

# RFID Chip To Monitor Tire Pressure

Philips Semiconductors has unveiled a new RFID chip that will drive a system for directly measuring vehicle tire pressure.

Oct. 17, 2002 - More than 88 deaths were attributed to problems with Firestone tires on vehicles made by Ford Motor Co. Whether the accidents involving the Ford Explorer were due to underinflated tires or faulty manufacturing, the debacle has created a potentially lucrative new market for RFID products.

On Nov. 1, 2000, the U.S. Congress enacted the Transportation Recall Enhancement, Accountability, and Documentation Act, or the TREAD Act, which, among other things, required new motor vehicles from 2004 onwards to have a system that "warns the operator when a tire is significantly underinflated."

This week, Royal Philips Electronics unveiled a new "signal conditioning chip," the P2SC, for directly measuring vehicle tire pressure. The new chip is designed to broadcast at regular intervals the temperature and pressure of each tire, which can be displayed on a dashboard, either through a warning light or digital readout.

The system is designed to work with the receivers used for remote keyless entry. Antennas are installed in each wheel well. The keyless remote entry receiver, which uses rolling ID numbers to match keys to cars, is modified so that it can send out a low-frequency signal through the wheel well antennas.

The low-frequency signal "wakes up" an active (that is, battery-powered) RFID tag either in the tire valve or inside the rim of the tire. The active tag then broadcasts ? at either 315 MHz or 434 MHz -- its rolling ID number, which identifies the tire and its location and data on the temperature and pressure of that tire.

Philips does not make the entire active sensor. Instead, it produces the microchip that will communicate with the wireless remote entry receiver. A system integrator would combine the chip with a pressure and heat sensor made by a third party. The two chips would likely be mounted on a tiny circuit board with a small battery.

Philips believes that by having the chip communicate with the keyless entry receiver, the cost of implementing the tire pressure sensor will be kept down, making adoption more likely. "The whole beauty of our system is you don't have to add any hardware except the tire pressure sensors," says Jack Morgan, Philips Semiconductors' director of the automotive segment for North America. "The rest is just software adaptation for the manufacturer."

Texas Instruments also has a product for directly measuring tire pressure. It's not clear, however, whether the industry will go the simpler, less expensive route of indirectly sensing pressure through data from adaptive braking systems. This technique requires virtually no additional cost to the automakers, but the ABS system can only detect a significant drop in tire pressure (more than 25 percent, according to some people), and it can't identify the individual tire with a problem.

Several experts argued before Congress that measuring pressure directly would increase passenger safety. Proponents also argue that being able to tell when a tire is only a little low enables drivers to reduce wear on

the tire and saves on fuel.

"Philips has elected to gamble that either the market or the government will favor the direct measurement system," says Morgan. "We think the lower tire wear and fuel economy will attract people by themselves. By doing the full integration that we've done, we can allow the auto industry to get to the lowest cost implementation, which will help the process along."

Strategy Analytics agrees that direct tire pressure monitoring will likely catch on. The research firm expects the worldwide vehicle OEM market for direct tire pressure monitoring to reach 15 million systems by 2006 and more than 22 million systems by the end of the decade.

The P2SC chip can withstand shock resistance up to 2000G and temperatures of up to 175 degrees C. It sells for \$3.25 for orders of more than 1,000 units and is available in sample quantities. Volume production is scheduled to begin in the middle of next year.

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