

## **DESIGN OF PRISON SECURITY INFORMATION SYSTEM USING RFID**

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### **ABSTRACT**

*Information systems and technology are currently developing rapidly, so computers can be used as security tools automatically with the addition of Radio Frequency Identification (RFID) technology. Sattahti security personnel in the detention room are required to always be ready to carry out security, supervision within the scope of the detention room. So far, Sattahti personnel in conducting surveillance and guarding detainees in and out of the room still use padlock locks so that security is less than the maximum, meeting SOP standards so that some detainees have a chance to escape, so that Sattahti personnel cannot properly monitor prisoners because there is no regulating system detention rooms are better IT-based. Based on the above problems, it is necessary to design and build a detention room security information system using RFID technology. So that every sattahti personnel can be accessed in the security system information system database of the detention room. This is very helpful for sattahti personnel in the process of guarding detainees. This system can do an automatic lock along with the time for each personnel who bring prisoners in and out of the detention room, by using serial communication from a personal computer (PC) to a microcontroller (reader RFID stater kit ID-12 LA) so that it will read the identity card (tag) RFID every person. This detention room security information system is useful to accelerate and facilitate personnel in changing duty pickets to the next personnel regarding the whereabouts of all the strength of the prison guard personnel at SATTAAHTI.*

**Keywords:** *Information on detention room security, RFID.*

### **1. INTRODUCTION**

The detention unit and evidence or the Sanjahuk Nganjuk police are units under the ranks of the East Java Regional Police, which have the task and function of carrying out supervision and security support for an alleged perpetrator

a crime or what is called a convict or a detainee. The activities carried out are directed at efforts to carry out support in the context of monitoring and securing detainees while in an effort to complete the criminal record of a case up to the stage of the court process.

Sattahti Polres has the main duties of carrying out care of detainees covering prisoner health services, guiding prisoners as well as receiving, storing, and securing evidence along with the administration within the police station, report the number and conditions of detainees in accordance with

statutory provisions. Sattahti is led by Kasattahti who is responsible to the Kapolres and in carrying out daily tasks under the control of the Deputy Police Chief. The door is the main access so that personnel can enter a room, to maintain security and supervision of the perpetrators of crimes, so that personnel who have the authority to guard prisoners can enter the detention room.

In the last few years in the electronic and print media there has been damage to public facilities, especially detention rooms that have occurred in several regions in Indonesia, many prisoners have fled so that in the field of guard room detention is demanded to always be ready to provide security, supervision and service to the suspects criminal offender. Because of the importance of the duties carried out by prison guard room personnel, where each person has duties and responsibilities in accordance with the position at the time of carrying out the guard service.

One of the tasks of guarding a detention room is to conduct an examination and collecting data on each suspect entering and leaving the detention room. The security of the detention room so far has been carried out using manual lock locks, and recording of personnel and the number of prisoners is still manual, so it is less than optimal in operational activities.

Based on the description above, it is necessary to design and build a detention room information system using Radio Frequency Identification (RFID).

This system can help solve the problem of guarding detention rooms in and out of the room.

In addition this system is useful for monitoring every prisoner who is in the detention room, knowing the strength of personnel who are carrying out guard room, and to anticipate or detect the escape of prisoners. This automatic lock system is also useful for speeding up and simplifying personnel in security efforts in the detention room.

Based on the background description of the problem above, it can be formulated a problem that is how to design an information system for detention room security using RFID that is applied at the Nganjuk Police Sattahti ?.

The purpose of this study is to design an RFID-based detention room information system. This system can help the process of collecting data on guard personnel and detainees, so as to prevent prisoners from escaping and close the access of other parties that can threaten the security of Research Benefits. The benefits of this research are as follows:

a. For resident or admin staff:

Simplify the process of recording prisoners who go out or enter the detention room and make it easier for admins to identify guard personnel who enter and enter the detention room and facilitate reporting to the Kasattahti.

b. For heads of detention units and evidence:

Easy to know the strength of guard personnel and easy to supervise personnel and detainees. Speed up the right decision / policy making based on accurate reports.

c. For Personnel Keep the prisoner or user:

Can find out the number of prisoners in and out as well as facilitate checking prisoners.

The system only safeguards suspects as long as the case is handled by the investigation team so that it does not discuss more deeply. Not discussing the procedures for reporting procedures for safeguarding a detention room, the format of safeguard reporting that applies in the Indonesian National Police.

The data used for the trial was taken at the Nganjuk Regional Police Station in East Java, the period of August 2017 and the data used in this system were the data of prison guard personnel at the Nganjuk Regional Police Station.

