



Solution Brief

Networking and Telecommunications
Intel Atom® P6900 Processor

Advantech SOM-5994 Helps OEMs Stay Ahead of Evolving Edge Networks

New COM Express Basic Type 7 networking module powered by the Intel Atom® P6900 processor delivers high-performance packet processing for edge networking, 5G infrastructure, and next generation telecom networks.

Executive Summary

Network edge and telecommunications infrastructure are evolving to support increasingly demanding workloads, including open RAN and 5G infrastructure deployment and emerging 6G networks. These applications require higher packet throughput, greater network density and enhanced power efficiency while maintaining the reliability needed for industrial environments.

For switch, router and network appliance manufacturers, meeting these requirements means increasing packet processing performance without adding unnecessary system size, power consumption or development complexity. The Advantech SOM-5994 provides a modular platform for building the next generation of edge networking systems, industrial network infrastructure, compact edge servers and telecom equipment.

Configured with an Intel Atom® P6900 processor, the SOM-5994 combines high core density, integrated high-speed Ethernet connectivity, extensive PCIe expansion and DDR5 memory support in a COM Express Basic Type 7 module.

The SoC design of Intel Atom P6900 processor with integrated peripheral components allows system designers to balance compute performance and power consumption for different edge networking and telecommunication applications. Additionally, Advantech's Embedded Solutions and Design-in Services with customizable BIOS features, Linux development support and engineering services simplifies system integration and product customization. Together, Intel and Advantech provide network equipment manufacturers with a scalable foundation that can reduce development time, simplify product customization and accelerate the deployment of new edge networking products.

Introduction

Network edge and telecommunications infrastructure are expanding as networking service providers, enterprises and industrial operators invest in next-generation connectivity. Open RAN platforms, 5G infrastructure deployments, industrial networking and future 6G networks are driving demand for networking platforms that can process growing volumes of data while supporting increasingly distributed network architectures.

At the same time, switch, router, and network appliance security OEMs serving this market face mounting pressure to deliver higher performance, enhanced scalability and faster product innovation. As AI-enabled network appliance workloads, edge

Advantech SOM-5994 Business Outcomes

- Faster time-to-market for networking and telecommunications equipment
- Scalable platform for diverse network infrastructure deployments
- Enhanced power efficiency for packet-processing workloads
- Reduced engineering effort and total cost of ownership

computing deployments and next-generation telecommunications infrastructure continue to evolve, OEMs frequently need to migrate to newer processor platforms to remain competitive. However, traditional custom board development or ODM-based redesigns often require substantial engineering resources, lengthy validation cycles and significant non-recurring engineering (NRE) investments. These challenges can delay product launches, increase development costs and make it difficult for OEMs to respond quickly to changing market requirements.

To address these requirements, manufacturers need scalable and flexible computing platforms that simplify system design while maintaining the performance needed for modern networking workloads. Modular COM Express platforms help address these challenges by separating processor technology from carrier board design. OEMs can upgrade to the latest computing platforms while reusing existing carrier board investments, reducing redesign effort, shortening validation cycles and accelerating time-to-market.

SOM-5994 Built on Intel Atom P6900 Processors

As shown in Figure 1, the SOM-5994 combines network and network security-optimized Intel Atom P6900 processor with Advantech's modular COM Express architecture, enabling OEMs to rapidly develop and customize their systems across multiple networking applications.

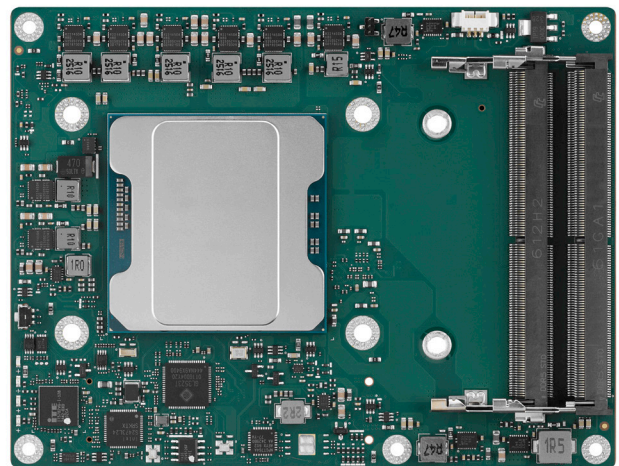
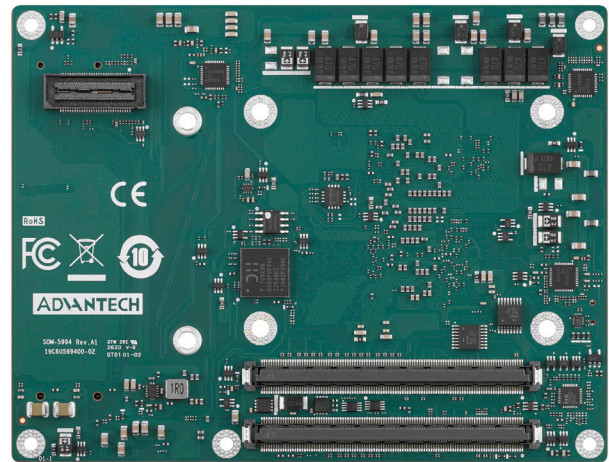


Figure 1. SOM-5994 COM Express Basic Type 7 Module with Intel Atom® P6900 (Code Name: Grand Ridge) Processors

The SOM-5994 family offers processor configurations ranging from 8-core to 24-core Intel Atom P6900 processors, with thermal design power (TDP) ranges from 50W to 86W, enabling OEMs to match compute performance and power requirements across diverse networking and telecommunications applications.

