A Review of RFID Technology

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Abstract

Radio frequency identification is a wireless technique that uses the radio waves to identify the object uniquely. RFID Tag and Reader are two component of the RFID System. Tags are used to store the information on a microchip about the object and Readers read information that stored in microchip when a object with a tag comes in the range of the Reader. Then both reader and tag communicate with each other. This paper provides the information about that in which various field RFID Technology is used in this also given about the part of RFID.

Keywords: RFID, RFID Tag, RFID Reader, Frequency.

INTRODUCTION

RFID stands for Radio frequency identification. It is wireless system that consist a tag, antenna, reader and a server. RFID is working same as bar code .it provides unique identification. In a barcode we need line of sight reading but RFID remove this. In RFID reader reads the information from the tags that are within range of the reader. This is a technology that uses radio waves to identify the objects uniquely. It is a wireless technology for finding the object. There is no require light of sight. RFID system use may be different frequencies. but common are (around 125 KHZ),high(13.56 MHZ), and ultra high frequency or UHF(800-900 MHZ) .Low frequency tags are cheaper than ultra high frequency tags. but ultra high frequency provide better range and faster data transfer.

RFID frequencies classification :

1 Low frequency RFID

2 High frequency RFID

3 Ultra high Frequency RFID

1 LF RFID

The LF band covers frequencies from 30 KHz to 300 KHz. Typically LF RFID systems operate at 125 KHz, although there are some that operate at 134 KHz. This frequency band provides a short read range of 10 cm, and has slower read speed

than the higher frequencies, but is not very sensitive to radio wave interference.[1]

2 HF RFID

The HF band ranges from 3 to 30 MHz Most HF RFID systems operate at 13.56 MHz with read ranges between 10 cm and 1 m. HF systems experience moderate sensitivity to interference.[1]

3 UHF RFID

The UHF frequency band covers the range from 300 MHz to 3 GHz. Systems complying with the UHF Gen2 standard for RFID use the 860 to 960 MHz band. While there is some variance in frequency from region to region, UHF Gen2 RFID systems in most countries operate between 900 and 915 MHz[1] [2]

Components of an RFID System

1 RFID tags

2 Readers

3 Antenna

4 Server

1 RFID tag

An RFID tag contain two things in the tag , one is microchip and second is antenna. Microchip contain the information that information that use for uniquely identification object ,a product price ,date of manufacture a product etc. how much information contains in a tag depends upon how Much that tag is expensive. if the tag is "dump" tags these have little memory and processing capabilities. On the other hand if "smart" tag then these can store more data and has more processing capabilities. Tags are various size. A small tag is smaller than grain of rice and big As deck of playing cards.

We have three type of tag that given below.

Types of tags

1 Passive tag

2 Active tag

3 Semi Passive tag

1 Passive tag

Passive RFID tags don't have an internal source of power. There is an electrical current that is created in the antenna by the incoming radio frequency signal from the reader. This means that the antenna has to be able to collect power from the incoming signal and also transmit the outbound signal to the reader. A passive tag can respond with identification numbers or non-volatile storage data. It can be read from about 10 cm to a couple of meters and since they don't have to have a power source on the device, they can be extremely small.

2 Active tag

Active RFID tags have their own internal source of power. This type of tag are used his own power for sending a information. These tags are usually more reliable than passive tags because these tag are always sends his information. They also have a stronger signal because of their built-in power supply. This also allows them to work in places that passive tags wouldn't be able to, such as in water(which would include humans and other animals), metal, or from longer distances. They are however, larger and more expensive than passive tags. Today, active tags can transmit from hundreds of meters and their batteries can last for about 10 years. Some active tags contain different sensors that can read things like temperature, humidity, and radiation.[3][7]

3 Battery-Assisted Passive (BAP) tag

Battery-Assisted Passive (BAP) tags have an internal power source like active tags, but it only powers the integrated circuit and doesn't send a information to the reader. The radiofrequency identification is used to sending information like a passive tag.

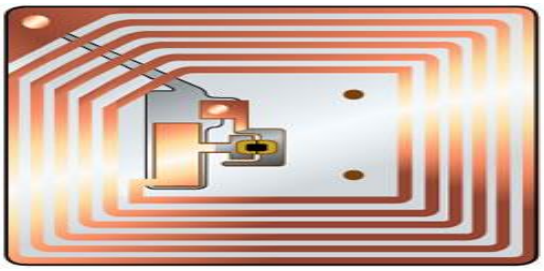

Fig:1 Internal Structure Of Tag

2 Readers

A radio frequency identification reader (RFID reader) is a device that used to collect information coming from the tag, which is used to identify the each objects. Radio waves are used to transfer data from the tag to a reader. An RFID reader's function is to interrogate(Reciver) RFID tags. The means of interrogation is wireless and because the distance is relatively short; line of sight between the reader and tags is not necessary. The transmitter consists of an oscillator to create the carrier frequency; a modulator to impinge data commands upon this carrier signal and an amplifier to boost the signal enough to awaken the tag. The receiver has a demodulator to extract the returned data and also contains an amplifier to strengthen the signal for processing.[4]

Fig.2 :-Reader

USES OF RFID

RFID systems use radio waves at several different frequencies to transfer data. In health care and hospital settings, RFID technologies include the following applications:

- Inventory control
- Equipment tracking
- Out-of-bed detection and fall detection
- Personnel tracking
- Ensuring that patients receive the correct medications and medical devices
- Preventing the distribution of counterfeit drugs and medical devices
- Monitoring patients
- Providing data for electronic medical records systems
- TAG READER COMMUNICATION
- To read the information in the tag there is a communication needed between the tag and the reader. During this communication the information stored in the tag is read by the tag. The reader transfers this information further to the computer system so that this information is used for application. The communication is represented by the following diagram

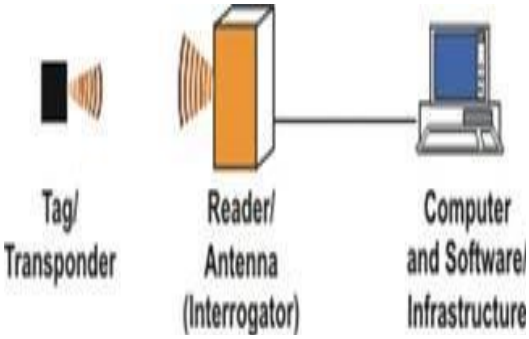

Fig.3:- Tag Reader Communication [8]

There are following steps in this communication

- The reader transfer the radio waves in its range
- If there is any tag in the range of the reader, the energy of the RF wave is received by the antenna of the tag.
- The antenna amplify this energy and passed it to microchip
- This energy activates the internal circuitry of the tag and tag respond by passing the information stored in the tag to reader

- The reader receives this information and passes it computer system attached with it.

Conclusion

The paper gave an overview of the that in which areas RFID technology is used. RFID is a wireless technology that can be used in our in the daily life to solve the problems. The versatility of RFID can be used in various areas. A low cost RFID Based system so it can be successfully developed. The RFID the system can provide several benefits over the conventional method of problem solving. Even though number of limitations and unresolved issues but RFID technology has number of applications. So RFID can be used to solve the number of problems of Transport system. It can make travel safer and less time-consuming, and easier.

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