



HARMAN

INNOVATE. CREATE.
INTEGRATE.

Personalize
Your Car.

Personalize Your Car.



HARMAN breaks new ground and brings the vision of a personalized, context-aware driving experience to life on-board of the Rinspeed™ DOCK+GO™ concept car.

Developed in partnership with automotive visionary Rinspeed, the DOCK+GO mobility concept delivers a personalized interface between the driver, the car, and the connected and digital world around it.

HARMAN has invented a new “context-aware” infotainment system concept that creates a personalized dashboard for the driver. The intelligent system combines leading-edge technologies that are CONNECTED, SAFE and GREEN including the cloud-based Aha™ platform, personalized and situational human-machine interface (HMI), advanced driver assistance features, energy management and learning navigation solutions. All brought into the car in an intuitive, easy-to-use manner, without compromising safety.

The in-car infotainment system connects with the driver’s smartphone and uses NFC (Near Field Communication) to recognize the driver and his saved preferences such as favorite music, podcasts, Facebook™ and Twitter™ accounts via the Aha platform as well as preferred HMI visualization and settings for the HARMAN HALOsonic™ Electronic Sound Synthesis system.

Imagine a car that automatically adjusts to every driver’s preferences, needs and the respective situation, harnesses a universe of personalized entertainment and information from the web, and makes your drive time easier, safer, more exciting and productive by learning your driving routes and habits.



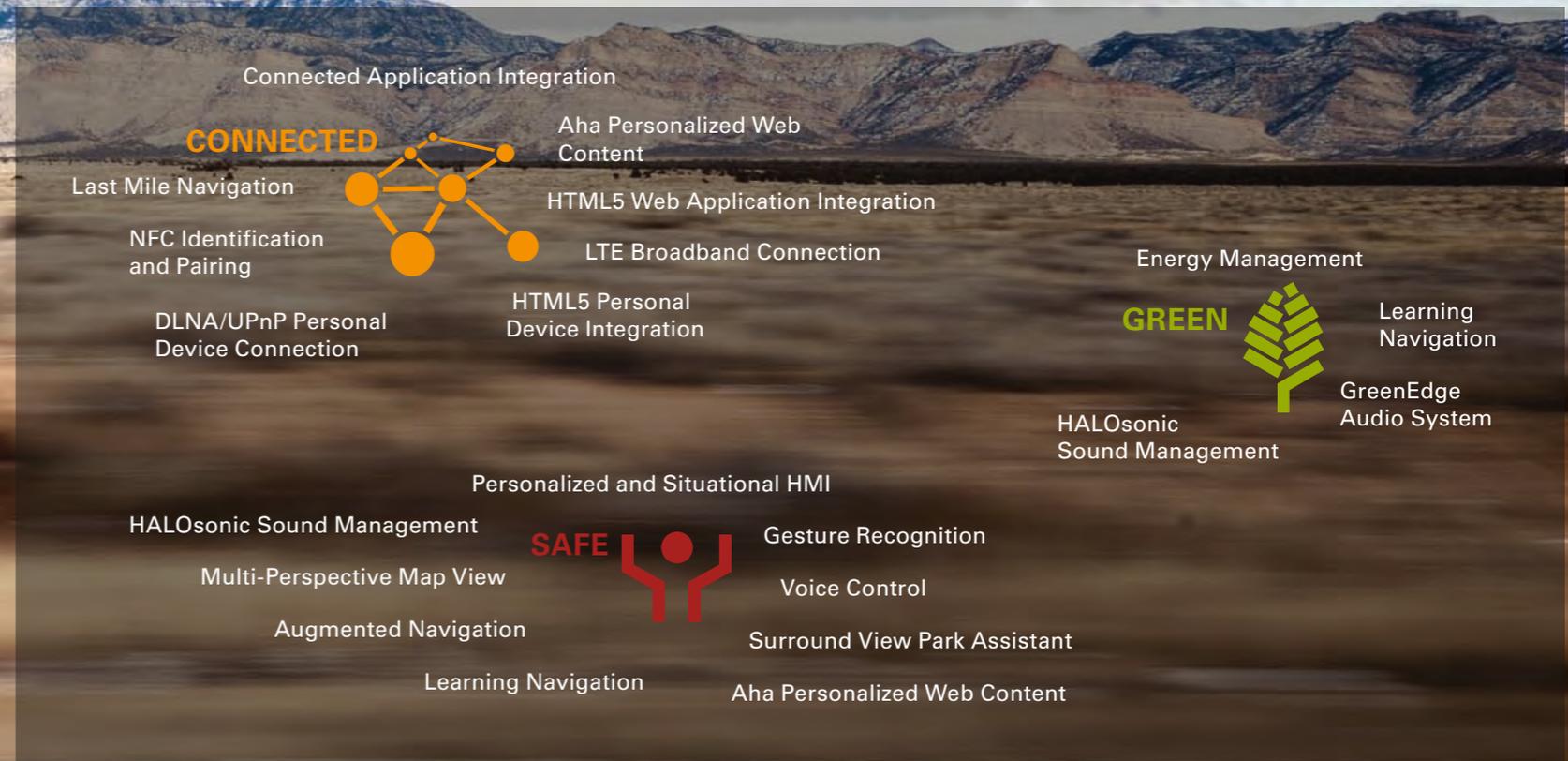
- 05_Connected Application Integration
- 07_Aha™ Personalized Web Content
- 09_HTML5 Web Application Integration
- 11_LTE Broadband Connection
- 13_HTML5 Personal Device Integration
- 15_DLNA/UPnP™ Personal Device Connection
- 17_NFC Identification and Pairing
- 19_Last Mile Navigation
- 21_Personalized and Situational HMI
- 23_Gesture Recognition
- 25_Voice Control
- 27_Surround View Park Assistant
- 29_Learning Navigation
- 31_Augmented Navigation
- 33_Multi-Perspective MapView
- 35_Energy Management
- 37_GreenEdge™ Audio System
- 39_HALOsonic™ Sound Management

