RFID Tags

How much information can an RFID tag store?

It depends on the vendor and the application, but typically a tag carries no more than 2KB of data—enough to store some basic information about the item it is on. Companies are now looking at using a simple "license plate" tag that contains only a 96-bit serial number. The simple tags are cheaper to manufacture and are more useful for applications where the tag will be disposed of with the product packaging.

What's the difference between read-only and read-write RFID tags?

Microchips in RFID tags can be read-write, read-only or "write once, read many" (WORM). With read-write chips, you can add information to the tag or write over existing information when the tag is within range of a reader. Read-write tags usually have a serial number that can't be written over. Additional blocks of data can be used to store additional information about the items the tag is attached to (these can usually be locked to prevent overwriting of data). Read-only microchips have information stored on them during the manufacturing process. The information on such chips can never be changed. WORM tags can have a serial number written to them once, and that information cannot be overwritten later.

What's the difference between passive and active tags?

Active RFID tags have a transmitter and their own power source (typically a battery). The power source is used to run the microchip's circuitry and to broadcast a signal to a reader (the way a cell phone transmits signals to a base station). Passive tags have no battery. Instead, they draw power from the reader, which sends out electromagnetic waves that induce a current in the tag's antenna. Semi-passive tags use a battery to run the chip's circuitry, but communicate by drawing power from the reader. Active and semi-passive tags are useful for tracking high-value goods that need to be scanned over long ranges, such as railway cars on a track, but they cost more than passive tags, which means they can't be used on low-cost items. (There are companies developing technology that could make active tags far less expensive than they are today.) End-users are focusing on passive UHF tags, which cost less than 40 cents today in volumes of 1 million tags or more. Their read range isn't as far—typically less than 20 feet vs. 100 feet or more for active tags—but they are far less expensive than active tags and can be disposed of with the product packaging.

What is a chipless RFID tag?

"Chipless RFID" is a generic term for systems that use RF energy to communicate data but don't store a serial number in a silicon microchip in the transponder. Some chipless tags use plastic or conductive polymers instead of silicon-based microchips. Other chipless tags use materials that reflect back a portion of the radio waves beamed at them. A computer takes a snapshot of the waves beamed back and uses it like a fingerprint to identify the object with the tag. Companies are experimenting with embedding RF reflecting fibers in paper to prevent unauthorized photocopying of certain documents. Chipless tags that use embedded fibers have one drawback for supply chain uses—only one tag can be read at a time.

I've heard that RFID doesn't work around metal and water. Does that mean I can't use it to track cans or liquid products?

Radio waves bounce off metal and are absorbed by water at ultrahigh frequencies. That makes tracking metal products, or those with high water content, difficult. However, good

system design and engineering are beginning to overcome this shortcoming. Low- and high-frequency tags work better on products with water and metal. In fact, there are applications in which low-frequency RFID tags are embedded in metal auto parts to track them.