SOLUTION BRIEF

Intel Atom® A3900
Automotive Processors
Automotive

Connected and Immersive Vehicle Systems Go from Development to Production Faster

Intel Atom® A3900 automotive processors power in-vehicle experiences and speed the deployment of smart and connected features for the next generation of cars.

INTEL OFFERS ONE FLEXIBLE ARCHITECTURE THAT LOWERS THE COST AND COMPLEXITY OF DEPLOYING NEXT-GENERATION FEATURES ACROSS FLEETS AND BRANDS.

Redefining in-vehicle experiences

As drivers expect more features and connectivity in the car, automakers must differentiate their models by creating immersive experiences that stand out in a crowded market. Intel Atom A3900 automotive processors make designing and incorporating features simpler and more cost effective, so that automakers can maximize profit margins while delivering on market demands. The processors are designed to bring a range of next-generation features to market faster, including:

- In-vehicle infotainment (IVI)
- Digital instrument clusters
- Advanced driver assistance systems (ADAS) visualization
- Rear seat entertainment

With substantial compute in a compact, low-power package, impressive graphics, and security features—all based on scalable Intel® architecture—Intel Atom A3900 automotive processors help automakers and suppliers get cross-fleet solutions to market faster, with lower costs.

Digital features in demand

The demand for IVI, navigation, rear-seat entertainment, and other digital features is surging, though each new feature adds cost and complexity to the design and manufacturing process. As these experiences become expected in a wider range of vehicle models, it's critical for automakers and suppliers to manage costs for current and future implementations.

Based on the same silicon used in numerous automotive design wins, Intel Atom A3900 automotive processors deliver power-optimized compute performance for a versatile range of applications.

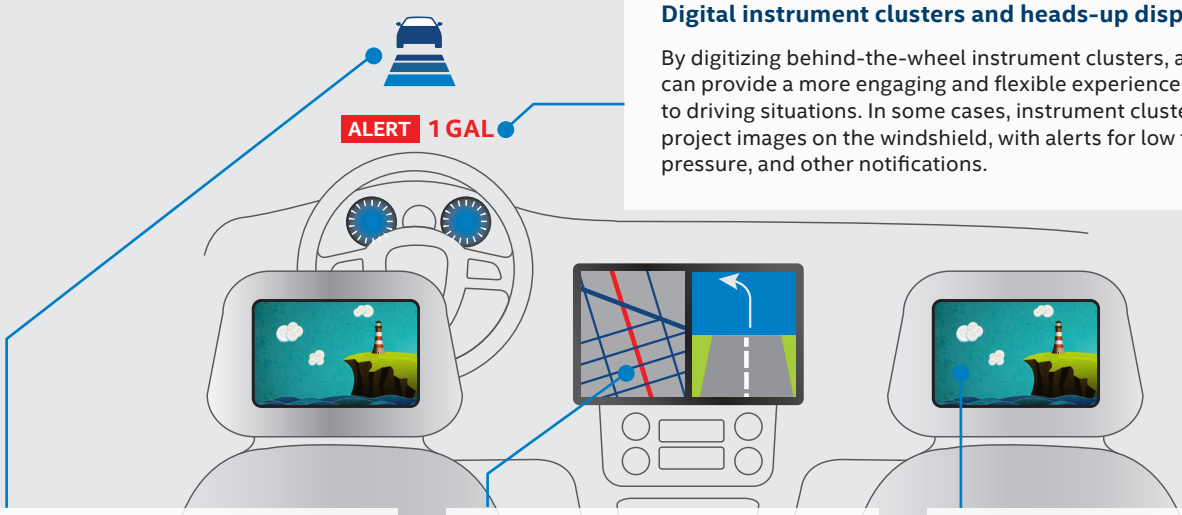
More compute in a compact, low-power package
Intel Atom A3900 automotive processors offer visually stunning graphics and Intel® Real Time Compute capabilities, which makes more demanding and real-time applications possible. Enhanced hardware-level security protects data and vehicle operations.

One flexible, scalable architecture
Intel® processors enable the consolidation of IVI, digital instrument clusters, and ADAS visualization features to one platform, which can then be scaled across a range of SKUs. Flexible architecture and sophisticated virtualization deliver the performance headroom to combine and scale these systems.

Lower development costs and complexity
Automakers and suppliers can dramatically reduce time to market, complexity, and development by leveraging Intel's selection of automotive-qualified components. In addition, Intel's industry-leading software tools, operating system (OS) support, and development platform help solutions get to market faster.

A REVOLUTION IN DRIVING

Today's consumers expect more from their driving experiences. Intel Atom A3900 automotive processors power a wide range of exciting new experiences, such as next-generation navigation systems, augmented reality heads-up displays, and visualization of ADAS technologies like surround-view parking assist.



Digital instrument clusters and heads-up displays

By digitizing behind-the-wheel instrument clusters, automakers can provide a more engaging and flexible experience that adapts to driving situations. In some cases, instrument clusters can even project images on the windshield, with alerts for low fuel, low tire pressure, and other notifications.

