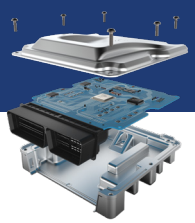
NEXT-GEN E/E ZONAL ARCHITECTURE



HIGHLIGHTS

- High-performance, flexible and scalable platforms available for design per OEM's/Tier 1 specifications
- Innovative hardware and software architecture utilizing defense in depth design from the ground up, with high assurance cybersecurity for all layers and components
- Greater connectivity and versatile computing resources for current and next-gen vehicles.
- Adaptable hardware design
- Robust automotive cybersecurity solution as the platform for safety, security and over-the-air (OTA) updates
- Capability to deploy Hardware-OTA (HOTA) updates
- Patented Communication Lockdown™ Methodology for safety oriented, real-time multi-layer protection
- Patented Service-Oriented Architecture (SOA) for rapid application deployment, real-time customization, access control and service level partitioning

GuardKnox's solutions empower the automotive industry with the **freedom to evolve** to meet the changing needs of connected vehicles safely and securely

A COMPREHENSIVE VEHICLE SOLUTION: FROM AVIATION TO AUTOMOTIVE

GuardKnox's expertise started over two decades ago in defense aviation and secure avionics. The GuardKnox team brings invaluable expert knowledge in defending embedded, safety-critical systems where lives are on the line.

The GuardKnox team has vast experience in hardware and software-based solutions and extensive and unparalleled knowledge in vehicle architecture in terms of needs, functionalities and design for future and next-gen of vehicles.

EXPERT KNOWLEDGE AND CAPABILITIES: DESIGNED WITH THE FUTURE IN MIND

GuardKnox's Platform functions as a Domain Controller or as a high-performance computing platform ECU, which provides a secure endpoint for data processing and storage and also supports secure cloud communication.

Safety and non-safety critical services and applications are hosted on a single system-on-chip (SOC) with secure separation, partitioning and access control. This ensures that no vulnerability can be used as a stepping stone to penetrate safety critical systems.

Partitions provide the capability to run multiple OSes in parallel, while supporting real-time OTA updating of all services and micro-services running on the platform. This creates the ability to do modular design, where each application/service can be tested and integrated independently of the others and the core system.

The Platform can utilize power efficient programmable logic (FPGA) and adaptable hardware to provide a variety of different computing resources which are adapted to optimize and accelerate a many types of software application running in parallel, while ensuring acceleration adapts as applications change during the life cycle.

FREEDOM TO E>OL>E

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NEXT-GEN E/E ZONAL ARCHITECTURE

USE CASES

ZONAL GATEWAY ON A CHIP

- Single chip SoC which can act as a full zonal gateway
- Integrates into existing ECU - no need for extra zonal gateway
- Hardware level routing and acceleration
- Supports all interface types and OTA configuration on a hardware level (HOTA)

SOA IN-VEHICLE-INFOTAINMENT

- Modular application deployment and integration. No need to recompile, integrate nor test entire software image
    - Full service (parition, process) - core function, big update
    - Micro service (container), small update - UX/UI
- OTA on all services/software modules
- Vehicle Appstore - vehicle level core capabilities updated OTA
- Isolation and sandboxing - secure separation between safety-security critical domains and other domains
- Strong and secure seperation between safety-security critical and other domains

VEHICLE COMPUTING UNIT (VCU)

- Increase modularization of the network
- Modular real-time OTA application deployment with load balancing based on SOA, including multi-OS support
- Adaptable computing with heterogenous resources in each
- Load balancing and management between several VCUs

MODULAR HIGH-PERFORMANCE ETHERNET NETWORK BACKBONE (RING)

- Plug and play ECUs
- Completely modular with no need for reconfiguration of individual ECUs
- Resilient to crashes and ECU disconnect
- High speed and high-performance (include video broadcasting throughout whole network)
- Automatic service discovery between all connected devices

The consolidated platform provides lower life cycle costs, high reliability, and flexibility to ensure vehicle E/E architectures will be able to meet the changing market trends and consumer demands, enabling the automotive paradigm shift to a service-oriented vehicle where the passenger (or driver) are the focal point rather than the vehicle itself.

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