Radio-Frequency Identification (RFID) Technology use a Model Library Feature in World: An analysis

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Abstracts:

Library consist intellectual capital it might be scholarly journals, books, reports, theses etc. For security purpose, the goal of the security system should be to provide a safe and secure facility for library employees, library resources and equipment and library patrons. At the same time due to application of security system, that promise to increase efficiency, productivity and enhance user satisfaction. Considering the importance of library security, the present paper concentrates on application of RFID technology in libraries, its components, benefits and role of librarian are described.

Keywords:

RFID, Library Security, Radio waves, Security System, Tag, Theft detection.

Introduction:

RFID means Radio frequency identification i.e. the technology that uses radio waves to automatically identify individual items. The objective of any RFID system is to carry data in suitable transponders, generally known as tags and to retrieve data, by machine readable means, at a suitable time and place and to satisfy particular application needs RFID is one of the most technologies being adopted by both industry and academic world. Modern academic library is a place where millions of books advanced; periodicals, CDs, DVDs and other electronic reading materials are contained. It is a challenge to manage for librarians, managing such type of huge collection. RFID technology is in use since the 1970s. RFID tags can be active, semi-passive and passive. It is a small device that can store information. Passive tags don't have internal batteries. RFID reader is a device that can receive and transmit a radio signal. It is built to encode data stored in the tag's microprocessor. Because of the higher cost, active and semi-passive RFID tags are used for valuable asset tracking. The passive RFID tags are used in RFID library management systems. RFID library management, using RFID tags library, is easy and convenient. A RFID library management system consists of books, each attached with an RFID tag, RFID reader, computer network and software. Library staff handle lending, returning, sorting, tagging etc. of books, using RFID tags in this library system. A person can locate RFID library books marked with a RFID tags, using the RFID reader which identifies and locates the book. When the book is carried to the counter, the library staff can either activate or deactivate the electronic article surveillance bit in the book's tag. If a book is borrowed, then the surveillance bit is deactivated.

Library RFID Management System
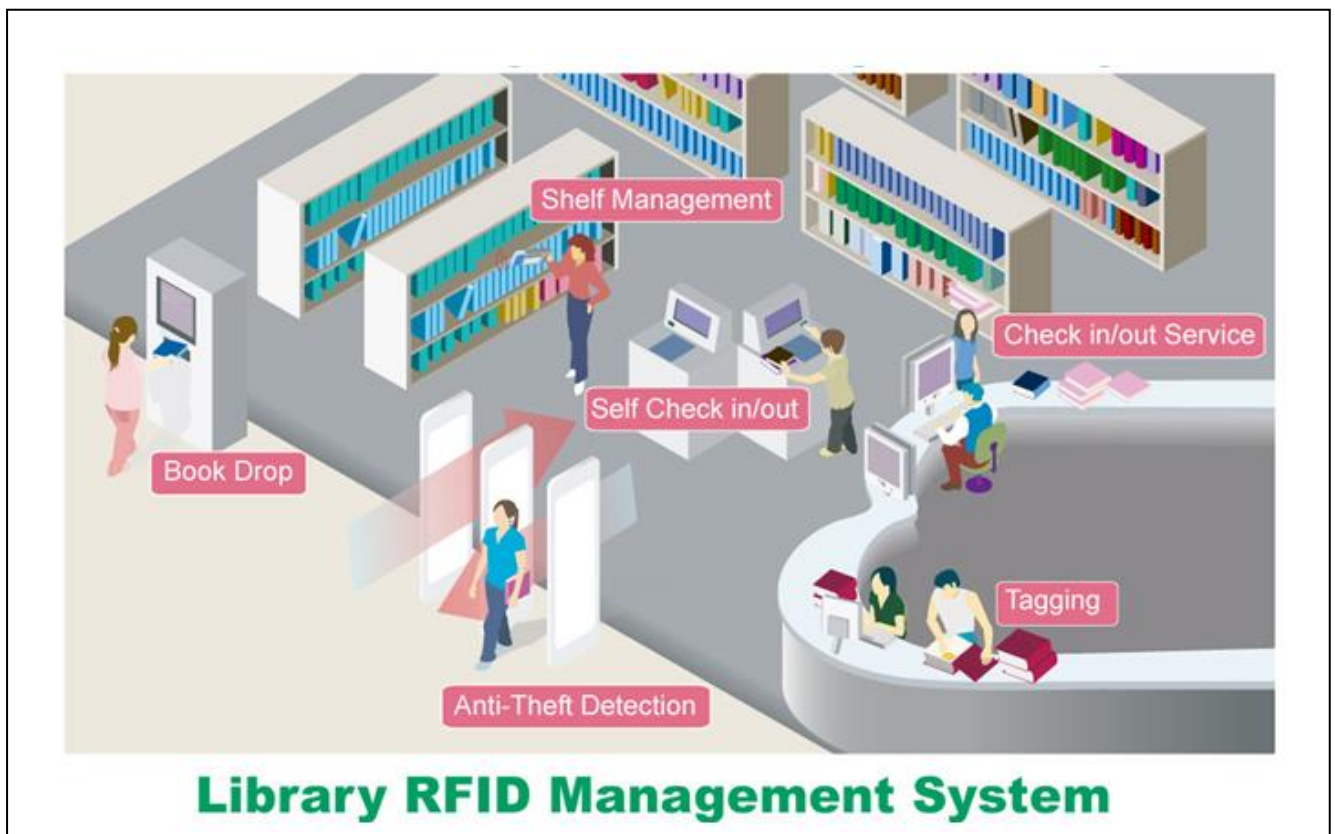
RFID Library Management System:

         Using RFID in libraries saves library staff's time by automatzing 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. A person using this system to borrow books, is presented with options on a computer screen. The person has to identify himself with a code, which is preferably a personal identification number, or any form of unique identity code. Books selected by the person are identified by the system's built-in RFID reader. And, the surveillance bit in the book's tag is deactivated by the system. When a book is returned, the check-in/out system activates the surveillance bit.

