Support for modern high TDP processors
- Multi generation upgrade roadmap

It delivers the best performance per area for next generation embedded applications.

Transitioning from COM Express: Smoother Than You Think

Migrating to COM-HPC does not require starting from scratch.
Designers can carry over:
- Power architectures
- Mechanical designs
- Embedded OS and software stacks
- Application-layer logic

COM-HPC simply unlocks headroom that COM Express cannot reach.

Embedded Applications Driving the Shift

AI Vision & Robotics
COM Express struggles with multi camera and GPU accelerated workloads.
COM-HPC enables deterministic real time AI with abundant PCIe Gen5 lanes.

Medical Imaging
DDR5 and higher TDP allowances support real-time CT/MRI reconstruction and AI driven diagnostics.

Digital Twins & Industrial Workstations
COM-HPC can host discrete GPUs and high-speed SSD arrays-ideal for simulation, generative AI, and edge training tasks.

Introducing ARBOR Technology COMX-A300: The Bridge to the Future

ARBOR's **COMX-A300 (COM-HPC Client Size A)** is built for developers preparing for the future of embedded innovation.

Key advantages:
- **Designed for Intel® Core™ Ultra processors**
- **Enterprise grade signal integrity**
- **Full PCIe Gen5 support**
- **AI ready architecture**
- **Stable thermal design for sustained performance**

It provides a low risk, high reward migration path for customers moving from COM Express to COM-HPC.

Conclusion: The Future is COM-HPC

COM Express remains valuable: but the AI driven edge requires a new foundation.

COM-HPC delivers:
- More compute
- More bandwidth
- More scalability
- More longevity

With platforms like the ARBOR COMX-A300, the transition is straightforward, strategic, and future proof.

ARBOR Technology is committed to driving the COM-HPC ecosystem forward, working with partners to usher in the next era of intelligent edge computing.

Partner Name

ARBOR Technology

Booth Info

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