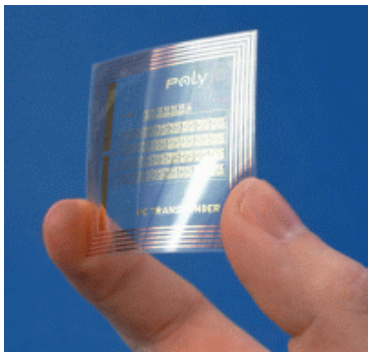
RFID AND LIBRARIES



RFID (Radio Frequency identification) is one of the latest technologies used in library security systems. Radio Frequency Identification, popularly known as RFID, is an electronic identification system that uses a "tag" (chip and antenna) and a "reader" (interrogator) system that communicates both ways using radio communications. RFID is a combination of radio-frequency-based technology and microchip technology. It is based on placing special microchips which stores about 2,000 bytes of data, known as RFID tags, to be read using radio frequency technology.

Libraries that are using barcodes can view it as a communicating "bar code". By putting the "readers" at the gates and the tags on the books and other reading materials, the tracking of items inside the libraries and information centers improve dramatically." More importantly, it enables un-mediated issue and return of books in the library.

Libraries are reported to have begun using RFID systems to replace their electro-magnetic and bar code systems in the late 1990s. It is reported that approximately 130 libraries in North America are using RFID systems, but hundreds more are considering it. Among South Asian nations, very few institutions are known to be using the RFID technology in libraries. In addition to rapid issue and return of books and tracking of reading materials in the library, the technology has several other advantages such as high reliability. Vendors claim almost 100 percent detection rate using the RFID tags. The technology also allows fast re-shelving of books.

The components of the RFID system include *tags, readers* and the *server.* The tag is sometimes also known as a *transponder.* It consists of an antenna and a silicon chip. Tags can be passive, active or semi-active. An active tag contains some type of power source on the tag, whereas the passive tags rely on the radio signals sent by the reader for power. The RFID technology mostly uses the passive tag and the power to read these tags comes from the reader or exit sensor, rather than from a battery within the tag. RFID tags can also be placed on member identification cards. Not only does that identify the library members for issuing and returning of library materials, but also for access to restricted areas or services in the library.

RFID *readers* or *receivers* are composed of a radio frequency module, a control unit and an antenna to interrogate electronic tags via radio frequency (RF) communication. Many also include an interface that communicates with an application (such as the library's circulation system). Readers can be hand-held or mounted in strategic locations so as to ensure they are able to read the tags as the tags pass through an "interrogation zone." The interrogation zone is the area within which a reader can read the tag. The size of the interrogation zone varies depending on the type of tag and the power of the reader. Passive tags, with shorter read ranges, tend to operate within a smaller interrogation zone. Most RFID readers in libraries can read tags up to 16 inches away.

Once the reader reads the tag, the information is passed on to a *server* that makes use of the information. 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 (Applications Programming Interface) necessary to interface it with the automated library system. The server typically includes a transaction database so that reports can be produced. A vendor may choose not to use a server by substituting a less expensive docking station and increasing the amount of software in the readers.

Advantages of RFID systems

1. Rapid charging/discharging
2. Simplified patron self-charging/discharging
3. High reliability – *the readers are highly reliable. Several vendors of RFID library systems claim an almost 100 percent detection rate using RFID tags.*
4. High-speed inventorying – *a unique advantage of RFID systems is their ability to scan books on the shelves without tipping them out or removing them. A hand-held inventory reader can be moved rapidly across a shelf of books to read all of the unique identification information.*
5. Automated materials handling – *it includes conveyor and sorting systems that can move library materials and sort them by category into separate bins or onto separate carts.*
6. Long tag life – *RFID tags last longer than barcodes because nothing comes into contact with them.*

Disadvantages of RFID Systems

1. High cost – *While the readers and sensors used to read the information are comparable in cost to the components of a typical EM or RF theft detection system, typically $2,500 to $3,500 or more each; a server costing as much as $15,000 may be required and the tags cost $.60 to $.85 each.*
2. Vulnerability to compromise – *it is possible to compromise an RFID system by wrapping the protected material in two to three layers of ordinary household foil to block the radio signal.*
3. Removal of exposed tags - *RFID tags are typically affixed to the inside back cover and are exposed for removal.*
4. Exit sensor problems - *the performance of the exit sensors is questionable because they read tags at up to twice the distance of the other short-range readers.*
5. Perceived Invasion of Patron Privacy - *two misconceptions: (1) that the tags contain patron information and (2) that they can be read after someone has taken the materials to home or office.*

Despite the several advantages of the RFID technology, the system is still not very popular in libraries in developing countries. The impediment is the high cost of the system particularly that of each individual tag. Some of the other disadvantages include vulnerability to compromise the system by canceling out signals. There are also some health concerns and some perceptions pertaining to invasion of library member's privacy.

The technology is still at its nascent stage as far as use in libraries is concerned, But as costs decrease and technology improves, the RFID technology will become a boon to the libraries.