

Infineon provides data for Ferrari F1

Ferrari will gain valuable engineering improvement knowledge through a new data logger debuting in the 2005 Formula One (F1) season.

"The existing data logger had not enough memory, not enough bandwidth for high-speed communication between different electronic control units [ECUs], and not enough high-speed analog inputs," said Andreas Pechlaner, Senior Manager of Motorsport Electronics for **Infineon Technologies**. "The main advantage of the new data logger is much more data acquisition for analysis that enables the Ferrari team to develop their next-generation racecars faster with less testing."

Infineon's data logger collects information via the bus system—which captures powertrain, chassis, tire, and aerodynamic readings from approximately 150 sensors and actuators—as well as some sensors that are directly connected through analog inputs. In development since 2003, the new data logger features some unique attributes, including its heat-management design.

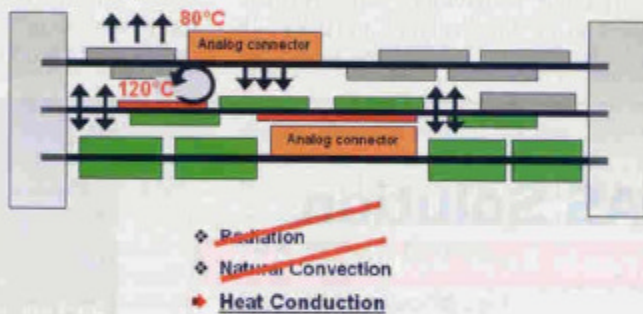
"Because of the high processor power used in the data logger, the internal heat dissipation is very strong," said Pechlaner. "You need a very efficient heat-management technology to avoid overheating under extreme harsh-environmental racing conditions, otherwise this will lead to board damage or malfunction."

While heat sinks were considered as a heat-dissipation solution, the plan was nixed because that method proved to be "too heavy, too big, and too difficult in terms of mechanical construction and integration into the board architecture," Pechlaner said. The new data logger uses two copper layers between the three printed circuit boards.

"The copper layers are dissipating the heat by heat conduction and not by radiation or by convection. This is by far the best way to manage the heat flow to the housing," said Pechlaner. "A further advantage of this new technology—developed by printed circuit board manufacturer **Schweitzer Electronic AG** and Infineon—is the even heat distribution across the entire board, which reduces the mechanical stress significantly and thus makes the system as a whole much more robust." Schweitzer Electronic holds patents on the copper-based heat and power management systems.

Because the new data logger has a very high bandwidth for high-speed communications, a much higher density of data logging is enabled. "With the old data logging system, a proper vibration analysis of the Formula One car was much more difficult to achieve," said Pechlaner, who notes that the data logger operates in an environment that is typically 80°C (176°F).

Kami Buchholz



The Infineon data logger uses two 210-nm copper layers to accomplish the internal heat dissipation needed for the three printed circuit boards to survive in temperatures up to 275°F (135°C).

"A very high degree of functionality must be integrated on a very small board package, which means you have to handle the complex functions in a very intelligent and sophisticated way with regard to board layout and circuit design," said Infineon's Andreas Pechlaner.

