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# Radio Frequency Identification (RFID) for Libraries

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**Abstract**

*RFID technology is a best solution for securing our library resources, and handling all the routine works of library Centers. RFID technology is automated materials that can move library materials and sort them by category into separate amount of staff time required to ready materials for re-shelving.*

*Author has described in this paper about the History of RFID, Types of RFID, Various components of RFID, Benefits of RFID Technology in Library and RFID used in Libraries.*

***Keywords: -*** *RFID, Security system RFID tags, RFID Technology*



## Introduction

Radio Frequency Identification (RFID) is the technology that is stated to replace barcodes in library applications. It is form of identification that is contact-less and does not require line of sight. The technology, though new to libraries, has been in use in other sectors for more than 2 decades. The RFID tags are placed in books and generally covered with a property sticker. Antennas of different sizes, based on application, are used to read the tags and manage the various library functions.

***What is RFID?***

Radio Frequency Identification (RFID) is a short range communication Technology. This RFID is used to describe technologies using radio waves to identify people or objects automatically. RFID technology similar to the bar code identification systems.

***History of RFID:-***

Radio frequency identification (RFID) system is a wireless technology. It is a new technology for libraries security system. But RFID system has been existence other sector more than 35 years ago. They have been extensively used for radio tracking application such as ticketing a public transport on motorway tollgates and in recent years, it is used many industry and academic organization.

| Decade | Event |
|---|---|
| 1941- 1950 | Radar refined and used, major World War II Development effort.<br>RFID invented in 1948. |
| 1951- 1960 | Early explorations of RFID technology,<br>Laboratory experiment. |
| 1961- 1970 | Development of the theory of RFID.<br>Start of applications field trials. |
| 1971- 1980 | Explosions of RFID development.<br>Tests of RFID accelerate.<br>Very early adopter implementations of RFID. |
| 1981- 1990 | Commercial applications of RFID enter mainstream. |
| 1991- Present | Emergence of standards.<br>RFID widely deployed.<br>RFID becomes a part of everyday life. |

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***Different types of RFID:***

The primary frequency bands are being used for **Low Frequency (125/134 KHz) –** Most commonly used for access control, animal tracking and asset tracking.

**High frequency (13.56 MHz) –** Used where medium data rate and read ranges up to about 1.5 meter are acceptable. This frequency also has the advantage of not beings susceptible to interference from the presence of water of metals.

**Ultra High Frequency (850 to 950 MHz) –** Offer the longest read ranges of up to approximately 3 meters and high reading speeds

***Components of an RFID System:-***

RFID is a generic term for technologies that use radio waves to automatically identify on objects.

**1. An Antenna –**It is conduit between RFID tags and the reader. RFID antennas emit radio waves that activate RFID tags as they pass through the activation field. After a tag is activated, it can send information or receive information from the PC through the reader.

**2. Tags:-**The heart of the system is the RFID tag, which can be fixed inside a book's back cover or directly onto CDs and videos. This tag is equipped with a programmable chip and an antenna.

**2. Reader or Transceiver** -When the tag passes through the field, the information stored on the chip in the tag is interpreted by the reader and sent to the server. These are radio frequency devices designed to detect and read tags to obtain the information stored thereon. The reader powers an antenna to generate Radio frequency field. When a tag passes through the field the information stored on the chip in the tag is decoded by the reader and sent to the server, after checking the circulation database, turns on an alarm if the material is not properly checked out.

**3. Server or Docking station -**It is the communications gateway among the various components. It receives the information from one or more of the readers and exchanges information with the circulation database. Its software includes the APIs (Application Programming interface) necessary to interface it with the automated library system.

***Optional Components:-***

Optional RFID system includes the following three components-

**1. RFID Label Printer**
**2. Handheld Reader**
**3. External Book Return**

An RFID printer is used to print the labels with an individual barcode, library logo, etc. When the print is applied, it simultaneously programs the data in to the chip. After this process, the RFID label is taken from the printer and applied to the book.

***Benefits of RFID Technology in Library:-***

- Reliable borrower self-checkout.
- Immediate and consistent borrowers self-check in.
- Circulation staff free for other library tasks.
- Reliable knowledge of stock locations (i.e. checked in or checked out).
- Financial- reduces costs of replacing stock.
- Labour savings on inventory processes, filling holds lists, shelf reading and correction processes, etc.
- Satisfaction with correct and reliable shelving order.
- Lower labour costs on * Check in processes *re-shelving *holds pickup
- Higher staff job satisfaction
- Financial *Cost of qualified staff exploited with increase in added value work.

***RFID Advantage for Libraries:***

- Rapid charging/discharging
- Theft detection
- Stock Verification
- Self-Charging /Discharging
- Automated Materials Handling

***Disadvantages of RFID Systems:***

- High Cost
- Lack of Interoperability
- Vulnerability to Compromise
- Removal of Exposed Tags
- Exit Sensor Problems
- Perceived invasion of Patron Privacy

***RFID used in Libraries:***

Using RFID in libraries saves library staff's time by automatizing their tasks. An establishment that uses RFID library management saves a book reader, precious time that he would have been spent, waiting for his turn in a queue for borrowing or returning a book. Taking care of books and making them available to the book readers are important tasks. Most of the library staff's time is spent in recording information of incoming and outgoing books. Borrowing and returning of books can be fully automatized with the help of self-check-in/out systems. This system involves installation of special software.

***Conclusion:***

RFID plays is vital role in libraries with new technology. Today libraries need to upgrade present traditional Systems with new and latest available

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technology for reduce the workload and provide the faster and better RFID Services to the library users. RFID helps to automate this process and provides an opportunity to better utilize their time in serving patrons.

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