

Pharma Label Maker to Test Tags That Record Temps

The credit-card-sized 13.56 MHz tags can measure and log up to 500 temperature readings, allowing drugmakers and other manufacturers to know the temperature at which their products were stored throughout the supply chain.

By Rhea Wessel

Sept. 25, 2006—Italian startup [Montalbano Technology](#) has created a family of RFID tags that log data about the intensity and duration of exposure to modifying environmental factors such as light, temperature and humidity. The semi-passive 13.56 MHz tags are credit-card-sized and are compliant with ISO 15693 and can be read by any standard RFID interrogator.

Daniele Grosso, the general manager at Montalbano Technology in Genoa, says a German company specializing in pharmaceutical labeling will begin testing the temperature-sensing tags, which are market-ready, since its clients—multinational drugmakers—have shown interest in the technology. The tags will allow drugmakers to know the temperature at which drugs were stored at various points in the supply chain. Grosso has declined to release the name of the company but says it offers high-tech labels to the pharmaceuticals market.

Montalbano Technology was created about three years ago, after [Montalbano Industria Agroalimentare](#), a Tuscany supplier of vegetable and fish products, experimented in house with chemical and mechanical devices to control and monitor perishable products.

"At some point, they realized that the solution should have been based on microelectronics, so they set up a new technology division and split it from the company," says Grosso, who was hired from [Cadence Design Systems](#) to lead the division before the spin-off. After the spin-off, in October of last year, the new company, Montalbano Technology, worked with electronics design firm [Accent](#) to develop its products. Based in Vimercate, Italy, Accent was founded in 1993 as a joint venture between [STMicroelectronics](#) (STM) and Cadence.

"The whole design has been engineered by Accent, based on STM technology," Grosso says.

The pharmaceutical industry was the first industry to test the use of RFID tags with temperature sensors since costly drugs can spoil when stored at the wrong temperature. The food industry, where margins are much lower but volumes are much higher, shares similar problems—i.e., billions of dollars are lost each year worldwide on spoiled meat, poultry, cheese and produce. Grosso says Montalbano's tags could be used on shipments of food, cut flowers, drugs and various other perishable items.

The tags are modular, which means users can add such optional components as extra memory or extra sensors, or increase the accuracy of time measurement. The tags are also programmable, allowing users to define their own criteria for recording sensor data. For instance, a standard chip would log temperature at a defined

acquisition rate (every 10 minutes, for instance). A user, however, could program the chip's software to record only those temperatures outside of a predefined range, and to record more often if temperatures were to reach these levels—or a person might program the tag to predict the time goods might spoil.

"If you knew the curve of when a given perishable product starts to spoil, you could actually write software to predict and forecast the expiration date given the therma-profile," says Grosso.

Finally, the tags are configurable after being programmed and implemented in an application, enabling users to set basic parameters such as the data-acquisition rate (i.e., how often temperature will be logged) or temperature thresholds (the temperature range in which the tag will log data).

Montalbano is in the process of applying for a patent on its MultiTag platform, the basis for all its tags. It is called MultiTag because the basic tag design can be adapted for different purposes (such as a tag that measures vibrations, one that logs shock or one that tracks humidity).

"The concept of a low-power, single-chip platform designed for RFID applications is innovative," Grosso says. "To stress the concept, I would say that our chip is a generator of RFID products. You think of an application, you find the right sensor, you stick it on the chip and there you go—the product is done."

At the Active RFID Europe and RFID Smart Labels conference in London in mid-September, Montalbano demonstrated two different tags in its MT Sens product family: the MT Shock and the MT Vibe. The MT Shock tag is designed to monitor physical shocks that could potentially damage an object to which it is attached. The MT Vibe tag, built to measure continuous vibrations, could be applied to structures requiring regular maintenance, such as bridges or monorail tracks, due to exposure to vibrations.

Grosso said the demonstration was well received: "There were three of us at the booth, and we couldn't deal with all the people who came to ask questions."

The MT Shock and MT Vibe tags ready for production at high volumes. Two other tags in the family (MT Humidity and MT Light) have been tested in Montalbano's lab and a feasibility study is complete. No field study has been conducted.

MT Sens tags have 1.5 kilobytes of memory embedded in the chip, split between program and data memory. The latter can be expanded, but the program memory cannot. In the basic smallest configuration, the tags can store up to 500 temperature readings. However, Grosso says, the data memory tags can be expanded to log up to 16,000 temperatures.

The tags also have an onboard battery to power the chip when it acquires, selects, processes and stores sensor data. To transmit data, however, the tags depend on backscatter technology, using radio waves from the interrogator to power up the microchip and send out a signal. At present, batteries provided by [Solicore](#) give the tags a lifetime of six to 18 months. Down the road, Montalbano plans to begin using a rechargeable battery like the ones offered by [Bullith](#) or [Infinite Power Solutions](#).

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