Automotive Electronics **REDEFINED**

Making Cars Safer and More Reliable

The automotive industry is working toward autonomous driving vehicles. As a result, future cars will be equipped with sensor clusters, more computing power, car-to-car and in-vehicle communication technology, high-bandwidth Ethernet networks, and multiple high-definition displays. These changes create new design challenges for automotive suppliers such as more complex electronic systems, functional safety, lack of space, and reduction of power, weight, emissions, and cost.

These additional challenges will push suppliers to:

- Integrate more functionality on a chip rather than on a PCB
- Leverage new advanced semiconductor process technologies in combination with dedicated design IP and packaging technology
- Create a new class of automotive SoCs and SiPs that enable new architectures of highly integrated Electronic Control Units (ECUs)
- Address functional safety (ISO 26262) throughout the automotive development process

Overall, these changes will greatly enhance future vehicle performance, efficiency, reliability, and safety.

Cadence Automotive Products

	Advanced Driver Assistance Systems	Infotainment	In-Vehicle Networking	ECU
Automotive Ethernet Ethernet MAC IP, Allegro Sigrity SI Technology	●	●	●	●
ISO 26262 (ASIL-B Ready) Functional Safety Flows, Tools, Kits, and Design IP	●	●	●	●
ECU PCB Design, Signal, and Power Integrity Analysis Allegro and Sigrity Tools	●	●	●	●
Imaging, Computer Vision, and Neural Networks Tensilica Vision DSPs	●	●		
Audio/Voice/Speech Processing Tensilica HiFi DSPs	●	●		
Wireless Processing (Car2X, Radar) Tensilica ConnX and Fusion DSPs	●	●	●	
Embedded Control Tensilica Processors	●	●	●	●
Standards-Based Design IP Interface, Memory, Analog, Systems/Peripherals	●	●	●	●
Hardware/Software Co-Design FPGA Prototyping, Software Bring-Up	●	●	●	●
Custom IC and Mixed-Signal Design Virtuoso Tools + Spectre and Incisive Verification	●	●	●	●

Key Automotive Applications

ADAS

Take advantage of the wide range of design and verification IP as well as Cadence® Tensilica® DSPs and software partner ecosystem to speed your advanced driver assistance system (ADAS) design.

- Support real-time data processing for sensors and cameras for safety-critical systems with high-performance, low-power Tensilica Vision DSPs for imaging, computer vision, and neural networks
- Enable automated parking, lane departure, Car2X, communications, and many more

Automotive Ethernet

Design high-speed Ethernet communication links between ADAS, infotainment, cameras, and other ECUs leveraging Ethernet IP, system verification, and physical Ethernet channel simulation.

- Enable deterministic real-time data transfer for safety-critical applications such as reliable anti-lock braking with our Ethernet MAC design and verification IP
- Synchronize and transmit high-bandwidth data streams accurately using AVB and time sensitive networking (TSN) for camera-based driver assistance systems
- Ensure protocol compliance and simplify digital simulation with Ethernet verification IP
- Implement automotive Ethernet networks and analyze the ECU-to-ECU communication performance via the physical Ethernet channel with Cadence Sigrity™ SystemSI™ automated chip-to-chip signal integrity analysis

Infotainment

Add flexibility and critical capabilities for voice recognition, immersive surround sound, active noise control, engine sound design, navigation systems, and digital radios with our analog, interface, and memory IP as well as Tensilica DSPs.

- Add audio, speech, and voice functions quickly with Tensilica HiFi DSPs and the most extensive software partner network
- Provide high-performance, low-power gesture recognition with Tensilica Vision DSPs

ECU Design

Collaborate across the design chain, optimize your module and PCB design, develop and integrate your mixed-signal subsystems, and ensure robust design margin as well as EMI analysis and optimization.

- Leverage automated techniques that verify modules across analog operating ranges and digital modes with Cadence Virtuoso® design tools and Spectre® and Incisive® verification
- Improve signal integrity and ensure electrical design intent with Cadence Sigrity constraint-driven design methodology
- Optimize device and system performance with Cadence OrbitIO™ system planner
- Minimize work and manage new vehicle/platform development by designing concurrently through Cadence Allegro® Design Workbench
- Reduce new vehicle or subsystem integration time with Allegro ECAD-MCAD collaboration

Functional Safety

Reduce the automotive ISO 26262 functional safety compliance effort by integrating the functional safety requirements with the functional verification environment, and automating the fault injection and result analysis for IP, SoC, and system designs

- Fully automate functional safety verification using Cadence verification platforms
- FMEDA-based intelligent safety analysis and execution across RTL and gate-level designs
- Formally identify potential and undetected fault runs for further debugging
- Accelerate development with pre-certified ASIL-B design IP and Functional Safety Kits for flows and tools

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