



RADIO FREQUENCY IDENTIFICATION AND ITS APPLICATION

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ABSTRACT : Radio frequency identification network is becoming so popular nowadays because of its reliability and security that it provides in wireless communication between RFID tag and system . RFIDs came into existence during II World War which was developed by British and was named IFF(Identification friend and foe) since then many modifications has been made in this technology and today this technology has wide range of application in supply chains , cash cards , airplanes , animal tagging etc . RFID is one of the most common used technology in today's world reason being less interference of human being which enhances the rate of Data computation and reduces the chances of error . As this technology came into existence about 50 years ago only due to which it provides us with numerous research opportunities as well as risk .Objective of this paper is to present an introduction about RFID technique and its application .

Keywords: Radio Frequency Identification .

I .INTRODUCTION

The RFID(fig1) is an automatic identification system where RFID stands for radio frequency identification in which a unique ID is being provided to a tag and with help of this ID detailed information about an object is retrieved from database .The process of communication between tag and system is via radio wave due to which the process is known as radio frequency identification . RFID was developed to replace bar codes as bar codes has a limitation of LINE OF SIGHT which means that the bar code is need to be placed under scanner for reading where as in case of RFID tag you need not place in some particular direction once the tag comes in the range of RFID scanner it could be scanned easily this is the reason why it became so popular in supply chains and pharmaceutical companies . RFID tag(fig 1) consists of a simple antenna , a transponder and memory chip which consists of ID information . when this transducer is exposed to electromagnetic waves than it enable a special rfid reader to retrieve information once RFID is verified this object profile could be retrieved from Database management .

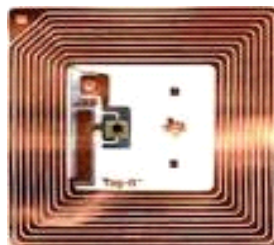


fig.1
RF tag

II.WORKING OF RFID

A RFID operates with radio waves . Magnetic or electromagnetic fields are used for data exchange between radio frequency transponder and reader . the components of RFID are :

- Tag - Transponder
- Reader- transceiver

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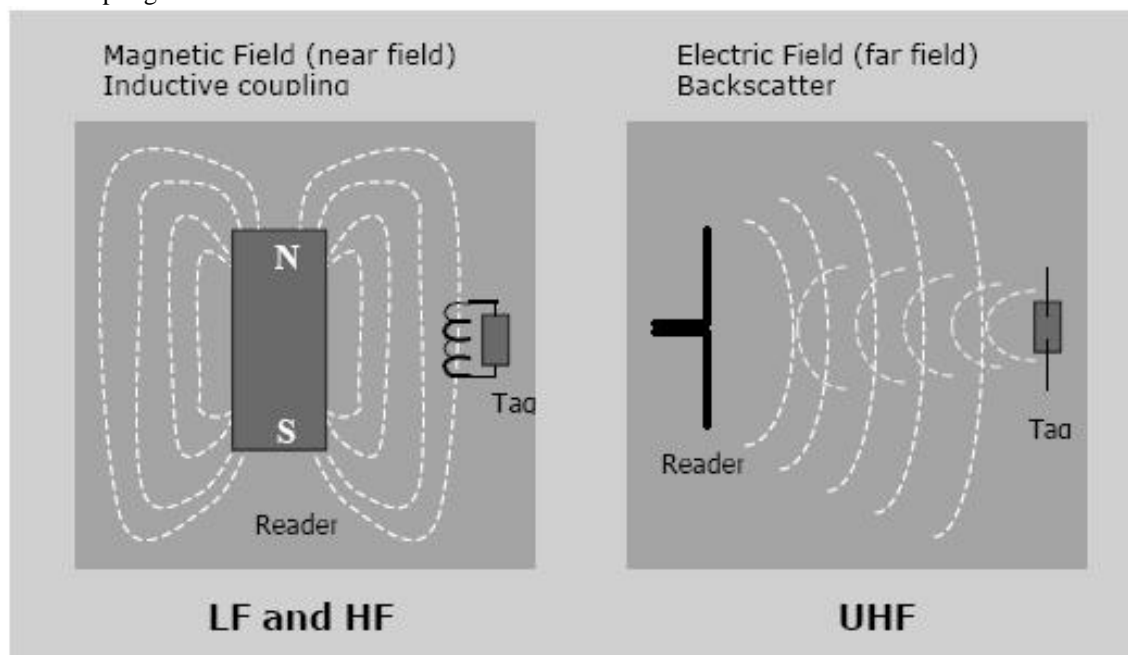
- Backed Database