Role of Librarian:

         RFID technology introduces an ethical dilemma for librarians. The technology allows for greatly improved services for patrons especially in the area of self check out, it allows for more efficient use of professional staff, and may reduce repetitive stress injuries for library workers. And yet, the technology introduces the threat of hot listing and tracking library patrons. Librarians have taken extra steps to ensure that law such as the USA PATRIOT act can not be used by government entities to invade the privacy of their patrons, and yet many of those same libraries are placing traceable chips on their patron's books. Libraries have traditionally acted to protect and defend 5the privacy of their patrons and yet some are implementing a technology before proper safeguards have been developed. Library use of RFID technology serves to legitimize the technology in the eyes of the community. Therefore, it is incumbent on the library community to ensure that the

technology is developed in concert with established privacy principles and that any library use of RFID follows best practices guidelines consistent with library values.

Disadvantages of RFID in Libraries:

1. High Cost
2. Frequency Block
3. Chances of removal of exposed tags exit gate sensor problems
4. User Privacy concern
5. Reader collision
6. Tag collision
7. Interoperability

Advantages of RFID in Libraries:

The use of RFID reduces the amount of time required to perform Circulation operations. The most significant time saving with bootable to the fact that information can be read from RFID tags much faster than form barcodes and that served items in the stack can be read at the same time.

1. Self charging discharging
2. Reliability
3. Streamlined Inventory Management
4. Longitivity of Tag life
5. Faster Circulation
6. Reduction in workplace injuries
7. Automated materials handling
8. Easy stock verification
9. Theft reduction
10. High level of security
11. Mis-shelve easy identification
12. External Book Return
13. Improved tracking of high value items
14. Reduce Shrinkage errors
15. Technology standards to drive down cost
16. Reduce materials cost and handling
17. Automated issue/return
18. Automated sorting of books on return
19. Inventory visibility accuracy and efficiency
20. Improved Production planning
21. Ability to manage the expenses over a number of years.
22. RFID tags are very simple to install/inject inside the body of animals, thus helping to keep a track on them. This is useful in animal husbandry and on poultry farms.
23. RFID technology is better than bar codes as it cannot be easily replicated and therefore, it increases the security of the product.
24. Barcode scanners have repeatedly failed in providing security to books and journals in libraries. But nowadays, RFID tags are placed inside the books and an alarm is installed at the exit doors.
25. The RFID tags can store data up to 2 KB whereas, the bar code has the ability to read just 10-12 digits

Benefits of RFID use in Library:

1. RFID improves library workflow by
2. reducing non-value added work processes

3. Improves staff productivity
4. Improves customer service
5. Assist inventory check with ease.
6. Easy book identification for shelving process
7. Assist traceability of book allocation
8. Enhance book return processes by full automation of check-in, EAS activation and system updates completed simultaneously in the self-return chute
9. Allow better accuracy in book collection management, resulting in reduced book purchase
10. More than one item can be checked out or checked in at the same time.
11. Items can be placed on reader without careful placement that it is required for line of sight system (bar code scanner)
12. Faster inventory process.
13. Ability to locate specific items.

Application in RFID Library Management System:

Book Drops: The Book Drops can be located anywhere, within or outside the library. Possible remote locations outside the library include MRT/train stations, shopping centers, schools, etc. This offers unprecedented flexibility and convenience of returning library items at anytime of the day, even when the library is closed.

RFID Transponder or Tagging: It is the most important link in any RFID system. It has the ability to store information relating to the specific item to which they are attached, rewrite again without any requirement for contact or line of sight. Data within a tag may provide identification for an item, proof of ownership, original storage location, loan status and history. FID tags have been specifically designed to be affixed into library media, including books, CDs, DVDs and tapes.

Counter Station is a staff assisted station on services such as loan, return, tagging, sorting and etc. It is loaded with arming/disarming module, tagging module and sorting module. Arming/Disarming module allows EAS (Electronic Article Surveillance) bit inside the tag of the library material to be set/reset so as to trigger/not trigger the alarm of the EAS gate.

The Patron self check-out station: It is basically a computer with a touch screen and a built-in RFID reader, plus special software for personal identification, book and other media handling and circulation. After identifying the patron with a library ID card, a barcode card, or his personal ID number (PIN), the patron is asked to choose the next action (check-out of one or several books). After choosing check-out , the patron puts the book(s) in front of the screen on the RFID reader and the display will show the book title and its ID number (other optional information can be shown if desired) which have been checked out.

Shelf Management: This solution makes locating and identifying items on the shelves an easy task for librarians. It comprises basically of a portable scanner and a base station. The solution is designed to cover three main requirements:

1. Search for individual books requested
2. Inventory check of the whole library stock
3. Search for books which are miss-helved

Anti-theft Detection: RFID EAS Gates is the anti-theft part of the Library RFID Management System using the same RFID tags embedded in the library items. Each lane is

able to track items of about 1 meter and would trigger the alarm system when an un-borrowed item passed through them. The alarm will sound and lights on the gate will flash as patron passes through with the un-borrowed library material.

Important points based on RFID Library Management System:

1. RFID tags replace both the EM security strips and Barcode.
2. Simplify patron self check-out / check-in.
3. Ability to handle material without exception for video and audio tapes.
4. Radio Frequency anti-theft detection is innovative and safe.
5. High-speed inventory and identify items which are out of proper order.
6. Long-term development guarantee when using Open Standard.

