Ansys

CASE STUDY /

Ansys + HARMAN

"Latest-generation cockpit domain controllers contain more and more high-speed digital interfaces, such as USB3.x, Multi-Gigabit Ethernet, LPDDR5, UFS3.x, etc. These designs require the understanding and testing of complex criteria that cannot be performed reliably with traditional prototyping. Virtual testing with Ansys Siwave and Ansys HFSS allows our engineers to meet the signal integrity requirements of our automotive customers with confidence."

Frank Gitzinger
Director of Product Development, Digital Cockpit / HARMAN Automotive

CASE STUDY

Ansys Simulation Helps HARMAN Deliver Automotive Cockpit Domain Controllers of the Future

HARMAN understands how important it is for time in a vehicle to be as enjoyable and as productive as it is outside of it. By integrating next-level technological and entertainment enhancements into the vehicle, HARMAN is delivering automotive-grade consumer experiences that help make time in the vehicle time well-spent. HARMAN's work involves the seamless integration of high-speed automotive memory and other high-speed digital interfaces (USB3, PCIe Gen4) that elevate the overall cockpit experience for all occupants. Furthermore, advanced simulation technologies enable higher integration for future systems, such as central computing.

Challenges

Multiple automotive OEM projects are requiring faster rates of data transfer, high-speed digital interfaces, and next-gen memory. In this case, it's DDR5 — a synchronous, dynamic random access memory that uses less power at higher transfer rates. DDR5 elevates the performance and efficiency of next-generation automotive apps to dramatically improve 5G and artificial intelligence (AI), as well as camera and display technology. As the speed and complexity of these applications continues to increase, simulation is required to validate its design and prevent expensive, time-consuming design re-spins.

Ansys Products Used

- Ansys HFSS
- Ansys SIwave

Engineering Solution

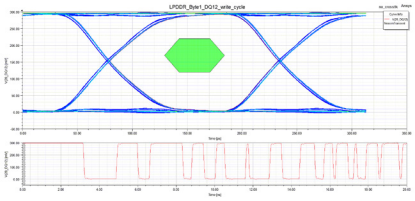
- Simulated the compute core, which is the main processor, or system on a chip (SoC), with its related memory and power supply to evaluate high-speed interfaces from the SoC to the peripheral connector, such as a display or Ethernet port.
- Used simulation to accurately analyze signal strength from the SoC to the memory, eliminating unnecessary hardware design development loops.
- Conducted a virtual probing of signals using the HFSS tool suite where it would not be possible in a physical application to verify signal timing and behavior.
- Ran complex display simulations from SoC to the sink, considering all the transitions on the PC board.
- Ensured all hardware designs met appropriate specifications for DDR5 memory, as well as HDMI display interfaces, Gigabit Ethrnet interfaces, and others.

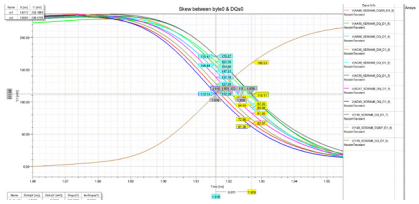
Benefits

Without simulation, test results would be very difficult to produce in a cost-effective, timely manner due to the complexities inherent to the design. Software accuracy of the simulation environment as it coincides with real physics is the key to both increase speed and reduce cost during development. Ansys simulation tools successfully supported shorter development lead times and lower costs while delivering the best electrical performance possible. Parametrization, enabled by virtual validation, is key to a scalable, stable hardware solution that supports high-performance, future-proof systems. Stable hardware is the key foundation in a world of ever-increasing software complexity.

Company Description

HARMAN (harman.com) designs and engineers connected products and solutions for automakers, consumers, and enterprises worldwide, including connected car systems, audio and visual products, enterprise automation solutions, and services supporting the Internet of Things. More than 50 million automobiles on the road today are equipped with HARMAN audio and connected car systems.





ANSYS, Inc.
www.ansys.com
ansysinfo@ansys.com
866.267.9724