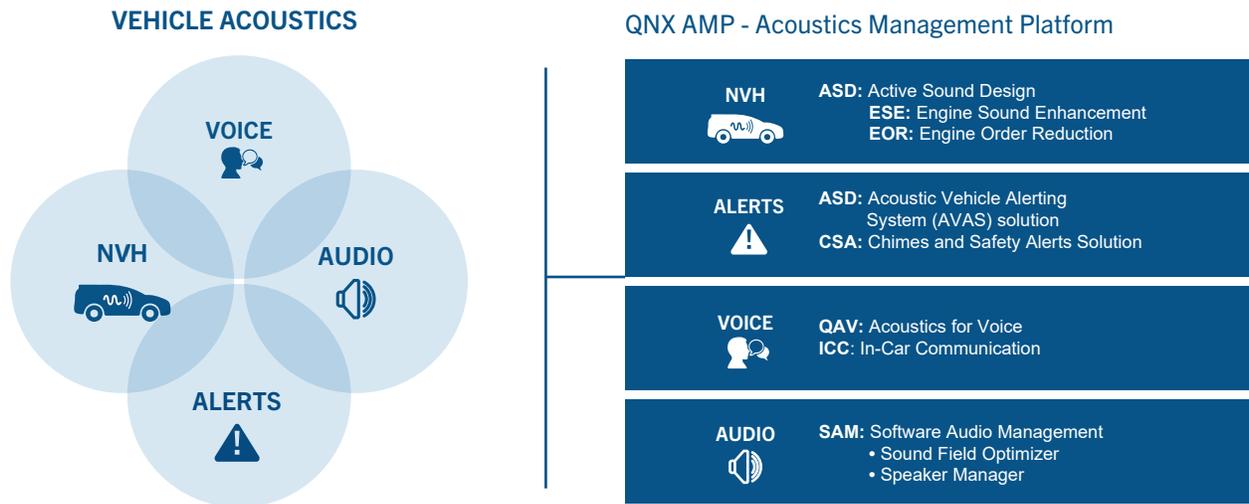




 **BlackBerry** | **QNX**

PRODUCT BRIEF

# QNX Acoustics Management Platform



**Figure 1** QNX AMP - Acoustics Management Platform

The QNX® Acoustics Management Platform (AMP) 3.0 is a breakthrough in automotive software. For the first time, automakers can design and manage the total sonic experience in their cars with a pure software solution designed to run on general-purpose application processor cores – saving bill-of-material costs and shortening time to production, while delivering new features and uncompromising sound quality.

Modern vehicles contain multiple acoustic and audio signal-processing features that need to operate simultaneously while sharing microphones and loudspeakers in the vehicle cabin. Until now, these features have been implemented in separate ECUs, provided by a myriad of suppliers and requiring detailed and labor-intensive tuning and integration for every vehicle configuration prior to production.

QNX AMP 3.0 comes pre-configured with a core set of audio and acoustic functionality that meets the requirements of today’s most advanced system designs and with the extensibility and flexibility to meet the challenges of the future.

All features of QNX AMP 3.0 are tuned and configured via QNX’s industry-leading tuning tool, LiveAMP, which provides a complete overview of microphones, real-time vehicle data streams,

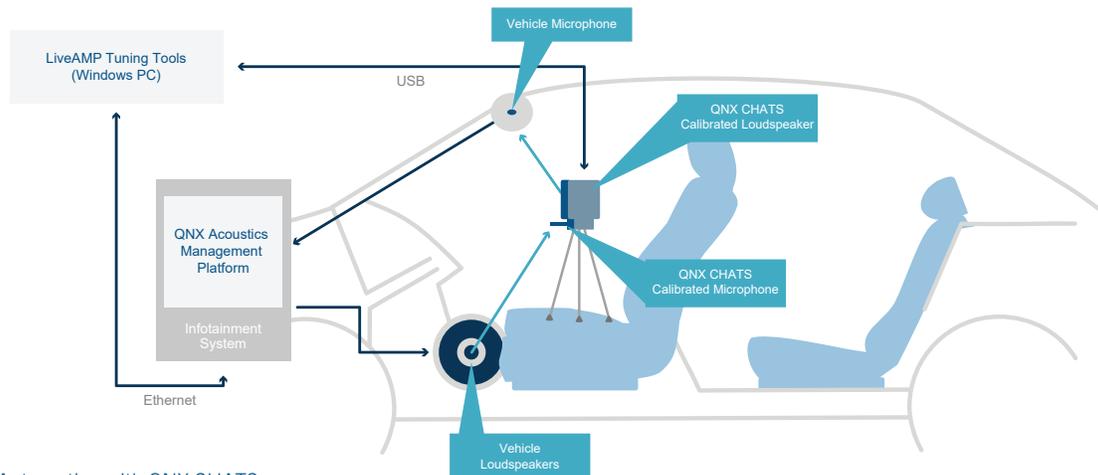
loudspeakers, and more to enable the acoustic experience of the vehicle to be defined and controlled in one place.