Tag or Transponder :

Transponders may be either active or passive. Active transponders have an on-tag power supply (such as a battery) and actively send an RF signal for communication where as passive transponders obtain all of their power from the RF signal of the transceiver and either reflect or load modulate the transceiver's signal for communication. It consists of a microchip for computation and storage. This chip carries a unique ID. These chips are typically programmed during their contact testing phase at time of fabrication and an antenna which is designed for either magnetic field or electromagnetic field depending upon its application. When these tags are exposed to a field then it provides a receiver with ID with help of which data is retrieved from Database.

Reader or Transceiver :

Reader consists of a RF receiver, control unit and antenna. Reader is used to provide command to tag. Readers are basically of two types depending upon the type of frequency they use. One is Inductive Coupling and the other is Backscatter Coupling.



Backed Database :

once the reader traces the transponder ID then connectivity is being established via ethernet which further connects the RFID to the central server which consists of a predefined database. In this database the detailed information of product is stored.

The functioning of RFID could be explained as follows with help of following block chart.

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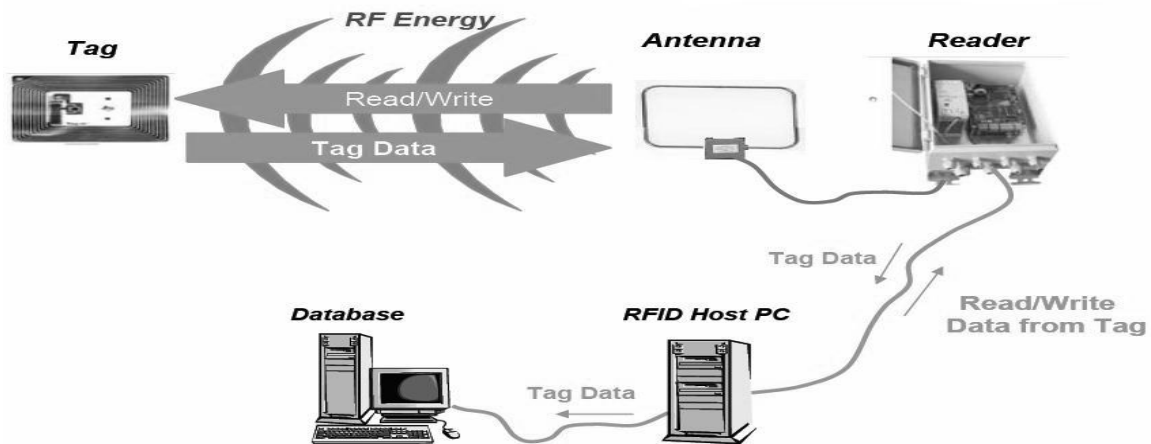


Fig. 2
working of RFID

III. VARIOUS FREQUENCY RFID TAGS

RFID tags are broadly divided into three respective frequency bands:

- Low frequency (30-500KHz)
- High frequency (10-15MHz)
- Ultra High Frequency (850-950MHz, 2.4-2.5GHz)

The low frequency tags are less expensive as that of other two and these tags have least effect of fluid presence or metal but

The disadvantage of these tags is their range they have very short range in which they can respond this problem could be overcome by using High frequency range tags which are expensive as that of low frequency tags but can respond from far distance with higher transmission rate. The ultra high frequency bands have highest range of all tags. Its range vary from 3-6 meters for passive tag and 30+meters for active tags.

