PLTW Engineering

10-12/RFID - Radio Frequency Identification

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10-12/DE
Lesson: **5/13/2020**

Objective/Learning Target: Students will be able to explain what RFID technology is, how it functions, and its applications.

RFID stands for radio frequency identification system.

In the system there are 3 main parts:

- A scanning antenna
- A transceiver with a decoder to interpret the data
- A transponder - the RFID tag - that has been programmed with information.

The scanning antenna puts out radio-frequency signals in a relatively short range. The RF radiation does two things:

- It provides a means of communicating with the transponder (the RFID tag)

- It provides the RFID tag with the energy to communicate.

RFID tags do not need to contain batteries, and can therefore remain usable for very long periods of time, possibly even decades.

The scanning antennas can be permanently affixed to a surface; handheld antennas are also available.

When an RFID tag passes through the field of the scanning antenna, it detects the activation signal from the antenna.

That "wakes up" the RFID chip, and it transmits the information on its microchip to be picked up by the scanning antenna.

RFID tags can be read in a wide variety of circumstances, where barcodes or other optically read technologies are useless.

The tag need not be on the surface of the object (and is therefore not subject to wear)

The read time is typically less than 100 milliseconds
Large numbers of tags can be read at once rather than item by item.

There are two types of RFID: Active and Passive

Active RFID tags have their own power source; the advantage of these tags is that the reader can be much farther away and still get the signal.

Even though some of these devices are built to have up to a 10 year life span, they have limited life spans.

There are two types of RFID: Active and Passive

Passive RFID tags, however, do not require batteries, and can be much smaller and have a virtually unlimited life span.

RFID technology has been in use since World War II, the demand for RFID equipment is increasing rapidly, in part due to mandates issued by the U.S.

Department of Defense and Wal-Mart requiring their suppliers to enable products to be traceable by RFID.

Applications that currently use barcode technology are good candidates for upgrading to a system that uses RFID or some combination of the two.

RFID offers many advantages over the barcode, particularly the fact that an RFID tag can hold much more data about an item than a barcode can.

In addition, RFID tags are not susceptible to the damages that may be incurred by barcode labels, like ripping and smearing.

There are additional uses for RFID technology

Animal tracking tags that are the size of a rice grain can be inserted under the skin.

RFID devices are being embedded in musical instruments to deter theft.

RFID tags attached to a leg of lamb could report on the temperature readings of the past 24 hours, to ensure that the meat was properly kept cool.

The proportion of "scan-it-yourself" aisles in retail stores will increase. Eventually, we may wind up with stores that have mostly "scan-it-yourself" aisles and only a few checkout stations for people who are disabled or unwilling.

1. What does the acronym for RFID stand for?
2. Name the 3 main parts of an RFID system.
3. Do RFID tags need to contain batteries?
4. How long does it take for a scanner to read an RFID tag?
5. Name the 2 types of RFIDs.
6. How long has RFID technology been in use?
7. List 4-5 applications and 1-2 future uses for RFID technology.

RFID explaination

RFID Examples and uses

Youtube video of RFID technology explained