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Connected Mobility: Infotainment and Comfort

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ABSTRACT

An ever-expanding array of functionality and demand for connectivity in today's automobiles is driving up the complexity of in-vehicle electronics. But there are two ingenious connector solutions that can help.

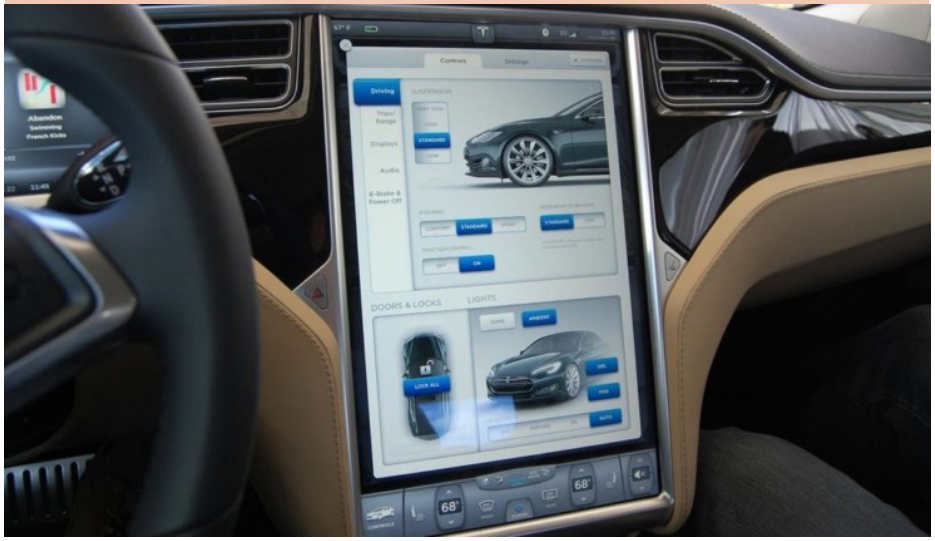


Figure 1: Tesla's big screen infotainment center gets high marks for it ease of use.

Except in cases where they are being flambéed by fraudulent accountants, numbers can give you a pretty accurate assessment of the health of a market. Consider automotive electronics, for example. Propelled by a rising tide of tech, from sensors and safety to infotainment systems, the Consumer Technology Association (CTA), which forecasts U.S. factory sales-to-dealers for more than 300 consumer tech products, estimates that factory-installed auto tech this year, inclusive of driver-assist and entertainment features, is projected to contribute $15.7 billion in revenue to the overall economy, representing a 6 percent year-on-year increase.

Not too shabby. And not surprising given that consumers expect to be able to constantly access the latest news, entertainment, information and features from their phones, and they expect the same ability from their vehicles. As a result, infotainment solutions are becoming increasingly complex with mobile internet, traffic information, navigation, digital broadcast and streaming services all being crammed into one console- or dashboard-based system.

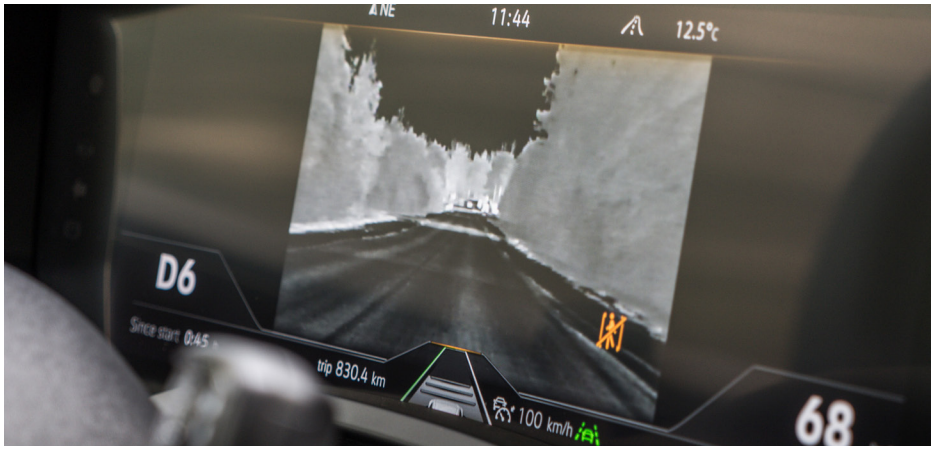
But while there's no questioning the attractiveness of seamlessly keeping up to date with your life while motoring down the highway, engineers must overcome some diabolical design challenges, namely that fact that car infotainment system design must, at once:

1) Function as a master controller for communication with portable consumer devices;

2) Have the speed and reliability to deliver information via audio/video (A/V) interfaces, touchscreens, keypads and other types of devices;

3) Interact with automotive systems to keep the driver informed about the status of brakes, engine performance, tires and other key vehicular systems.