Blueprints for Intelligent Cars.

HARMAN is the driving force in automotive audio and infotainment innovations for more connected, safer, greener and more intelligent vehicles.

HARMAN creates and seamlessly integrates groundbreaking technologies and system concepts for the networked generation to keep people connected to their favorite entertainment media, applications, services, office functions, news, and social media networks anywhere, anytime across devices and platforms.

And all these capabilities are available to drivers without compromising safety through visionary infotainment solutions that let you keep both eyes on the road and hands on the wheel. Intuitive and easy-to-use. Personalized and context-aware. Learning and energy-saving. HARMAN stays one step ahead and defines what is coming next.



Connect Your World.

HARMAN offers advanced solutions for the integration of connected applications including smart office functions in the car, ranging from embedded and downloadable applications over smartphone integration to cloud computing concepts. HARMAN infotainment systems provide optimum implementation of each individual concept or seamlessly network the benefits of different concepts to provide a high level of integration, interaction and upgradeability for an exhilarating connected driving experience without compromising safety.

Imagine you receive a meeting request from a customer while travelling and your infotainment system reads the message, allows replying by simple voice commands, updates your calendar automatically and offers the possibility to start navigation to the meeting location. Or imagine you are traveling in your car and your navigation system and calendar "interact" with each other informing you automatically in case you cannot keep an appointment due to heavy traffic and offering to send an email automatically to your meeting partner to report the delay.

HARMAN Native Embedded Application Solutions offer applications such as direct access to Microsoft Exchange Server™, Google™ Search and Google Earth™, which are specially optimized for the respective car and infotainment system. The applications are fully integrated and provide seamless interaction with other functions.

HARMAN Downloadable Application Solutions offer the possibility to download specially created applications from dedicated portals directly into the car or from home via USB. The applications are easy to update and optimally linked with infotainment key functions such as voice recognition or navigation.

HARMAN Cloud Computing Solutions allow direct access and use of applications in the cloud through HARMAN's Aha platform and HTML5 connected application integration technology. Drivers and passengers always benefit from newest applications through easy update of functionalities and content directly in the cloud, without the need to change any software in the car.



