How RFID Works

An RFID system consists of two major components—the reader and the tag or card. They work together to provide the end user with a non-contact solution to uniquely identify people, animals or objects.

The reader performs several functions, one of which is to produce a low-level radio frequency magnetic field. The RF magnetic field emanates from the reader by means of a transmitting antenna, typically in the form of a coil. The magnetic field serves as a "carrier" of power from the reader to the RFID tag.

A passive RFID tag contains an antenna, also in the form of a coil, and an integrated circuit, or IC. The IC requires only a minuscule amount of electrical power to function. The antenna in the tag provides a means for gathering the energy present in the magnetic field produced by the reader, and converts it to an electrical form of energy for use by the IC.

When a tag is brought into the magnetic field produced by the reader, the recovered energy powers the IC, and the memory contents are transmitted by the tag's antenna. With Brady products, this data transmission occurs simultaneously with the gathering of energy from the antenna, minimizing the amount of time required to read a tag. In the Brady line of passive tags, the output signal is in the form of an alteration of the existing magnetic field (from the reader) surrounding the tag. This approach affords higher power efficiency. Higher efficiency translates into greater read range, as well as lower tag cost.

The electromagnetic signal from the tag is recovered by an antenna within the reader, and converted back into an electrical form. The reader contains a sensitive receiving system that is designed to detect and process the weak tag signal, demodulating the original data stored in the tag memory. Once the tag data has been demodulated, a microcomputer within the reader performs error-checking functions to verify that it has received a valid signal. The reader uses additional information stored within tag memory to perform the validation process. Once the reader has checked for errors and validated the received data, the data is decoded and re-structured for transmission in the format required by the end user's host computer system. All of these operations take place in the blink of an eye.

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RFID
SYSTEMS