With this intricacy has come the understanding that trying to connect systems and networks using traditional wiring approaches will be unwieldy, driving up vehicle weight, cost, and adding to the overall design complexity. In response some companies are looking to connector technologies to provide higher performance with smaller package size that automotive customers want.



As ideas go the two we will discuss here might not make automotive history, but they are the kind of things that creative engineers--who always are looking to simply design--tend to come up with. The first solution is to eliminate the need for two separate connection systems for signals and Ethernet, and the second involves creating modules that will enable the integration of multiple I/O port connection types such as USB, HDMI, Ethernet, SD Memory Cards, Auxiliary Jack inputs and more to meet end-system requirements.

Let's look at these advances in detail.

A two-in-one solution

Figure 2: stAK50h connectors deliver both signals and Ethernet networking information

Infotainment systems have traditionally relied on two separate connector systems, one for signal and one for Ethernet connectivity. Both signal and Ethernet connectivity can be processed through just one low-footprint stAK50h Unsealed Connection System interface, and in this way optimize space and design flexibility in comfort and infotainment devices. Leveraging industry-approved terminal design, the stAK50h Connector System incorporates unsealed hybrid connectors to deliver both signal and Ethernet connectivity through one connector.

The USCAR-2-compliant stAK50h is intended to expedite validation time for Tier One automotive manufacturers making design changes and launching new vehicle models. The stackable header design is meant to eliminate custom tooling, engineering, and the time typically required to validate systems in in multi-bay automotive device and module configurations.

Incorporating through-hole style unsealed headers and hybrid connectors, the single- to multi-bay stAK50h meets industry-standard footprints based on 0.50 mm, 1.20 mm, and 2.80 mm terminal sizes widely used in automotive applications. The hybrid system, available with 12- to 56-circuit receptacles, can be used in applications ranging from low-current signal (5.0 A) to high-power applications (30.0 A).

Figure 3: The Infotainment Media Module incorporates data, navigation information and audio/video content.

In automotive design, overly complex terminal design and connector interfaces within a vehicle can lead to mis-matching and faulty connections. Here the StAK50h headers and receptacles are color-matched to enable quick identification and easy assembly, while the Connector Position Assurance (CPA) latching feature prevents accidental disengagement.

Media Modules for intelligent vehicles

Recently, Molex and INVECAS have, in a joint collaboration, developed an Automotive Infotainment Media Module for intelligent vehicles. The Molex Infotainment Module optimizes a host of functional capabilities on a single solution for reduced complexity, size and cost to automotive manufacturers.

Designed by INVECAS, a provider of IP and embedded software and system-level solutions for the automotive industry and manufactured by Globalfoundries, a global full-service semiconductor foundry, the new Infotainment Media Module is a scalable all-in-one solution that incorporates data, navigation, and in-vehicle infotainment features for audio and video. Configurable for wired and wireless connectivity, it can be integrated with the vehicle head unit and/or in-dash HMI displays.

Employing USB, these media modules feature bring-your-own-device compatibility for in-vehicle data sharing and also permit multiple devices charging and operating simultaneously, such as an Android Auto running a navigation app, while an iPad streams music. The use of high-power USB Type-C connectors (up to 100W) supports fast-charging profiles and optimizes design flexibility for custom power and data requirements.

Infotainment plays an important role for car buyers and OEMs that are seeking ways to differentiate vehicle designs. Packaging more functionality into a module provides a competitive advantage. Innovation in the integration of connector technologies, providing effective communication within an intelligent vehicle network and reliably connecting consumer devices to vehicle systems and adapting to the needs of the emerging next-generation "Connected Vehicle" (V2X, incorporating V2I [Vehicle-to-Infrastructure], V2N [vehicle to network] and V2V [vehicle to vehicle] will help shape the automotive market of the future.