HARMAN Smartphone Integration Solutions support seamless wireless integration of smartphones from Apple™, Rim™, Android™ and Windows Mobile based versions including Nokia™ to deliver safe applications and synchronized office features. The applications run on the smartphone, the infotainment system ensures safe control via in-car HMI and synchronizes the data and office features including email, calendar and contacts. Advanced in-car speech processing technology enables the driver to send and receive messages verbally.



Stay Connected and Safe.

Aha organizes your favorite Internet content into personalized, live and on-demand radio stations, making it safe and easy to access your favorite content on the go instantly, all from one place.

Imagine having the latest information from your favorite Web sources while driving, all with an interface that is as safe and easy to use as radio. Everything from Internet radio, music services, and podcasts, to local searches and audible updates from your Facebook News Feed or from Twitter.



Brings the full spectrum of Web content safely and personalized into the car.

Reduces cost and complexity of app integration, maintenance and regression testing.

“Future-proofs” vehicle hardware and software by shifting content integration to the cloud.

Offers customized internet search for upcoming restaurants or coffee shops.

Delivers personalized traffic updates covering current position and route.

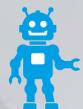
Minimizes visual and cognitive distraction by organizing all content types into a single, familiar interface.

Provides access to tens of thousands of Internet radio stations, leading on-demand music services, and a wide variety of podcasts and audiobooks.

Supports playback of the latest updates from Facebook News Feed or Twitter.



Informs about special offers from nearby businesses while driving.



HTML5 Web Application Integration Solutions

Always Up-to-Date.

HARMAN intelligent infotainment systems utilize HTML5 Web technology for advanced integration of cloud-based applications into the car. Web applications and services stay in the cloud and the HTML5 browser-based infotainment system seamlessly integrates the content vehicle-optimized into the car.

Imagine you can access your favorite applications directly from the cloud at the same speed, quality and simplicity you are used to, but with vehicle-optimized look-and-feel for safe driving.

Web applications and services stay in the cloud, allowing centralized server updates, independent from vehicle system or device.

Brings latest dynamic cloud content into the car without the need to download apps.

Provides simple access to applications and services directly from the Web via LTE and HTML5-based infotainment systems with vehicle-optimized look-and-feel.



Allows direct, high-quality access of smart office functions including emails and contacts from the cloud server account without any additional device.

Speed Up Your Connection.

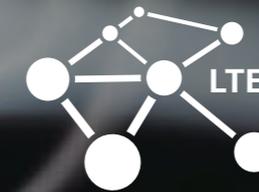
HARMAN brings the speed and quality of high-bandwidth networks into the car with automotive integration of next-generation Long Term Evolution (LTE) mobile broadband communication technology. LTE delivers data download speeds of up to 100 Mbps and uploads as high as 50 Mbps with low latency of <10msec giving drivers and passengers access to a vast array of bandwidth-rich applications and services including video-on-demand streaming and Internet radio right from the cloud.

Imagine you can live-stream high-quality music directly from the Web and run several other concurrent cloud applications with best user experience in your car. Or that you can hold video conferences from the rear seat, always at the highest quality even when travelling at speed.

Allows faster streaming services leveraging lower per-byte costs.

Offers the facility to run online applications concurrently e.g. play video from the cloud, use Google Earth, stream music and load news with pictures.

Provides high-speed broadband data connection with low response times and excellent quality of service, optimized for a moving car.



Delivers virtual real-time access to bandwidth-rich applications and services directly on the Web, creating the impression of integrated onboard applications.



Rear-Seat Entertainment Can Be That Easy and Personal.

HARMAN next-generation infotainment systems apply globally established Web technologies such as HTML5 for intelligent and easy usage of personal devices in the car. The integrated "Automotive Web Server Engine" of the infotainment system also delivers rear-seat entertainment through easy integration of tablet PCs via Wi-Fi™ and HTML5 standard browser, as well as remote control of car functions via smartphone.

Imagine that your passengers can take their personal tablet PCs into the car, simply open their device browsers and connect them to the vehicle infotainment system via Wi-Fi to live-stream their favorite movies. Or that they can remote-control certain car functions such as air conditioning from the rear seats.