BlackBerry QNX also offers services ranging from basic support and training to complete acoustic tuning, testing, and compliance certification against ITU and industry standards – with the benefit of decades of experience with hundreds of OEM production programs.

Leveraging the power of the QNX® Neutrino® Realtime Operating System, QNX AMP 3.0 is built on a modular, low-latency audio architecture that offers real-time, high-performance signal processing on general-purpose application processors – with unprecedented time resolution of as low as one millisecond.

Automakers no longer need to rely on proprietary digital signal processing (DSP) cores or specialized external hardware to implement compute-intensive acoustic signal processing applications.

QNX AMP 3.0 can also be implemented in a virtualized environment using the market-leading QNX® Hypervisor 2.0. This allows seamless integration with Linux® / Android™ infotainment guest OSs with full support for all audio functionality.



**Figure 2** - Tuning Automation with QNX CHATS

Each of the QNX AMP 3.0 modules are also available as stand-alone signal processing libraries that can be ported to a wide range of CPUs/DSPs and operating systems where the QNX Neutrino OS or QNX Hypervisor is not available.

#### **QNX Acoustics for Voice (QAV) 4.0**

Industry-leading handsfree telephony and multi-zone speech processing solution. QAV supports:

- ITU P.1100/1110, P.1140 (eCall), & ERA-GLONASS signal processing requirements
- Narrow and wideband Bluetooth® connectivity
- Apple CarPlay® and Google® Android Auto™ requirements at 8, 16, 24, 32, and 48 kHz sample rates
- Multi-zone speech isolation with QNX proprietary Zone Interference Control (ZIC)
- Up to 32 microphone elements in up to 8 zones and 32-bit/sample format
- Fixed and adaptive beamforming with up to 8 elements per beamformer
- Comprehensive tuning and diagnostics tool QNX LiveAMP included
- Optional QNX® Compact Head and Torso Simulator (CHATS) tuning automation system
- Superior full-duplex performance on native Android or Linux systems with optional io-acoustic for Linux

#### **QNX In-Car Communication (ICC) 2.1**

Production-hardened, high-performance ICC solution that features:

- Fully automated, true noise-based, per-zone gain control for zero-distraction consumer experience
- Low algorithmic latency of 3ms
- Supports from 1 to 4 independent source and target zones, scaling from a simple front-to-back to a complete multi-way ICC system
- Fine-grained, per-zone control over EQ for the most natural ICC experience ever
- Comprehensive tuning, diagnostic and configuration management with QNX LiveAMP
- Full interoperability with high-quality music and media playback
- CPU optimized and low-memory footprint code

#### **QNX Active Sound Design (ASD) 2.1**

A complete interior and exterior vehicle sound management solution, featuring:

- Active Noise Control for Engine Order Reduction with up to 6 microphones, 6 control outputs, 5 engine orders, and up to 300

Hz bandwidth

- Engine Sound Enhancement with up to 24 additive engine orders, advanced granular synthesis and sample playback capabilities
- Comprehensive real-time and dynamic effects and processing chain that can reference any real-time data available from CAN or other sources
- Complete, graphical and intuitive sound profile design with QNX LiveAMP that also allows desktop auditioning and driving data replay prior to vehicle deployment
- Fully supports the development of Acoustic Vehicle Alerting Systems (AVAS) compliant with UN138 and national derivatives

#### **QNX Software Audio Management (SAM) 1.0 – New in AMP 3.0**

A comprehensive loudspeaker management, media playback and sound field optimization solution, supporting:

- High-resolution 32-bit audio path at sample rates up to 96kHz and beyond
- Cabin correction with fine-grained multi-node parametric EQs
- Scalable from 2 to 32 independent loudspeaker outputs each with fine-tuned gain & delay normalization
- Base management
- Active crossovers
- Dynamic EQ for perceptual loudness control and speed-dependent volume
- End-user tone controls and parametric EQ
- Intuitive, graphical tuning and diagnostics via LiveAMP
- SIMD vectorized and optimized code

