Understand CAN, LIN, and FlexRay buses for automotive apps

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It used be that automobile buyers cared more about horsepower and styling when it came to figuring out what car to buy. Now it’s all about efficiency, and lately with the growth of consumer electronics, showroom battles are often won or lost based on gadgetry and electronic sophistication. In fact, it has been estimated that electronics account for approximately 25 percent of the value of today’s automobile. This figure is estimated to increase to nearly 40 percent in the future. Under the covers, all those electronics are linked together via multiple serial buses that must interact with the environment and communicate vital information throughout the entire vehicle.

Debugging and testing this type of network topology can be challenging and time consuming. It is therefore critical that electronics engineers working in the automotive industry become proficient at troubleshooting and debugging the serial bus architectures commonly used in automotive designs. These buses include CAN (controller area network) for mainstream powertrain communications, LIN (local interconnected network) for lower-cost electronics and FlexRay for higher-end applications.

This article compares and contrasts these three buses and then provides examples for debugging common problems that require the ability to decode the various network protocols and time-correlate network communication data with external events.

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