RFID stands for **Radio-Frequency IDentification**. The acronym refers to small electronic devices that consist of a small chip and an antenna. The chip typically is capable of carrying 2,000 bytes of data or less.

The RFID device serves the same purpose as a bar code or a magnetic strip on the back of a credit card or ATM card; it provides a unique identifier for that object. And, just as a bar code or magnetic strip must be scanned to get the information, the RFID device must be scanned to retrieve the identifying information.

**RFID Works Better Than Barcodes**

A significant advantage of RFID devices over the others mentioned above is that the RFID device does not need to be positioned precisely relative to the scanner. We're all familiar with the difficulty that store checkout clerks sometimes have in making sure that a barcode can be read. And obviously, credit cards and ATM cards must be swiped through a special reader.

In contrast, RFID devices will work within a few feet (up to 20 feet for high-frequency devices) of the scanner. For example, you could just put all of your groceries or purchases in a bag, and set the bag on the scanner. It would be able to query all of the RFID devices and total your purchase immediately.

RFID technology has been available for more than fifty years. It has only been recently that the ability to manufacture the RFID devices has fallen to the point where they can be used as a "throwaway" inventory or control device. Alien Technologies recently sold 500 million RFID tags to Gillette at a cost of about ten cents per tag.

### What can RFID be used for?

RFID tags come in a wide variety of shapes and sizes; they may be encased in a variety of materials:

* Animal tracking tags, inserted beneath the skin, can be rice-sized.
* Tags can be screw-shaped to identify trees or wooden items.
* Credit-card shaped for use in access applications.
* The anti-theft hard plastic tags attached to merchandise in stores are also RFID tags.
* Heavy-duty 120 by 100 by 50 millimeter rectangular transponders are used to track shipping containers, or heavy machinery, trucks, and railroad cars.

RFID devices have been used for years to identify dogs, for a means of permanent identification. Dog owners had long used tattoos, permanent ink markings, typically on the ears. However, these can fade with age and it may be difficult to get the animal to sit still while you examine him for markings.

Many musical instruments are stolen every year. For example, custom-built or vintage guitars are worth as much as $50,000 each. Snagg, a California company specializing in RFID microchips for instruments, has embedded tiny chips in 30,000 Fender guitars already. The database of RFID chip IDs is made available to law enforcement officials, dealers, repair shops and luthiers.

### Comparison of RFID Versus Barcodes

[RFID tags](http://www.technovelgy.com/ct/Technology-Article.asp?ArtNum=50) and barcodes both carry information about products. However, there are important differences between these two technologies:

* Barcode readers require a direct line of sight to the printed barcode; [RFID readers](http://www.technovelgy.com/ct/Technology-Article.asp?ArtNum=54) do not require a direct line of sight.
* RFID tags can be read at much greater distances; an RFID reader can pull information from a tag at distances up to 300 feet. The range to read a barcode is much less, typically no more than fifteen feet.
* RFID readers can interrogate, or read, RFID tags much faster; read rates of forty or more tags per second are possible. Reading barcodes is much more time-consuming; due to the fact that a direct line of sight is required, if the items are not properly oriented to the reader it may take seconds to read an individual tag. Barcode readers usually take a half-second or more to successfully complete a read.
* Since line of sight is required for barcodes, the printed barcode must be exposed on the outside of the product, where it is subject to greater wear and tear. RFID tags are typically more rugged, since the electronic components are better protected in a plastic cover. RFID tags can also be implanted within the product itself, guaranteeing greater ruggedness and reusability.
* Barcodes have no read/write capability; that is, you cannot add to the information written on a printed barcode. RFID tags, however, can be read/write devices; the RFID reader can communicate with the tag, and alter as much of the information as the tag design will allow.
* RFID tags are typically more expensive than barcodes, in some cases, much more so.

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