Offers easy, flexible and personalized rear-seat entertainment solutions with every standard tablet PC, connected via Wi-Fi and HTML5 standard browser.

Allows the remote-control of car functions through simple integration of smartphones via Wi-Fi and HTML5 browser without specific applications or software.



Enhance Your Mobile Entertainment Experience.

HARMAN intelligent infotainment solutions apply consumer driven standards such as Universal Plug and Play UPnP (DLNA certified™) for easy connection and interoperability of consumer devices, smartphones and mobile phones in the car. Passengers simply connect to the in-car Wi-Fi hotspot and can seamlessly access, live-stream and exchange media content in the car.

Imagine you have the latest movie stored on your smartphone and your passenger in the rear seat would like to watch it on his iPad™ or on his rear-seat entertainment unit. You both simply connect your devices to the in-car Wi-Fi hotspot and your passenger can easily stream the movie on his iPad in the highest quality. Or imagine that you park your car in the parking lot at home; your in-car infotainment system connects to your home hotspot and you can easily download music and movies directly into your car.

Provides seamless high-quality audio/video streaming from consumer devices, smartphones and mobile phones.

Allows highly flexible and simple connection of personal devices via in-car Wi-Fi hotspot.

Reduces the need to carry DVD collections or to wire music devices.



Offers the possibility to share media content easily between various connected devices.



Simply Touch.

Near Field Communication (NFC) technology is much like a security ID card with a chip and antenna serving as “virtual signature” for the driver. HARMAN’s NFC integration solutions not only ensure easy pairing of standard phones, smartphones or credit cards featuring NFC technology by holding them up to the in-car NFC activation point, but also simple vehicle access and personalization, as well as easy use of optional features and services including personalized cashless payment for toll highways and e-ticketing.

Imagine you can pair any device or configure any Wi-Fi connection simply by holding it up to an activation point with no additional action. Or imagine you are on your way to New York and an advertisement for a big concert event pops up and you can simply purchase tickets by holding your regular smartphone up to the activation point while travelling.

Enables drivers to activate personal vehicle settings conveniently. No additional identification or configuration. Simply Touch and Go.

Allows easy connection of standard phones, smartphones or credit cards with integrated NFC technology. Simply connect via Wi-Fi or Bluetooth without any complex connection steps, configurations and troublesome PIN number entry. Simply Touch and Connect.



Simplifies and enriches the user experience without compromising safety.

Offers the ability to easily and securely purchase features and services. No dangerous credit card number entries or online purchase scenarios. No complicated activation or additional devices. Simply Touch and Confirm.

Increase Your Navigation Convenience.

HARMAN last mile navigation technology allows the transfer of navigation data from the infotainment system to a connected smartphone for “last mile” guidance to the final destination. This feature is particularly interesting in conjunction with HARMAN’s parking search function, which leverages HARMAN’s Aha connectivity technology to find and book free parking spots. If the parking place is off the beaten track, the remaining route can be transferred to the driver’s smartphone to facilitate orientation after leaving the vehicle.

Imagine you have a dinner appointment at a restaurant located in a pedestrian area of a big city. The closest parking garage is 400 m walking distance and your in-car navigation system offers the possibility to transfer the navigation destination for the remaining distance to your connected smartphone for pedestrian navigation. Simple and convenient, without any additional entry or search.

Parking search function reduces the time and frustration of circling to find a vacant spot.

Provides safe navigation outside the vehicle for the remaining distance to the final destination and back to the vehicle.



Improves schedule adherence – no wasted time getting lost.

Transfers navigation data to the connected smartphone easily and conveniently – no additional entries necessary.



Personalized and Situational HMI Solutions

Focus on Driver and Situation.

HARMAN's driver and context-aware human-machine interface (HMI) solutions virtually personalize the infotainment content and functions to the respective situation and the individual needs and preferences of the driver. All information and services are displayed in the most intuitive, easy-to-use and least distracting manner.

Imagine you are driving to the office and your intelligent infotainment system first shows up business-relevant information e.g. email, calendar and phone book. Or imagine you are off on a skiing trip over the weekend and your system automatically displays destination-relevant information e.g. snow conditions. And the displayed content even differs depending on the respective driver and day of the week.