Advanced driver assistance systems (ADAS)

For semiautonomous vehicles, detecting and reacting to dangers on the road requires highly coordinated efforts between an array of sensors and imaging devices. The same module used for IVI or digital instrument clusters can also be used for visualizing ADAS features by connecting to other cameras and sensors on the vehicle. The module can support backup and surround-view parking assist, lane departure warning, collision warning, and other ADAS visualization features.

Infotainment and navigation

More consumers are comparing vehicle models based on features like built-in navigation and entertainment, touch and voice control, connectivity to mobile devices, and upgradability throughout the life of the vehicle. With high-performance compute, visually stunning graphics, and support for ultrahigh-definition 4K video, Intel Atom A3900 automotive processors enable an exciting variety of IVI systems.

Rear-seat entertainment systems

Happy passengers make for safer drivers. Intel Atom A3900 automotive processors can support entertainment solutions such as DVD players mounted in the ceiling or the headrests. Entertainment systems can be linked with mobile devices or the front IVI system so passengers can see navigation, control the radio, or even change directions from the back seat. Giving passengers access to more capabilities can ultimately help the driver stay focused on the road ahead.

Driver awareness

The determinism made possible by Intel Real Time Compute capabilities helps achieve the accuracy and synchronization needed for today's driver awareness systems. Meanwhile, improved video and image-processing capabilities allow the analysis of visual data to determine safe courses of action much more quickly.

Scalable platform with hardware-level security

Intel automotive processors enable automakers and suppliers to deploy in-vehicle experiences with advanced security features and a scalable architecture that can be used for many model years to come.

Intel® Atom™ automotive processors for in-vehicle experiences

Impressive compute and graphics
Intel Atom A3900 automotive processors integrate an energy-efficient quad-core CPU, a powerful GPU, and dedicated audio, video, and image processors. This results in new levels of image and video processing to support critical real-time video analytics, all in a compact form factor. In addition to the ability to handle more sensors and tasks, these processors offer excellent memory speeds, fast graphics, HD video acceleration, and support for 4K video.

Built into a compact flip chip ball grid array (FCBGA) and featuring 14 nm silicon technology, Intel Atom automotive processors offer a new image processing engine, greatly expanding video capabilities. Intel Real Time Compute capabilities can coordinate and synchronize peripherals and networks of connected devices, achieving improved determinism and resolving latency issues.

Flexible architecture that scales across SKUs
Developers can save time and resources by optimizing apps once, including those for graphics and video, and then deploying across SKUs, from midrange to premium vehicle models. Scalable architecture means workloads can run in the vehicle or in the cloud and on a range of platforms, from Intel Atom automotive processors to Intel® Xeon® processor-based servers.

Sophisticated virtualization to consolidate systems
Intel Atom automotive processors deliver the performance headroom to combine IVI, digital instrument clusters, and ADAS visualization features to one platform, which can then be scaled across a range of SKUs. But they also offer the sophisticated virtualization technology needed to integrate the human-machine interfaces (HMIs) for all systems, delivering seamless, intuitive experiences that win the trust of drivers and passengers. Intel® Virtualization Technology for Directed I/O (Intel® VT for Directed I/O) provides hardware support for isolating and restricting device access and I/O device assignment. This ensures key safety functions get priority in terms of access to the processor when consolidating IVI and instrument clusters.

Integrated, validated components
Intel Atom A3900 automotive processors are also available as an automotive compute module featuring integrated power management and memory. Automotive-qualified modules meet the Automotive Electronics Council AEC-Q100 standard for stress test qualification for integrated circuits, with SKUs that offer a -40°C to 110°C temperature rating. Modules are prevalidated with Intel® automotive software tools and multiple OSes, so suppliers can build simpler printed circuit board solutions.

Developer tools

To speed development, Intel and its partners provide third-party OS support and a comprehensive set of developer tools, including:

- The Intel® C++ Compiler, Intel® VTune™ Amplifier for Systems, and Intel® Graphics Performance Analyzer
- Reference stacks, including an IVI middleware and automotive boot loader
- Reference OS support for Linux*, Android*, Green Hill Integrity*, QNX CAR Platform for Infotainment*, and Wind River Helix*
- Hypervisors for multi-operating systems from QNX, Green Hill, and Mentor Graphics*
- Performance-tuning tools for the Intel® architecture-based CPU and GPU and complete hardware development vehicles

Powerful processing and graphics
Intel Atom A3900 automotive processors deliver excellent memory speeds and bandwidth (up to LPDDR4 2400 and 38.4 GbpsB/s) in a compact, low-power package. They offer fast graphics and HD video for media-centric applications, with support for 4K video at 60 Hz.

Enhanced hardware-level security

With advanced protection at the hardware level, Intel Atom automotive processors can help reduce vulnerabilities. An integrated Converged Security Engine (CSE), a dedicated security coprocessor, dynamically adapts the security level to function criticality. Processors also offer secure boot and fast cryptographic execution with Intel® Advanced Encryptioni Standard New Instructions (Intel® AES-NI).

Powering the car of the future

Smart and connected driving will change lives and societies for the better. By combining Intel's expertise in technology with ingenuity in the automotive industry, a new vision for transportation is coming to light. With smart, secure technology from door lock to data center, Intel is building solutions that not only help transportation providers meet today's demands, but also prepare for the amazing future of transportation.

Learn More

To learn more about Intel® automotive solutions, visit **intel.com/automotive**.

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