

HP Spots New Opportunities for Passive RFID

HP Labs has developed a prototypical passive tag that's long on memory, short on range and suitable for both business and consumer apps.

By Mary Catherine O'Connor

July 18, 2006—The passive RFID tags used to track consumer products in the supply chain have often been referred to as "bar codes on steroids." This week, [HP Laboratories](#), Hewlett Packard's research arm, unveiled a prototype of a tiny tag that might be considered a passive RFID tag on steroids. This device, the Memory Spot, is a memory-rich, passive 2.45 GHz RFID transponder containing a microprocessor, can hold up to 4 megabits (500 kilobytes) of data and has a 10 megabits-per-second data transfer rate. Because the transponder operates at such a high frequency, its antenna can be small enough to be incorporated into the chip, which would lower the Memory Spot's manufacturing costs relative to tags made by attaching the chip to the antenna.

Memory Spot tags are designed to transmit large amounts of data at close range (approximately 1 millimeter), while EPC Gen 2 and other passive UHF (900 MHz) tags in the supply chain are made for transmitting small amounts of data at a distance of up to 30 feet. Howard Taub, vice president and associate director of the labs, says Memory Spot tags are not intended to compete with tags optimized for use in the supply chain. Today's EPC Gen 2 tags hold 96 bits—though plans for extended memory tags will expand that to 256 bits—and can transfer data at a rate of 640 kilobits per second.

According to Taub, the Memory Spot tag would be a good fit for a number of different business applications for tags carrying large amounts of sensitive data that should be protected and read from a short distance. These include tags embedded in passports and encoded with travelers' biometric data, or others attached to pharmaceuticals with authenticating data used to fight counterfeiting. The chip's microprocessor supports data encryption.

Recent demonstrations of the tags at HP Labs, however, have focused on consumer applications. HP showed the tag in use as a means of adding words to a photograph: an audio file of a child singing a short tune was encoded to a Memory Spot tag adhered to an image of the child. When an interrogator was brought within the Memory Spot's 1-millimeter read range, the interrogator picked up the song and played it. HP Labs is also considering how the Memory Spot—which has an adhesive backing—could be used as a digital note pad to replace or augment such documents as travel brochures and owners manuals for consumer electronics products. They could also be used as digital postcards, complete with movies and audio snippets from vacation. "These things could be sold like a book of stamps. People could peel one off, attach it to something and then add data to it," says Taub.

According to Taub, the cost of the tags will depend on the quantity HP is able to produce, as well as the business model used to sell them. Memory Tags sold as stand-alone devices would likely cost more than those sold for use in a specific consumer product, such as a camera. Still, he mentioned \$1 per tag as a possible price point for the example of Memory Spot tags being sold like stamp books.

Whether the Memory Spot will be used more broadly for consumer or business applications—and if it will

ever become a product at all—has yet to be determined. "Right now, this is a research effort," explains Taub. "[HP Labs] develops enabling technology and attempts to encourage our businesses to pick it up and run with it." Those businesses are HP's three main business arms: the imaging and printing group, which sells printers and cameras; the technical services group, which provides enterprise technology and integration; and the personal systems group, which sells personal computers, including laptops and PDAs.

Taub says HP businesses have expressed interest in seeing how Memory Spot tags might be received by its customers and which of the proposed applications are the most marketable. This is one reason HP is announcing the Memory Spot prototype. Before HP businesses can bring the Memory Spot to market, the company will first need to seek out a chipmaker and other partners, and enter into licensing agreements with them based on the IP used in the Memory Spot, which includes 50 patents filed by HP Labs. "To get this to really work, we need an ecosystem to form," says Taub.

The first building block of that ecosystem would be a device end users could use to encode data to and read data from the Memory Spot tags. Taub says these interrogators could be built into mobile devices such as handheld computers, digital cameras or cellular phones, depending on the application. He notes that HP Labs has already demonstrated the Memory Spot tags to phone makers [Nokia](#), [Motorola](#) and [Samsung](#), and that it has discussed the possibility of adding the reader-encoders to their phones.

Cell phones are currently being tested and used as RFID interrogators for near-field communication (NFC) tags operating at 13.56 MHz and based on [ISO](#) standards. Nokia is a founding member of the [Near Field Communication Forum](#), which is working to commercialize NFC technology; Motorola and Samsung are also part of the group. According to the NFC Forum site, Hewlett Packard recently became a member, as well.

Memory Spot tags not only operate at a different frequency than NFC tags, they also do not comply with the air-interface protocols used for NFC. Taub says HP is in talks with NFC members about the Memory Spot tags, but he would not go into any further details. Still, he did say that along with the need for an ecosystem of reading and encoding devices, Memory Spot technology would also need to be adopted as a global standard before it could become widely usable. "We will join standardizing groups," he says. "We'll look at licensing and partners to bring the Memory Spot to market."

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