IV. STANDARDS

As RFID tags being used for wide applications so different tags are required with different specifications for various applications for this purpose we have provided various standards to these tags some of the standards are listed as follows ISO 11736, ISO 11785, ISO 14223, ISO 10536, ISO 14443, ISO 15693, ISO 18000.

V. SECURITY

Security is one of the most crucial aspect of related to wireless communication. RFID provides many security benefits that is why it has wide application in Airlines passenger and baggage tracking and comes in range of transceiver than Keyless entry system. RFID tags contain quite essential information, so these tags must not compromise with privacy of holders information and this information must not be leaked to unauthorized user for this purpose only we use following techniques:

- TAG KILLING :

In tag killing the privacy of consumer is protected by deactivating the tag, this process of deactivating tag is known as to "KILL" the tag. Killing of tag is done before handing over the product to consumer. A killed tag is truly dead and can never be reactivated.

- ACTIVE JAMMING :

Active jamming is physical means of shielding tag from view. The consumer could carry a device that blocks



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radio signals in order to prevent the connectivity between tag and any near by RF reader source .

- TAG SHIELDING :

Here, tag is being placed in container made of metal mesh or foil ,this container do not allow RF wave to penetrate it and it blocks the connectivity between reader and tag . This cage is known as Faraday cage .

- HASH LOCKING :

In hash lock technique , tag is being locked by user by first selecting key at random , then computing hash value of key .The hashed output is designated as "MetaID" and this MetaID is stored on tag which toggles the tag into locked state .

The key and MetaID is stored in database. To unlock a tag, the owner first queries the MetaID from tag and uses this value to lookup into data base . The owner transmit key value to tag which hashes the received value and compare it with stored MetaID if it matches than tag unlock itself and information is made available to user.

VI.APPLICATION

RFID has wide range of application in various fields and these applications are stated as follows

- IN AUTOMOTIVES :

Automation companies use RFID for taking their cars in order to provide them security from thieves .A RFID tag is being placed in car and this RFID tag when it could be traced .

- IN SUPPLY CHAINS :

Some big supply chains like Walmart use RFID for keeping up record of their product in market and also these RFID tags are being used for storing details of the product which include the product description about its shape, size, colour ,model number , date of manufacturing etc.

- IN TRACKING ANIMALS :

RFID tags are becoming more popular in animal tracking in which a collar is placed around the neck of animal and it consistently emit a radio frequency which could be easily traced via receiver . these collars consist of all information about vaccine, weight, details of blood sample etc

- ASSET TRACKING :

Assets such as jewelry, watches ,currency etc could also be tracked via RFID system in which tag is being placed in assets , and via reader we could trace the path of these assets .

VII. FUTURE PROSPECTIVE

As , RFID is new technology so there is vast source of research and development in this field some of the projects that could be achieved in future are stated as below :

- "Smart" products

Clothing, appliances, CDs, etc. tagged for store returns these tags contain detailed description of products .

- Smart appliances

- Refrigerators that automatically create shopping lists

- Closets that tell you what clothes you have available, and search the Web for advice on current styles,

etc.

- RFID-enabled mobile phones (e.g., Nokia):

Scan movie poster to learn show times Scan consumer product to get price quotes

- Recycling :

this system would automatically separate plastic from the waste .

VIII.LIMITATION

- Till today there are no certain standardized protocols that are being introduced related to the RFID transfer due which different countries use different frequencies for communication between device and tag .
- A thief could create a duplicate tag with the same EPC number and return a forged item for an unauthorized refund .
- privacy is another issue as if somehow the consumer would be able to get active RFID tag then valuable information of owner could be leaked.



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IX.CONCLUSION

As many reforms have been made in RFID technology but still it is feild which has many resarch and devlopments need to be made .so by this paper I just want make large popullation aware of this technology .

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