COMPONENTS OF AN RFID SYSTEM

RFID system has mainly components:

1. RFID tags / transponder that are electronically programmed with unique information
2. Readers or Sensors to query the tags.
3. Antenna.
4. Server on which the software that interfaces with the integrated library software is loaded.
5. RFID Label Printer
6. Handheld Reader
7. Self Check Unit
8. External Book Return
9. Staff and Conversion Station

Tags:

RFID tag is the heart of the system is the RFID tag, which can be fixed inside a book's back cover or directly onto CDs and vidios. This tag is equipped with a programmable chip and an antenna.Each paper thin tag contains an engraved antenna and a microchip with a capacity of at least 64 bits. These are three types of tags 'read only', 'WORM', and 'read/write'. Tags are read only if the identification is encoded at the time of manufacture and not rewritable 'WORM' (write once read many) tags are programmed by the using organization, but without the ability to rewrite them later 'Read/Write tags' which are chosen by most libraries, can have information changed or added. In libraries using RFID is common to have part of the read/write tag secured against rewriting e.g. the identification number of the item.

Readers:

A receiver device called as reader detects the signal as soon it enters into its radio range and decodes the number for interpretation; Reader interrogates the tags and offers optimum reading performance enabling instant data capture when passed alongside the items in a continuance movement. The devices used within the building are usually called 'readers' while the ones used at building exits are usually called 'sensors'.

Antenna:

An antenna is connected to the reader to help to process identification of the items and activate/deactivate the tag antitheft function simultaneously. Additional antenna can be added to increase the number of item processed in case of larger transactions.

Server:

The server is the heart of some comprehensive RFID systems. It is the communication gateway among the various components. It receives the information from one or more of the readers and exchange information with the circulation database. Its software include the SIP/SIP2 (session initiation protocol), APIs (Application Programming Interface) NCIP or SLNP necessary to interface it with the integrated library software.

RFID Label Printer:

Used to Print the labels

Handheld reader:

It can be moved along the items on the shelves without touching them. It used in stock verification, used in search for book-miss shelved, search for individual book on request.

Shelf Check Unit: Users identification is done with an RFID-ID card. Users can put item onto the reader surface in front of the self check unit to be registered under particular user's name. Multiple items can be checked out at the same time.

External Book Return/book Drop Station: Libraries can offer a distinct service, such as ability to return the books when library is closed. It is machine with a slot with a chip RFID Reader integrated into a wall. User identifies him or her then puts the Books into the Slot. Upon Completion of return, user gets a Receipt showing how many and which books are returned.

Staff and Conversion Station: Staff station consists of antenna, electronic Module and power supply. There are additional software windows Integrated into library management Systems.

Four Phases:

1. Library Security System Only.
2. Support Library Circulation
3. Patron Self Check-in/Check-out
4. Smart and Quick Inventory

1.**Library Security System Only.**

Using RFID Tag replace EM Security Stripe

Phase Target:

1. Radio Frequency Detection
2. Replace the EM Anti-theft system to avoid the high volume EM field harm human body and without False Alarm.

Equipment & parts needed:

1. Anti-theft Detection Gate - Detect the RFID Tag on Book and Check EAS Status, System alarm when the EAS status is ON.
2. Security Processing Station - Turn On or Off the EAS Setting of the Chip
3. RFID Tags

2. Support Library Circulation:

Phase Action:

Using RFID tags replace the barcode in Circulation process. Reading book's access number from RFID than from barcode to borrow and return the book.

Phase Target:

1. No line of sight needed
2. Allows to check-out and check-in several items simultaneously
3. Performing both identification and antitheft in one single operation

   Equipment & parts needed:

1. Counter Station
2. New Integrated Library System functions - read from RFID and set the EAS status.

3. Patron Self Check-in/Check-out:

Phase Action:

Let patron do the check-out and check-in process of books.

Phase Target:

1. Benefit to Librarian:
   - A) Speeds up book check-in / check-out
   - B) Frees staff to better service patrons
   - C) Better space planning
2. Benefit to Patrons:
   - A) Easy to use: books can be read in any orientation
   - B) Reduces queuing time
   - C) Provides patron privacy

   Equipment & parts needed:

1. Self Check Station - Perform patron self check-out and check-in process and turn off or turn off the EAS status.
2. Book-Drop - Indoor or Outdoor. After patron drop in the book into this station, book's id is checked and turned on the EAS simultaneously.
3. Remote Book-drop - Long distance away from library, Acquire better protection of the Book-drop.
4. Sorting station - Sorting the return books automotive or manual.
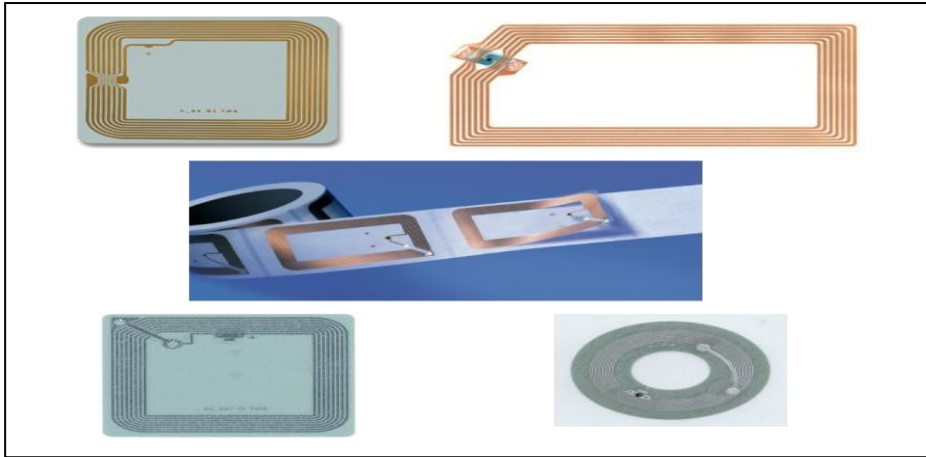
4. Smart and Quick Inventory:

Phase Action: Search and Inventory by reading the RFID using portable reader and portable computer.