Seamlessly integrated into HARMAN's multimodal HMI concept, allowing the driver to choose from multiple interaction styles based on personal preferences.

Ensures intuitive and easy operation.

Focuses on situation. HMI is adapted to the driving situation e.g. daily commuting or weekend road trip.

Minimizes visual and cognitive distraction.

Reduces wealth of information based on driver's needs.



PERSONALIZED AND SITUATIONAL HMI

Focuses on driver. Infotainment content and functions are dynamically tailored to the individual driver.



Intuitive and Natural.

HARMAN's hand gesture control solutions allow the driver to perform basic infotainment system functions seamlessly with a wave of the hand in a natural and intuitive manner. And in flexible combination with other interaction styles from HARMAN's multimodal HMI concept including speech and optimized tactile interaction.

Imagine you can flick through your radio stations, audio tracks, emails and contacts simply with an intuitive wave of your hand. And then turn up the volume of your favorite music with a natural swipe. No need to manipulate buttons, switches, dials or touch screens.

Allows safe and convenient control of basic infotainment functions, even in noisy environments e.g. while driving in a convertible.

Seamlessly integrated into HARMAN's multimodal HMI concept, allowing the user to choose from multiple interaction styles based on personal preferences.

Increases usability and customer satisfaction through more intuitive and natural interaction, as well as reduced learning times and adaptation needs.

Reduces the driver's cognitive workload and distraction.



GESTURE RECOGNITION

Eyes on the Road.

HARMAN's speech recognition solutions provide advanced voice detection and control applications with natural language processing and speech interaction. Integrated text-to-speech and speech-to-text technologies enable read-aloud functions for emails and text messages, voice read-back of calendar and notes, and support dictation of messages, which can then be converted to text and sent out as email or text message. And it is even possible to interact via social media platforms such as Twitter and Facebook without taking eyes off the road or hands off the wheel.

Imagine you can follow tweets from your favorite artist or interact with your friends via Facebook while driving as easily and naturally as in a simple conversation. Or imagine you can simply reply to an email by talking to your infotainment system, which then converts your message into text and sends it out as an email or text message.

Provides safe and easy control of infotainment functions.

Allows safe usage of cloud-based applications and services.

Seamlessly integrated into HARMAN's multimodal HMI concept, allowing the user to choose from multiple interaction styles based on personal preferences.



VOICE CONTROL

Increases convenience through true speech interaction.

Reduces complexity, driver's cognitive workload and distraction.

Surround View Park Assistant

Know What's Happening Even Before You Can See It With Your Own Eyes.

HARMAN's revolutionary new camera-based parking assistant goes beyond today's single, rear-mounted view or multi-camera top view. With the help of 4 super-wide-angle cameras positioned around the car, HARMAN computes real camera data with virtual reality modeling to offer complete 360-degree surround views of the perimeter of the car from virtually any viewing angle.

Imagine you are reversing out of a very tight driveway and your cameras and display enable you to take a look around the corner eliminating all blind spots for you. Or imagine you intend to maneuver your car into a spot with very poor visibility, turn your steering wheel to the left and your parking system understands your intention and focuses on the most critical part, the front right corner of your car. And all that not only from a bird's eye perspective but in 3D surround view produced by a camera that virtually flies around your car.

Improves overall parking safety and accuracy.

Provides intuitive 360-degree view of what is happening around the car, even before actually viewing it with own eyes.

Eliminates blind spots during critical maneuvers in crowded and narrow spaces.



Optimize Your Journey. Make It More Personal and Safer.

HARMAN intelligent next-generation navigation solutions are learning and personalized. The system monitors the driver, his operation characteristics such as speed and braking habits, his preferred routes and his interactions with the system. And it memorizes temperatures, turn signals and rain sensor information, as well as road parameters such as turns, lanes, gradient, conditions, rolling resistance and speed limits. Based on this data the system will recommend an optimized route, taking into consideration bad traffic situations, weather and road conditions during this time of travel. The system even anticipates the destination based on time and day of the week and informs you in case of an incident on the anticipated route, without route guidance even being activated. The navigation system also detects driver alertness through sensors that measure the driver's current concentration, braking and accelerating behavior, to intelligently propose less risky routes or suggest stopping for a rest.