### 1.1. Radio Frequency Identification

*Radio Frequency Identification (RFID) is a development of technology for automatically retrieving data or recognizing or identifying objects (Myerson, 2007). RFID is a data capture technology that can be used electronically to identify, track and store information stored in RFID tags (Wilshusen, 2005).*

*RFID is part of RF (Radio Frequency) which is used as a wireless identification media consisting of two components (T.Karygiannis, 2007), namely:*

*RFID tags (transponders) consisting of a small device that is embedded in a book such as labels, smartcards and others that have a unique identification and writeable memory. Figure 2.1 the following is a form of RFID card tags:*

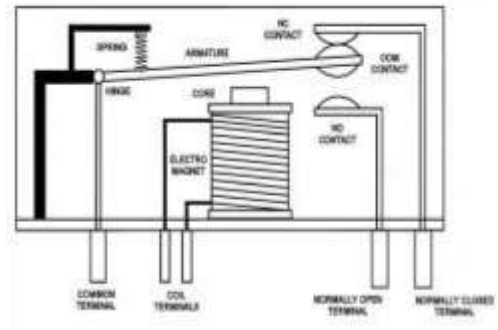


Figure 1. Tag RFID card.  
(Source : <http://www.indiamart.com>)

RFID reader is a device that can communicate without direct contact with a tag to identify it if it is connected in a data association. Figure 2. is LA's RFID stater kit ID-12 reader.

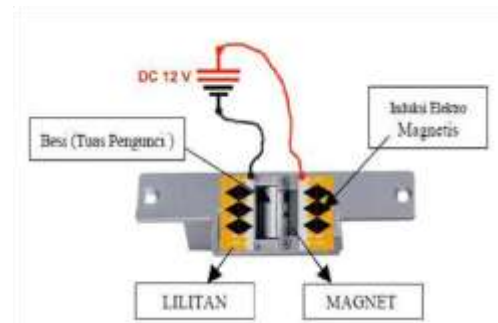


Figure Error! No text of specified style in document.. Reader RFID stater kit ID-12 LA.  
Figure 1. Normally close (NC)

relay

(Source: [www.centralelectro.com](http://www.centralelectro.com))

## 1.2. USB Relay

USB Relay is a mechanical switch that is controlled or electronically controlled (electromagnetic). Switch on the relay will change position off to on when given electromagnetic energy to the relay armature, the relay basically consists of 2 main parts, namely a mechanical switch and an electromagnetic generating system (iron core inductor). Relay switches or contactors are controlled using an electric voltage applied to a magnetic generator inductor to pull the switch

lever armature or relay contactor. (Sutrisno, 1987).

Relays are needed in electronic circuits as executors as well as interfaces between loads and electronic control systems that have different power supply systems. Physically, the switch or contactor with an electromagnetic relay is separate so that the load and control system are separate. The main part of the electro mechanical relay can be seen in Figure 2 and Figure 3, the switch electromagnet coil or the spring armature swing contactor.

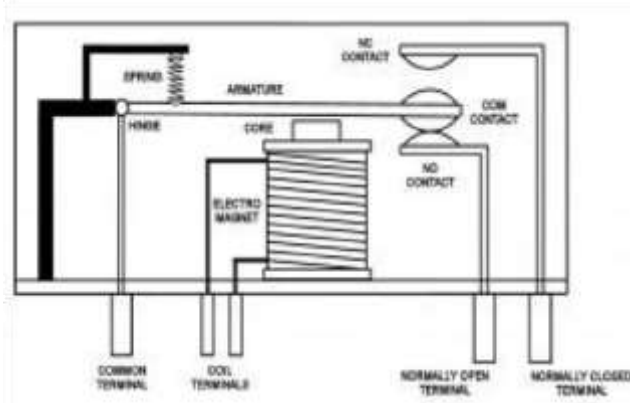


Figure 4. Normaly open (NO) Solenoid Electric Door Lock

### 1.3. Solenoid Electric door lock

Solenoid Electric door lock is an electric locking device that is electromagnetic, because this tool consists of iron and magnet winding arranged in such a way, so that when given an input voltage will occur induction which can produce magnetic force and the spring lever can lock automatically.

