

by **Randy Frank**

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UNDER THE HOOD OF THE 2006 VOLKSWAGEN ~~GOLF~~ RABBIT

In addition to pulling a Rabbit out of a Golf, Volkswagen has a few electronic surprises in the 2006 model that goes on sale this summer. Known for offering a high level of standard features and equipment at a reasonable price, the Rabbit's electronics are connected by a high-speed (500 kps) and low-speed (100 kps) CAN as well as two local interconnect network (LIN) buses. The LIN buses lower the cost of communicating between modules. The Society of Automotive Engineers has developed SAE J2602, the North American version of LIN, but so far no North American-made vehicles have a LIN bus.

The Rabbit's standard electronic features include an advanced ABS braking system, traction control, active front head restraints, front side airbags, air conditioning, and anti-theft alarm system with remote locking.

RABBIT NETWORKS— NOT ALL ARE FAST

In the Rabbit, the CAN bus has more than 30 nodes. The high-speed

CAN bus handles engine controls for the 2.5-liter, five-cylinder engine that generates 150 horsepower. In addition, high-speed CAN connects the diagnostics, instruments and two private networks. These applications are primarily real-time controls with event-driven elements.

The low-speed CAN bus handles infotainment and convenience electronics. Items in the infotainment network include radio, radio navigation, telematics and a booster amplifier. The convenience/comfort network connects to items such as the door controller, climate controller and memory seats as well as two LIN sub-buses.

Initially introduced in high-end German vehicles with extensive electronic subsystems, the LIN bus reduces the cost of connecting components with low performance and communication requirements.

Volkswagen's initial implementation of LIN occurred in 2002. The single wire, UART-based LIN is a networking architecture developed for automotive sensor and actuator

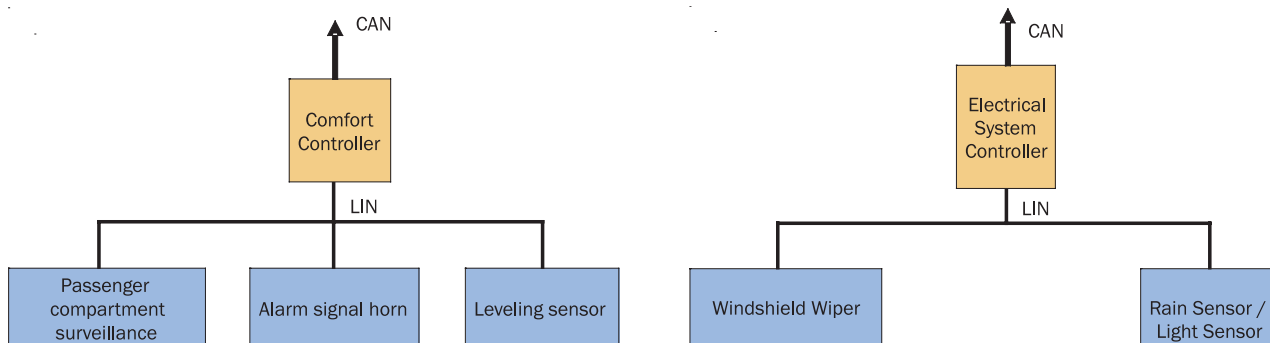
networking applications with data rates up to 20 kbps. The LIN master node connects the LIN network to higher-level networks.

In the Rabbit, one LIN bus connects the comfort controller, the gateway between the CAN and LIN buses, and acts as the LIN master. This bus connects the passenger compartment surveillance, the alarm signal horn, and leveling sensor in the anti-theft system. The other LIN network connects the windshield wiper, the rain sensor, and the light sensor. Volkswagen sees the LIN protocol taking over a significant share of communication in comfort and basic service systems.

The recent improvements in the LIN V2.0 protocol extension support higher layers with:

- slave identification;
- reconfiguration of message ID; and;
- LIN description file that enables high level tool support.

Additional advanced electronics in the Rabbit include a standard electromechanical steering system, and an optional electronic stabilization program (ESP). Today, these systems connect with high-speed CAN. In the future, Volkswagen may use FlexRay for some high-speed CAN networks, especially where safety is involved. ■



The CAN bus that connects all the vehicle's systems in the Rabbit has two LIN sub-buses from the convenience/vomfort network.