Phase Target:

1. Quick inventory
2. Look up the misplace material
3. Search for certain material

Equipment & parts needed:

1. Portable RFID reader
2. Portable Computer - Notebook PC or PDA
3. Inventory & Searching software
4. Library RFID System - HF RFID Tag

RFID HF Tag (Transponder):

An RFID tag is the most important link in any RFID system. It has the ability to store information relating to the specific item to which they are attached, rewrite again without any requirement for contact or line of sight. Data within a tag may provide identification for an item, proof of ownership, original storage location, loan status and history. RFID Tag consists of an integrated circuit and an antenna combined to form a transponder. RFID tags collect the energy to operate from a Radio Frequency (RF) field emitted by a reader device; therefore they do not need a battery. When energized by a radio signal from a fixed position reader or handheld scanner, the tag returns the stored information in order that the item to which it is attached can be easily located. The chip also has a "multi-read" function, which means that several tags can be read at once. RFID tags have been specifically designed to be affixed into library media, including books, CDs, DVDs and tapes.
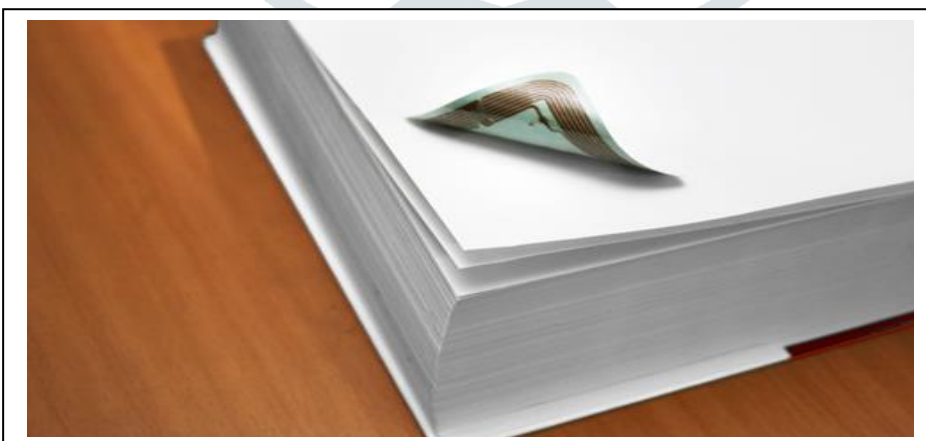
Specification

Integrated Circuit (IC): NXP I-CODE SLIX
Standard: ISO 15693, ISO 18000-3
Memory: 1024 bit.
Operating frequency: 13.56 MHz (HF)

It is thin, flexible and thus can be laminated between paper and plastic. With special method to attach to books, patron is totally unaware that the tag is there.
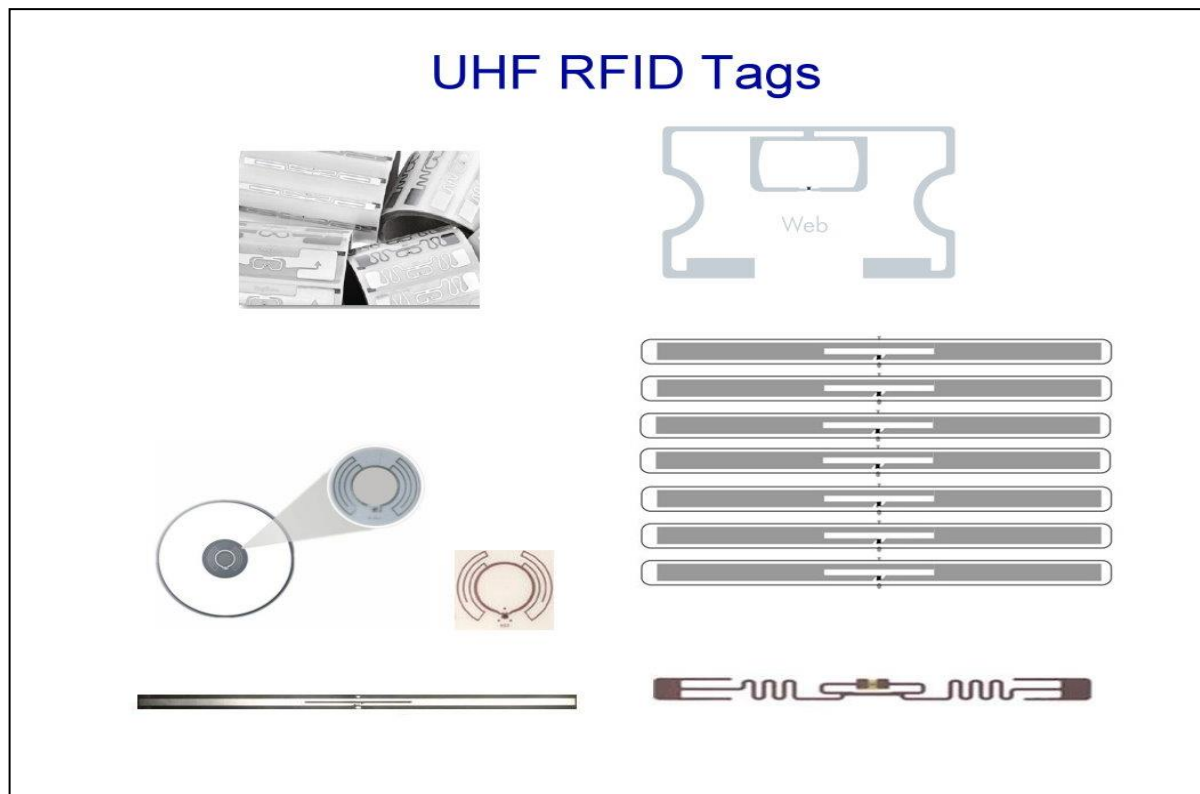
KEY BENEFITS:

No line of sight needed

1. Allows check-out and check-in several items simultaneously
2. Information directly attached to product
3. Performing both identification and anti-theft in one single operation

4. Different shape and sizes available
5. Able to tag almost anything
6. Accelerate scanning and identifying
Library RFID System - UHF RFID Tag

RFID UHF Tag (Transponder)

An RFID tag is the most important link in any RFID system. It has the ability to store information relating to the specific item to which they are attached, rewrite again without any requirement for contact or line of sight. Data within a tag may provide identification for an item, proof of ownership, original storage location, loan status and history. RFID Tag consists of an integrated circuit and an antenna combined to form a transponder. RFID tags collect the energy to operate from a Radio Frequency (RF) field emitted by a reader device; therefore they do not need a battery. When energized by a radio signal from a fixed position reader or handheld scanner, the tag returns the stored information in order that the item to which it is attached can be easily located. The chip also has a "multi-read" function, which means that several tags can be read at once. FID tags have been specifically designed to be affixed into library media, including books, CDs, DVDs and tapes.

Specification

Integrated Circuit (IC): NXP U-Code G2iM
Standard: ISO 18000-6C
Memory: 256 bit EPC, 512 bit User Memory
Operating frequency: 860-960 MHz (UHF)
It is thin, flexible and thus can be laminated between papers. With special method to attach to books, patron is totally unaware that the tag is there.

KEY BENEFITS:

        A) No line of sight needed
        B) Allows to check-out and check-in several items simultaneously
        C) Information directly attached to product
        D) Performing both identification and anti-theft in one single operation
        E) Different shape and sizes available
        F) Able to tag almost anything
        G) Accelerate scanning and identifying

Library RFID System - HF Detection Gates

N2   T2

The RFID EAS Gates is the anti-theft part of the Library RFID Management System using the same RFID tags embedded in the library items. Each lane is able to track items of about 1 meter and would trigger the alarm system when an un-borrowed item passed through them. The alarm will sound and lights on the gate will flash as patron passes through with the un-borrowed library material. The EAS Anti-Theft Gates is used to detect RFID tag that is equipped with EAS (Electronic Article Surveillance). It can detect the RFID tags within 1 meter range without interference of magnetic items, Upon detecting of Armed RFID tags, the alarm will sound on the gate. It has option to trigger a Camera to record patrons who trigger the alarm to the Surveillance Station. Theft detection is an integral feature of the chip within the tag. It is a stand-alone technology, which operates independently of the library database.

FEATURES:

1. Detect EAS Armed RFID tags
2. Multi-item detection
3. Able to integrate camera with the gate (Option)
4. Gale to integrate with Surveillance Station (Option)

KEY BENEFITS:

Single technology is required for both inventory and theft management of the library. Library staff is alerted immediately when un-borrowed items pass through the theft detection gates. Would-be thieves are deterred by the physical presence of the gates. Number of patrons passing through the gates is captured by a counter on the gates Alarm volume can be easily controlled.

Installation Examples:

Library RFID System - UHF Detection Gates

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Library RFID System - Staff Station
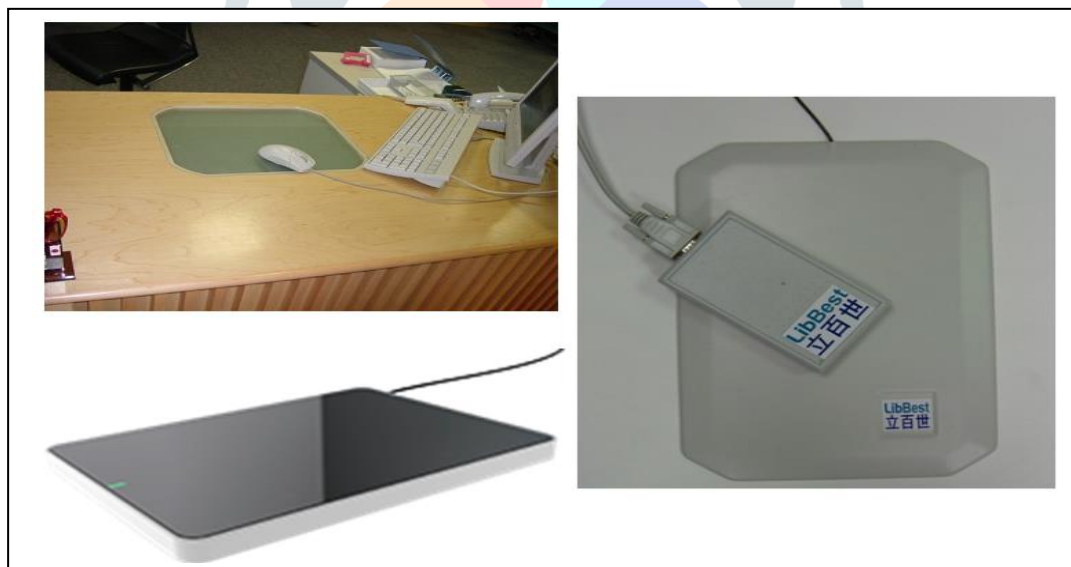
Staff Station is a staff assisted station on services such as loan, return, tagging, sorting and etc. It is loaded with arming/disarming module, tagging module and sorting module. Arming/Disarming module allows EAS (Electronic Article Surveillance) bit inside the tag of the library material to be set/reset so as to trigger/not trigger the alarm of the EAS gate. Checking of EAS status of library material is easy. The staff puts the item on the reader and click on the view to display the information stored inside the tag and status of EAS. There are also feature of Auto Arming and Auto Disarm. Auto Arm/Disarm will automatic arm/disarm library material that is within the Reader range. Together with circulation module from Library Management System Software, this station is used for the following services:

H) Editing and updating of patron's record
I) Add and deleting of patron's record
J) Generate loan history for a particular patrons
K) Managing of fines incurred by the patron
L) Arm/Disarm of EAS bit inside the library material
M) Program of new library material
N) Sort item in accordance to their branch and category number
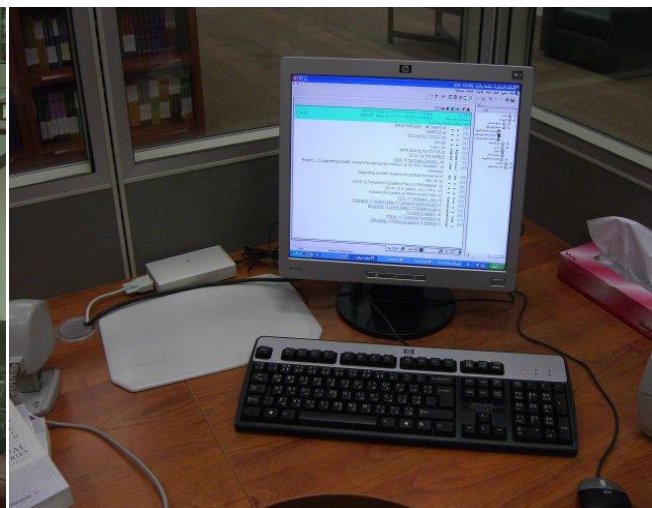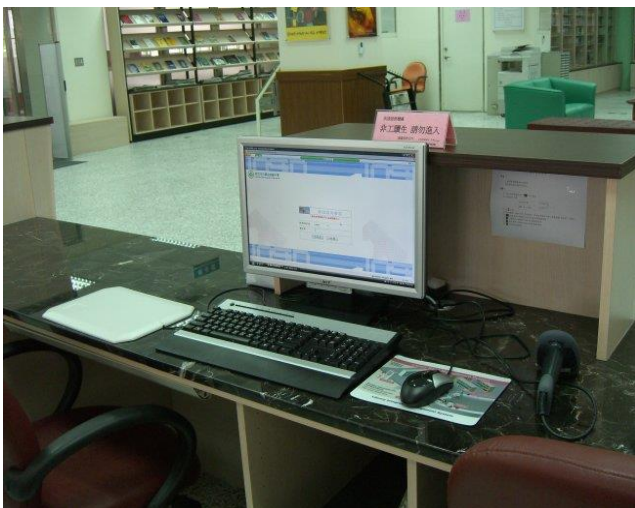O) The features of this station depend on the module loaded by the Library Management Software.

KEY BENEFITS:

1. Provide Value Added Customer Service instead of manual daily routine
2. Perform media check-in/-out for those patrons who choose not to use the self service system
3. Help patron that need assistance from the staff

Parts

Installation Examples:

Library RFID System Conversion Station & Multi-Functional Staff Station
The world First Movable and Height-Adjustable Staff Station

The Conversion Station is a staff assisted station on services such as tagging and security operation. This conversion station is used to program RFID tags on new or existing library items. It is helpful when the library move from barcode to RFID equipment.

This station is used for the following services:

A) Convert item barcode number and write into RFID tag memory
B) Automatically dispenser RFID labels
C) Fast processing means lower operation cost
D) Equipped with touch screen, optical barcode scanner and RFID reader
E) Enable to program or reprogram the RFID tags memory
F) It is standalone operation, no need to connect with Integrated Library System
G) Self-contained on portable cart in order to move between the stacks
H) The conversion station consists of the following components:
I) Laptop PC with Windows 7 / 8 / 10
J) 13 inch touch screen
K) Keyboard and mouse
L) RFID reader and Antenna
M) Manual Label dispenser
N) Handheld barcode scanner with stand
O) Operation software

KEY BENEFITS:

1. Quickly and easily converts barcode to RFID tags
2. Converts to RFID tags with one simple system
3. Fast process - Dispenses RFID tags automatically, one by one
4. It is portable and self-contained

Library RFID System - HF Shelf Management System

The Shelf Management Solution makes locating and identifying items on the shelves an easy task for librarians. It comprises basically of a portable scanner and a base station.

The solution is designed to cover three main requirements:

1. Search for individual books requested
2. Inventory check of the whole library stock
3. Search for books which are miss-helved

All these functions are performed by sweeping the portable scanner across the spines of the books on the shelves to gather their identities. In an inventory check situation, the identities collected are compared with the database and a discrepancy report could be generated.In situations when search function is required, whether for a particular item or an item category, the information is first entered into the portable scanner from the base station, and when a foreign item is found on the shelves, a built-in beeper sound to alert the librarians.

KEY BENEFITS:

1. Changes inventory process:
2. No more book handling: just pass the reader across shelved books to perform an instant inventory.
3. Accuracy: book identification numbers are registered in the Shelf-Management Reader. The data is then downloaded to the central database.
4. The fastest inventory you have ever made: 20 books per second.
5. Notification: books to be pulled are up-loaded to the reader for quick identification.
6. User friendly:
7. Light weight
8. Wand allows easy reading of high and low shelves
9. Saves time and resources:
10. Implementers indicate a 75% reduction in human resources required for shelf management activities.