## 2. RESEARCH DESIGN

The research design is the stage to provide an overview of the system that will be made. Starting from analyzing the system is the stage of studying the existing system based on the results of a survey of existing problems. Then various survey data are processed to get a general picture of the results obtained. General description of the system of information systems for detention room security using RFID can be seen in Figure 5 Personnel close the RFID Tag / RFID Card according to his level to Reader. Check the ID number if it matches the database, the software will display the password form. Here admin level personnel are asked to enter their password. If the password matches the database then the application data form will display the main menu, after the menu is selected then the software orders to open the solenoid sesuai dengan database melalui RS232 dan USB relay.

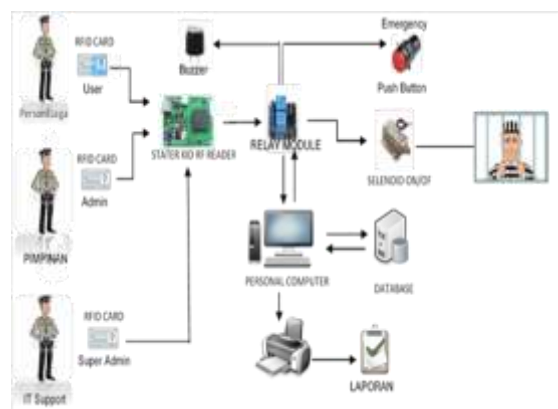


Figure 5 System Description.

### 2.1. Design

Design is a process carried out on a project that we are working on, starting from the research design, to the finished results that will be functioned. In principle, good design and systematic can provide convenience in the manufacturing process to become an application system that really functions as it should. In designing a detention room security information system using RFID, it consists of several designs, namely input / output design, form design and identity card design.



Figure 5 Primary Menu Design

## 2.2. Results and Discussion of RFID Reading Distance Testing

The results and discussion of RFID reading distance testing is the part that explains the results of the RFID reading distance testing data that has been done. From the testing of the RFID reading distance capability, the results of the test can be seen in table 5.1.

Table 6 Results of RFID distance testing.

No	Length (cm)	Condition	Indicator Beep
1.	10	Not Detected	Not Beep
2.	9	Not Detected	Not Beep
3.	8	Not Detected	Not Beep
4.	7	Not Detected	Not Beep
5.	6	Not Detected	Not Beep
6.	5	Not Detected	Not Beep
7.	4	Detected	Beep
8.	3	Detected	Beep
9.	2	Detected	Beep
10.	1	Detected	Beep

Based on the table above, it can be concluded that the ability to read RFID distance for a distance of 4 cm can still detect RFID tags and at a distance of 5 cm RFID reader cannot detect RFID tags. RFID reading distance testing is also influenced by the quality of the RFID tag, because of several RFID tags tested, found 2 RFID tags that can not be read at a distance of 3 cm, after the tag is closer, it can only be read, which is about a distance of 2.5 cm.

### 3. RESULTS AND DISCUSSION

Test results and discussion RFID reading capability is the part that explains the results of testing data how many RFID tags can be read by an RFID reader at the same time. From the RFID reading ability test, the test results can be seen in table 5.2.

Table 5.2 Test results for the number of RFID tags that are read by the RFID reader.

No	Tag RFID	Indicator	Beep
1.	5	Detected 1	Beep
2.	4	Detected 1	Beep
3.	3	Detected 1	Beep
4.	2	Detected 1	Beep
5.	1	Detected 1	Beep

Based on the table above, it can be concluded that the ability to read RFID reader for 1 RFID tag can still be read RFID reader and for the amount of more than 1 RFID tag still read 1 RFID tag that is the closest tag. From these results it can be explained that the ability to read RFID reader for this type can only detect 1 RFID tag at the same time.

#### 3.1. Conclusion

Based on the results of tests that have been carried out on the design and construction of a security information system for detention rooms using RFID, the following conclusions are obtained:

Can display transaction data in and out of data of all Sattahti personnel quickly and accurately at Nganjuk Regional Police Station.

Can display data on the number of prisoner transactions carrying out the process of searching personnel and detainee data according to known criteria, namely name, nrp, RFID number, address, place of entry, date of entry and number of detainee.

Can validate and print personnel data reports in accordance with the desired status, namely, prisoner data reports, and Sattahti personnel data reports.

Can validate and print reports of data in and out of personnel and detainees in accordance with the desired time frame and date.

*RFID tags can be detected by RFID readers with a maximum range of 4 cm. At the same time, RFID readers cannot detect more than 1 RFID tag.*

#### 3.2. Discussion

Suggestions for system development are as follows:

This system can be made completely by adding electronic components such as fire detection sensors and microcontroller devices. In this system a push button can be added which is authorized with a fingerprint. In this system, RFID readers and RFID tags can be placed far from the detention room to minimize conditions in the detention area.

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