

The Package Is the Computer

A Swedish startup has developed a low-cost, RFID-like system for embedding intelligence in packaging.

Feb. 11, 2003 - Sun Microsystems's slogan is "The network is the computer." Cypak's could be "The package is the computer."

The Swedish startup has developed a very low-cost system of embedding intelligence in product packaging. One of its first applications is for tracking compliance in clinical drug trials.

Cypak has developed blister packaging in which conductive inks are used to print circuits on the plastic bubbles that hold pills. When a patient breaks open the blister to take a pill, a microchip in the package records the date and time. This can be checked against the timing required by the drug regimen.

The packaging can also include a keypad, so patients can input information, such as whether or not they are feeling better after taking the pills. Then, when the patient visits a doctor's office or clinic, the package is placed on a close-proximity reader, and the information stored on the microchip is transferred to a PC. Certus, a drug-testing company, is currently testing the technology.

Jakob Ehrensvar, Cypak's CEO, says the technology adds a couple of dollars to the cost of blister packs. The reader costs about \$10. The reason it's so inexpensive is data can only be transmitted a quarter of an inch or less. This limits interference and enables the electronic components to be far simpler than those used in RFID readers.

Ehrensvar says he looked at RFID, but it was too expensive. Since the readers need to be given away, and each patient might need one, the readers had to be very cheap for the system to make economic sense for a drug company. Cypak developed an electrostatic communication system that requires very little power and enables the circuits and antenna to be printed with nonmetallic ink.

"We sometimes refer to our proprietary technology as RFID-lite," says Ehrensvar. "It's a short-range system, which keeps the cost, complexity and power consumption down. We really see this as complementary to RFID." (For a comparison of Cypak's technology and RFID, [click here](#).)

One key to Cypak's technology is the microcontroller has an encryption engine and can store 32 KB of data, including encryption keys, so it can ensure the integrity of data. For example, information about a clinical drug trial could be downloaded from the packaging, sent across the Internet and decrypted by a drug company's host computer.

Cypak is also looking at other applications. One is a smart card with a keypad. The system can be used for access control, where the unique identifier on the card is stored in an encrypted form. The user has to enter a PIN to activate the card, which adds an extra level of security.

Another interesting application is parcel authentication. Cypak is doing a pilot study in which the microcontroller in the parcel stores confidential data and encryption keys that are used to verify that the

package sent is the package that arrives. The system can also monitor whether the package has been tampered with or damaged. (If the printed circuits are broken when the package is dropped or opened, that would be recorded in by the microprocessor.)

Ehrensvard says Cypak is in discussions with a number of companies, but so far, none has committed to using the technology. Cypak is an engineering company and plans to develop applications, based on its technology, for larger firms.

"Our strong encryption and the low cost of the technology opens up a vast range of applications," he says. "Instead of having a hologram to check the authenticity of a CD or an envelope, you can check it electronically with enhanced security. We think that will be a big driver in the future for this technology."

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