Image your navigation system would know exactly your driving style, recommending a route optimized to your personal driving habits, preferred routes and time of the day. Or imagine your navigation system suggests stopping for a rest based on steering wheel movements and timbre of your voice.

Increases fuel efficiency through optimized route guidance in conjunction with HARMAN energy management solutions.

Optimizes personal route guidance based on learned individual driving patterns and habits, as well as traffic, weather, road conditions and parameters.



LEARNING NAVIGATION

Increases driving safety through intelligent driver alertness monitoring solutions.



Enhance Your Route.

Augmented navigation is a HARMAN advanced driver assistance feature creating a 3D model of the environment by combining live motion video and navigation data for route guidance with enhanced visualization. Drivers can get a more accurate and realistic view of the road ahead on the navigation display and benefit from clearly marked directional cues for off-ramps, roundabout exits or even points-of-interest.

Imagine you are approaching a major intersection or a complex roundabout in a big city with heavy traffic, multiple lanes and exits, and that navigation would be as easy and relaxed as driving through a small village.



Reduces complexity and driver distraction.

Provides immediate situation overview with clear directional cues for complex situations.

Reduces necessity to estimate distances and work out correct turnings.



AUGMENTED NAVIGATION

Reduces need for real-life conversion of abstract 2D or 3D navigation information.

Delivers precise feedback to the driver on the correct lanes (lane tracking).



Multi-Perspective Map View Concept

Optimize Your Orientation.

HARMAN multi-perspective map view technology provides an optimum combination of 2D and 3D map view for improved map orientation and navigation through big cities where skyscrapers and street canyons pose a major obstacle to long-distance visibility.

Imagine you are driving through a big city and would like your map to show an optimum combination of your direct surroundings in 3D and the remaining route in 2D. No skyscrapers that reduce visibility or confuse long-distance navigation.



Improves orientation and navigation through complex environments, especially big cities.

Combines the benefits of 2D and 3D navigation for improved short and long-distance navigation. 3D navigation improves orientation in immediate city surroundings and 2D navigation allows an overview of the remaining route.



MULTI-PERSPECTIVE

Enhances driving experience through 3D POIs.

Make Your Journey More Efficient.

HARMAN intelligent energy management solutions feature power-saving components including advanced processors and seamlessly network "green" functions including Eco Assistant, Eco Route and Range Manager to ensure advanced performance with reduced power consumption for an unparalleled high-efficiency driving experience.

The HARMAN **Eco Assistant** function offers the driver the possibility to contribute actively to a reduction in fuel consumption of about 10% to 15% by using an anticipatory, more efficient driving style. The system provides the driver with forward-looking driving recommendations to accelerate, decelerate and coast the car based on learned navigation information such as driving behavior, road conditions, rolling resistance, signs, intersections, sharp turns and upcoming speed limits.

Imagine you are driving through a city and your HARMAN Eco Assistant knows about a 30 zone on the road ahead, recommending you free-wheel your car before you can even see the sign, helping you to optimize your fuel consumption. Or imagine you intend to take a long-distance journey in your electric vehicle and your HARMAN Range Manager takes care of everything, automatically informing you about the available range and providing a selection of charging stations within your available range, as well as the ability to book the energy charge and start navigation to the selected station.

The HARMAN **Eco Route** guidance calculates the most energy-efficient route based on personal driving behavior and "learned" road parameters through HARMAN's intelligent learning navigation solution.

The HARMAN **Range Manager** combines advanced 3D navigational databases including precise road topography and consumption modeling for detailed range management. Integrated charging station search and reservations, along with easy-to-use navigation and advanced range management, will help drivers to manage the distance limitations of their electric vehicles more efficiently.

Reduces energy/fuel consumption at maximum infotainment performance and content.

Ensures convenient long-distance journeys through effective management of range limitations and charging infrastructures for electric vehicles.

Increases safety through forward-looking and conscious driving behavior.