Library RFID System - UHF Shelf Management System

The Shelf Management Solution makes locating and identifying items on the shelves an easy task for librarians. It comprises basically of a portable scanner and a base station. The solution is designed to cover three main requirements:

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1. Changes inventory process:
2. No more book handling: just pass the reader across shelved books to perform an instant inventory.
3. Accuracy: book identification numbers are registered in the Shelf-Management Reader. The data is then downloaded to the central database.
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<u>Library RFID System - Card Production</u>
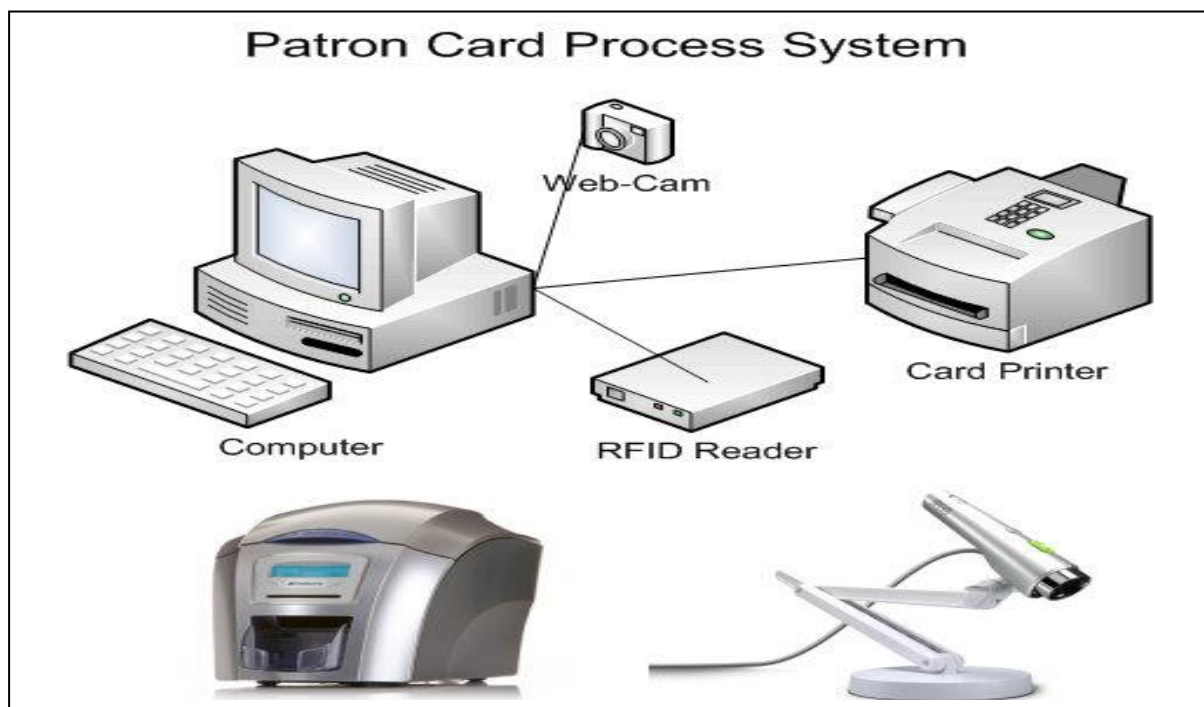
Components:

1. Card Printer (Double Side printing)
2. Digital Webcam & Tripod
3. Mid Range RFID Reader/Writer
4. Capture, Edit & Printing Software
5. Price not include PC & Monitor

KEY BENEFITS:

1. Double Side Card Printing will set librarian print patron card without changing side of card.
2. Library can make patron card in quick way and without patron to bring their own photo.
3. It is best way to serve patron.
4. Connect to Integrated Library System Directly (this option depend on ILS/LMS system)

Library RFID System Self Check Station

New Design - (M type) :The World First Mobility & Elevatable Self Check Station.

The Patron Self Check station is basically a computer with a touch screen and a built-in RFID reader, plus special software for personal identification, book and other media handling and circulation. After identifying the patron with a library ID card, a barcode card, or his personal ID number (PIN), the patron is asked to choose the next action (check-out of one or several books). After choosing check-out , the patron puts the book(s) in front of the screen on the RFID reader and the display will show the book title and its ID number (other optional information can be shown if desired) which have been checked out. The patron then confirms that he has finished the check-out process and a receipt is printed, showing which books have been borrowed and the return date. The RFID tag in the book is set on quiet as a result no alarm will go off at the EAS gates. It is also possible to use the station for Check-In (return) of books. In this case the patron identifies herself, chooses return and then puts one book or a stack of books onto the reader. She will receive a receipt. If the books were to be taken through the gate now, an alarm would sound. One important point for library productivity is that the whole process is significantly less time consuming than with barcode and magnetic strip system; therefore long lines are avoided and fewer stations are needed for the same process.