With support for up to 16 PCIe Gen4 lanes and 16 PCIe Gen 3/2 lanes, the SOM-5994 offers extensive expansion capabilities for networking accelerators, storage devices and high-speed I/O connectivity. Support for up to 128GB of DDR5-5600 memory provides the bandwidth needed for packet processing, virtualization and modern network infrastructure workloads.

Built-in networking in Intel Atom P6900 processors enable four ports of 10GBASE-KR Ethernet for backplane connectivity, along with an integrated Ethernet port that auto-detects network interface speeds ranging from 10 Mbps to 2.5 Gbps.

For networking and telecommunications operating in challenging environments, an extended-temp version is also available with an operating temperature range of -40°C to 85°C for installation in outdoor or minimally controlled environments.

Beyond the hardware platform, the SOM-5994 supports Advantech SUSI API and Yocto Project integration, giving developers access to platform management, hardware control features, comprehensive software framework, development tools and resources that simplify Linux deployment and system customization. An embedded BIOS feature optimized for networking applications can be customized to support application-specific functionality without extending development schedules.

Advantech selected the Intel Atom P6900 processors because they are purpose-built for networking and telecommunications infrastructure, combining high core density, networking acceleration, power efficient operation, and long-term embedded support.

By integrating Intel Atom P6900 processors into a COM Express Basic Type 7 module, the SOM-5994 provides a ready-to-integrate computing platform that allows OEMs to focus on application-specific innovation rather than designing a processor subsystem from scratch. By leveraging the standardized COM Express architecture, developers can reuse carrier board designs across product generations, simplify hardware validation and accelerate future platform upgrades while reducing overall development effort.

To further simplify product development, Advantech complements the hardware platform with Embedded Solutions and Design-in Services that include carrier board design review, BIOS customization, thermal design guidance, system validation and lifecycle management. These services help system developers reduce development risk, accelerate time-to-market and focus engineering resources on product differentiation.

Optimized SOM-5994 Use Cases

Networking systems that can benefit from the SOM-5994, include:

- **Industrial Network Infrastructure** – Enable industrial Ethernet switches, industrial gateways, industrial routers, private 5G Industrial Networking, and factory connectivity solutions for Industry 4.0 deployments.
- **Optical Networking Systems** – Support for OTN, DWDM, and optical transport equipment through high-speed Ethernet interfaces and scalable processing performance, making the platform suitable for modern optical communication infrastructure
- **Network Edge Appliances** – Deploy high-performance edge networking systems for packet processing, traffic management, virtualized network functions (VNF), and network security applications. SOM-5994's high core density, 10GbE connectivity, and PCIe Gen4 expansion make it ideal for next-generation networking infrastructure.
- **Telecommunications Infrastructure** – Support Open RAN platforms, 5G infrastructure equipment, network edge deployments and telecommunications gateways. High packet-processing performance, integrated networking capabilities and scalable multicore processing make the SOM-5994 well suited for carrier-grade networking applications.

Conclusion

The continued expansion of edge computing, industrial networking and telecommunications infrastructure is driving requirements for the systems that process and transport growing volumes of data efficiently. As network speeds increase and applications become more distributed, OEMs must deliver higher performance, scalability and reliability while controlling system power consumption, development costs and product development cycles.

The Advantech SOM-5994 provides a modular approach to meeting these challenges by combining the networking-optimized Intel Atom P6900 processors with the flexibility of COM Express Basic Type 7 architecture. Scalable multicore processing, high-speed Ethernet connectivity, PCIe Gen4 expansion and DDR5 memory support enable the platform to address a wide range of applications, from industrial networking and optical transport systems to network edge appliances and telecommunications infrastructure.

Beyond hardware performance, the SOM-5994 helps OEMs accelerate product development through a modular Computer-on-Module approach that simplifies system design and future platform upgrades. Customizable BIOS capabilities, Linux development resources and Advantech Embedded Solutions & Design-in Services further reduce engineering effort and help customers bring differentiated products to market more quickly.

By combining Intel's networking-optimized processor architecture with Advantech's modular development ecosystem, the SOM-5994 provides network equipment manufacturers with a scalable foundation for building next-generation networking systems while accelerating product development, shortening deployment cycles and reducing total cost of ownership.

Learn More

[Advantech SOM-5994](#)

[Advantech Embedded Solutions & Design-in Service](#)

[Intel Atom® Processors](#)



Notices & Disclaimers

Performance varies by use, configuration and other factors.

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See configuration disclosure for details. No product or component can be absolutely secure.

Intel optimizations, for Intel compilers or other products, may not optimize to the same degree for non-Intel products.

Your costs and results may vary.

Intel technologies may require enabled hardware, software or service activation.

Intel does not control or audit third-party data. You should consult other sources to evaluate accuracy.

See our complete legal [Notices and Disclaimers](#).

Intel is committed to respecting human rights and avoiding causing or contributing to adverse impacts on human rights. See Intel's [Global Human Rights Principles](#). Intel's products and software are intended only to be used in applications that do not cause or contribute to adverse impacts on human rights.

© Intel Corporation. Intel, the Intel logo, Atom, and other Intel marks are trademarks of Intel Corporation or its subsidiaries. Other names and brands may be claimed as the property of others.