#### **QNX Chimes and Safety Alerts (CSA) 1.0 – New in AMP 3.0**

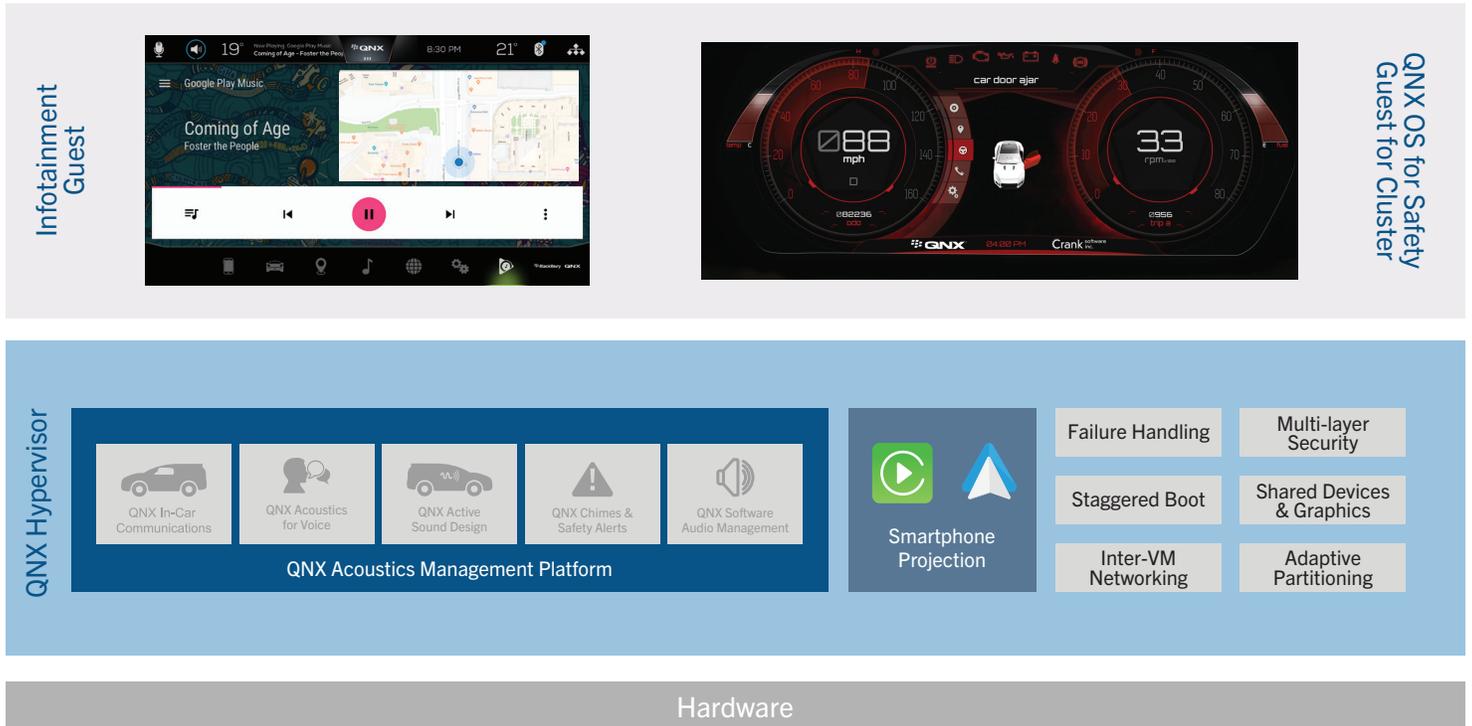
Advanced & proprietary audibility monitoring for safety.

- QNX's software early audio capabilities remove need for dedicated chime hardware
- Audio alerts becoming safety-critical components for ADAS and autonomous/semi-autonomous driving systems
- QNX® Chimes and Safety Alerts offers proprietary audio system audibility monitoring using cabin microphones / electrical monitor
- QNX® Active Sound Design (ASD) 2.0 provides dynamic audio generation with real-time vehicle data sources
- Early Audio support via QNX RTOS fast boot and Instant Device Activation (IDA)
- LiveAMP PC tuning tool allows rapid live tuning and diagnostics capabilities

## Tooling and Integration

### LiveAMP

QNX AMP 3.0 includes a powerful PC-based desktop tuning tool: LiveAMP for real-time and interactive adjustments of all system parameters, injection and streaming of signals and vehicle data at multiple tap-points in the system, tuning automation using QNX CHATS\*, monitoring using device-under-test and/or reference microphones, real-time spectral displays, configuration file management, and offline sound design for QNX ASD.



### About BlackBerry QNX

BlackBerry QNX is a leading supplier of safe, secure, and trusted operating systems, development tools, and professional services for connected embedded systems. Global leaders such as Ford, Audi, Cisco, General Electric, Lockheed Martin, and Siemens depend on BlackBerry QNX technologies for their next generation of secure vehicle software platforms, network routers, medical devices, industrial automation systems, security and defense systems, and other mission and/or life-critical applications. BlackBerry QNX is headquartered in Ottawa, Canada, with its products distributed in over 100 countries worldwide.

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