ENERGY MANAGEMENT

Allows the driver to actively participate in the process of optimizing energy consumption.



GreenEdge Audio Solutions

Twice the Performance— Half the Energy.

harman/kardon

HARMAN GreenEdge systems utilize high-efficiency designs for amplifiers and speakers to reduce current input and heat dissipation, while optimizing packaging and weight characteristics.

Imagine a world where energy-saving technology delivers an uncompromised audio experience. Vehicles of the future will employ all possible assets to maximize their efficiency to conserve energy and reduce emissions. The goal for GreenEdge systems is to ensure all vehicles, particularly with hybrid and electric drivetrains, have reduced load requirements for powering audio components of at least 50% compared to regular audio equipment. GreenEdge systems will also outperform traditional audio products with higher output levels and greater dynamic response.

GreenEdge

Provides Spectral Manager for optimized frequency control and distribution.

Features Power Manager for intelligent level protection.

Lowers system weight and packaging requirements.

Reduces energy consumption by at least 50% over traditional systems.

Increases audio performance with higher sound pressure levels.



GreenEdge

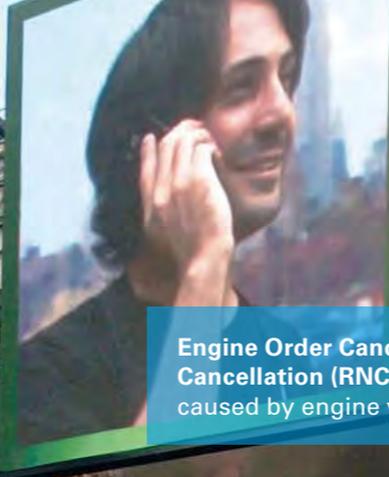
Improves acoustic transparency and dynamic response.

Reduces heat dissipation.

Enhanced Driving Experience in a Greener and Safer World.

HALOsonic sound synthesis technologies bring together HARMAN's world class expertise in vehicle acoustics and Lotus™ Engineering's proven active noise control technologies, which together provide reduced internal cabin noise and the ability to generate sound for electric and hybrid vehicles.

In the car of the future, audio systems improve safety, enhance the driving experience and contribute towards a greener world.



Engine Order Cancellation (EOC) and Road Noise Cancellation (RNC) cancel unwanted noise inside the car caused by engine vibrations or the road surface.

Electronic Sound Synthesis generates or complements the desired sound of an engine, either inside or outside the car.

HALOSONIC™

HARMAN
AUTOMOTIVE

HALOSONIC™
MANAGEMENT SOLUTIONS

Improved interior sound quality.

EOC

Improves comfort with smaller 4-cylinder engines.

Vehicle weight reduction.

Acoustic management of cylinder deactivation and hybrid modes.

Enhanced pedestrian safety.

Internal/external ESS

Efficient exhaust tuning.

Improved engine feedback.

Desirable interior engine sound.



HALOsonic

RNC

Reduced driver and passenger fatigue.

Higher perceived vehicle quality.





AKG

harman/kardon

Infinity

JBL

lexicon

mark
levinson

© 2012 Harman International Industries, Incorporated. HARMAN, Aha, AKG, GreenEdge, HALOsonic, Harman Kardon, Infinity, JBL, Lexicon and Mark Levinson are all registered or unregistered trademarks of Harman International Industries, Inc. Rinspeed and Dock-Go are registered trademarks of Rinspeed AG. Facebook is a registered and unregistered trademark of Facebook, Inc. Twitter is a registered and unregistered trademark of Twitter, Inc. Apple and iPad are registered and unregistered trademarks of Apple, Inc. Google and Android are registered and unregistered trademarks of Google Inc. RIM is a registered and unregistered trademark of Research In Motion Limited. Nokia is a registered and unregistered trademark of Nokia Corporation. Lotus is a registered and unregistered trademark of Group Lotus Plc. Wi-Fi is a registered and unregistered trademark of The Wi-Fi Alliance. UPnP is a registered and unregistered trademark of UPnP Implementers Corp. DLNA Certified is a registered trademark of The Digital Living Network Alliance.