All in One

G2 Microsystems has developed a chip that can locate and identify objects. It has interfaces not only for WLAN and RFID but also for special sensors.

Back in 2004, a team of experts with many years of experience in identification and tracking applications met in Sydney, Australia. Their objective was to develop a chip capable of dealing with both technologies. One of the participants, G2 Microsystems chairman John Gloekler, believed such a chip could offer huge potential. Before moving to G2, Gloekler had spent many years analyzing and optimizing global supply chains as a partner at Ernst & Young, an international consulting firm. So, by the time he joined G2 Microsystems, which is based in Campbell, California and has an R&D center in Sydney, he already knew the main questions that companies were asking: “Where is our merchandise?” and, “What condition is it in?”

Identification systems are now an indispensable part of logistics. They use reading devices to track the contents of trucks passing through factory gates. Real-time locating systems such as Moby R from Siemens use RFID tags to find a specific automobile in giant parking lots for cars. The tags send radio waves to reading devices, which take runtime measurements of the signal in order to calculate the location of the car in question.

In addition to such systems, many companies also have WLAN. Tags that are equipped with a corresponding chip can communicate their position via a WLAN access point. The advantage here is that an existing infrastructure can be used, thus eliminating the need to purchase reading devices.

In some cases RFID and WLAN operate in the same environment. However, this has required the use of two separate tags. To get around this, researchers have explored the idea of combining these. “But,” says Gloekler, “The WLAN tags that were used until recently consumed too much energy, and their batteries died after just a few weeks or months.”

But a new chip from G2 systems known as the G2C501 allows users to set up systems that reduce total lifecycle costs by up to 75 percent. The chip switches from standby to active mode very quickly, power consumption in the standby mode has been reduced considerably, and the entire power regulation process has been optimized.

In order to support tracking, the G2C501’s system platform consists of a processor with radio interfaces for RFID and WLAN. But a G2 chip can do more. “In many cases, customers not only want to know where their assets are, but also how the local environment is affecting them,” says Gloekler. They need to know about temperature, humidity, and lighting conditions, for example, and also require data on whether merchandise is stationary or in motion. All of this data can be provided by sensors linked to the system.

Text Messages from Containers. Although only recently introduced, early birds such as Finland-based Ekahau, are already working with the chip. Siemens also plans to get in on the action. “By merging RFID, positioning systems, and the properties of wireless sensor networks on a mobile platform, the new chip makes it possible to create applications that go far beyond simple identification and asset tracking,” says Marcus Bleszke from Siemens Automation and Drives.

Consider, for example, a container housing refrigerated items in a storage building. Equipped with a G2C501 tag, the container can be located in real time via WLAN. The tag in the refrigerated container is equipped with a temperature sensor — and the G2C501, with its integrated processor, can be programmed in such a way as to enable it to send a message via WLAN if the temperature exceeds a predefined level. By linking the chip with a GSM module, it could in the future even send a text message.

The idea of integrating several technologies onto one chip was so convincing that Siemens Venture Capital (SVC) decided to invest in the start-up. “We expect the market for identification and positioning systems to grow rapidly,” says Dr. Uwe Albrecht from SVC. New applications are already being created, such as employing WLAN-enabled transponders to make it easier to locate mobile machines in hospitals. Frost & Sullivan, a market research company, expects the asset-tracking market to grow at an annual rate of 23 percent over the next five years, reaching a volume of $1 billion by 2010. For his part, Gloekler firmly believes that the G2 chip will form the core of many of the systems in this market.

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