KEY BENEFITS:
To Librarian:
1. Speeds up book check-in / check-out
2. Frees staff to better service patrons
3. Better space planning
4. Increases membership rate
5. (M type) Movable - Easily move to the right place in library
6. (M type) Height-Adjustable - It serve adult and also children

To Patrons:
1. Easy to use: books can be read in any orientation
2. Reduces queuing time
3. Provides patron privacy
4. Encourages patrons to come back

Library RFID System - Book Drop
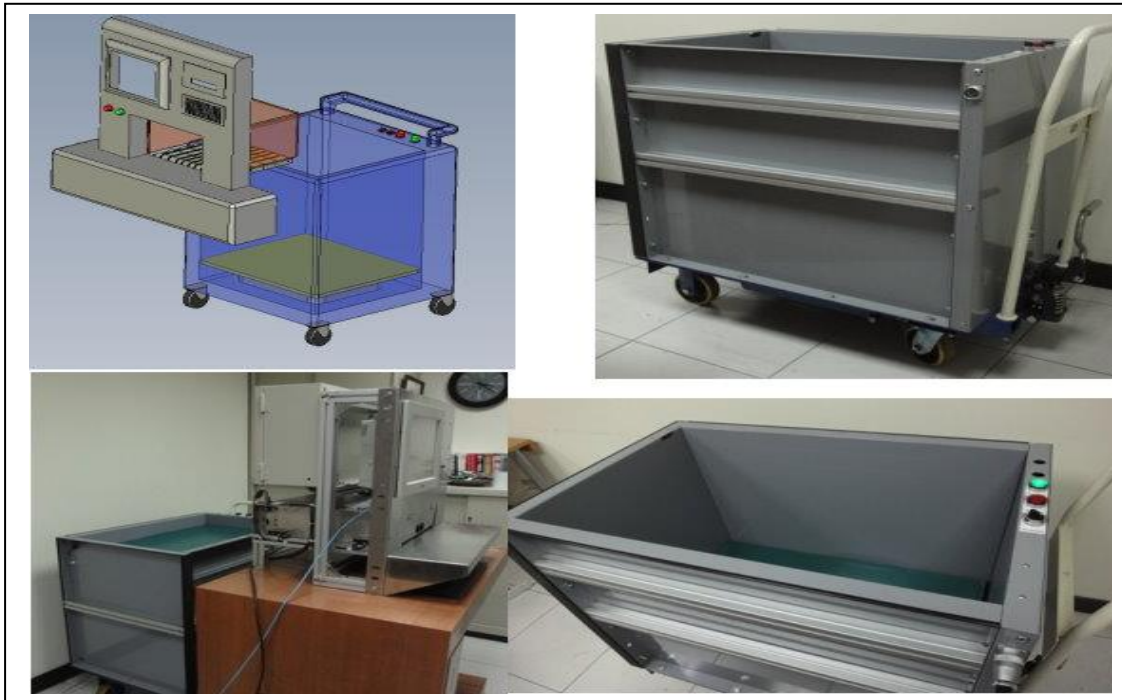
      The Book Drops can be located anywhere, within or outside the library. Possible remote locations outside the library include MRT/train stations, shopping centers, schools, etc. This offers unprecedented flexibility and convenience of returning library items at anytime of the day, even when the library is closed. Patron inserts the library item into the slot. The reader captures the electronic signature and sends to backend system for loan cancellation. Patron is acknowledged by beeping sound and flashlight. Patron's record is updated immediately. This is possible due to the seamless link between Library RFID Management System and the host computer system. As such, users who have reached their loan quota can start borrowing items once they have returned them through the Book Drop.

KEY BENEFITS:
1. The ability to return books during off hours.
2. Loans for the returned items will be instantaneously cancelled so that patron may immediately borrow again.
3. Librarians are able to allocate more time to customer service, as they are free from the labour-intensive loan cancellation activity associated with barcode system.
4. Display the return status and printing receipt.
5. The design of the Book Drops is such that items cannot be retrieved back once deposited.

OPTIONS:
1. Accept special design
2. Able to Integrate with Auto-Sorting system

New Design
1. Smart Book-Drop with Smart Bin
2. Smart Book-drop - Able to reject the improper book to return.
3. Smart Bin - Protect book from falling, alarm when it is 80% and 100% full.
4. Door Lock - Door is closed when system process check in and when system is not operable.

Library RFID System - Indoor Return Station (HF only)

The fastest way to check-in library items:

Indoor Return Station detect and identify all items that are placed between the RFID bookstands. When situated near the entrance of the library, it is easily accessible for a patron. He places the books on the shelf and the items are automatically checked-in in your Library Management System. All the items are directly available for the next patron to be borrowed. Consequently, over 25% of all books returned are checked-out on the same day. Theft detection is an integral feature of the chip within the tag. It is a stand-alone technology, which operates independently of the library database.

Quick and Easy:

Returning an item does not take more than just placing one or more books on the library trolley. Anywhere. That's it. No more queues, no more waiting in line. Just drop and go.

Move it:

Whenever one of your intelligent library trolleys is nearly full, you simply un-click it from the info terminal and roll it into your library where you can return the books to the shelves or make the trolley available in the 'just-returned' section. In the meantime you just click an empty trolley into the info terminal so the lenders have an empty trolley at their disposal again.

Increased circulation:

Normally speaking, after check-in, an item can be behind the counter for at least a day. With indoor return station it nevertheless is available immediately. Due to this, in libraries that use an Indoor Return Station for returning items, 25% of all returned items are directly taken from the trolleys by other patrons and checked-out on the same day.

KEY BENEFITS:

1. Quick and easy
2. Increased turnaround rates
3. 25% of returned books are checked-out the same day
4. Build-in Intelligent Shelves in existing or bespoke furniture
5. Multi-item processing

Conclusion:

RFID technology is not only emerging but also more effective, convenient and cost efficient technology in library security. This technology has slowly begun to replace the traditional bar-code on library items. The RFID tag can contain identifying information such as a book's title or material type, without having to be pointed to a separate. The information is read by an RFID reader, which replaces the standard barcode reader commonly found at a library's circulation desk. The RFID tag found on library materials. It may replace or be added to the barcode, offering a different means of inventory management by the staff and self service by the borrowed. It can also act as a security device, taking the place of the traditional electromagnetic security strip. And not only the books, but also the membership cards could be fitted with an RFID tag. The cost of the technology is main constraint.

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