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Design Of The E-KTP As a Car Security System

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ABSTRACT

Vehicle theft cases continue to increase every year. This is very troubling vehicle users both two-wheeled vehicles or four-wheeled vehicles. The security system used today is still using analog, so it needs to be replaced using a digital system to improve the security system. The use of electronic control systems almost covers most of everyday human life. The electronic control system is practical and efficient, so many people like it. Digital electronic control systems are made to replace analog systems because they have advantages, namely practical, efficient, and more futuristic. design and construction of the use of E-KTP as a car security system, this system is to ensure its security as a communication medium using SMS, to ensure the security of vehicle owner data. in conducting research the research methods used design methods. data from the study in the form of electrical and starter on / off sub system testing, short message system testing.

Keywords: ArduinoNaNo, E-Ktp, Car, short message system

1. INTRODUCTION

Vehicle theft cases continue to increase every year. This is very troubling vehicle users both two-wheeled vehicles or four-wheeled vehicles. The security system used today is still using analog, so it needs to be replaced using a digital system to improve the security system. The use of electronic control systems almost covers most of everyday human life. The electronic control system is practical and efficient, so many people like it. Digital electronic control systems are made to replace analog systems because they have advantages, namely practical, efficient, and more futuristic.

Various efforts continue to be made to improve the safety of four-wheeled vehicles that are being parked, both in public parking lots and in the yard, so as not to be easily stolen. One effort to improve the safety of four-wheeled vehicles was carried out by researchers (Abdul Rahman 2015) the design of a motorized vehicle starter using an RFID card. The working system of this tool is a system designed using an RFID card that will detect cards that already have a special ID. microcontroller used is atmega 16 microcontroller with an RFID card, motorized vehicles can be kept safe, because to start a motorized vehicle must use RFID.

vehicle activation and security system design using RFID is used as an input to be able to read the ID card on the E-KTP to be used as input and arduino to be used as a processor of the whole system so that if theft or activation of the vehicle can provide information or authentication through messages short massage service.

2. LITERATURE REVIEW

2.1 Security

Security is a state free from danger. This term can be used with reference to crime, all forms of accidents, and others. Security is a broad topic including national security against terrorist attacks, computer security against hackers or crackers, home security against thieves and other intruders, financial security against economic collapse and many other related situations. Physical security (Biologic safety) is a physical condition that is safe free from the threat of accidents and injuries (mechanical), mechanically, thermally, electrically and bacteriologically. The need for physical security is the need to protect themselves from hazards that threaten physical health, which in this discussion will focus on providing for safety or providing a safe environment.

2.2 Electronic-KTP

Identity Card (KTP) which is made electronically, in terms of both physical and computerized functions. E-Ktp is a thin chip like paper dominated by silicon and a type of plastic, not resistant to heat, corrosion, wet or damp. The e-KTP chip uses a contactless interface that meets the ISO 14443 A / B standard. Data transmission via radio waves. The e-KTP blank is made from PETG, a kind of thermoplastic polymer, which is arranged in 7 layers.

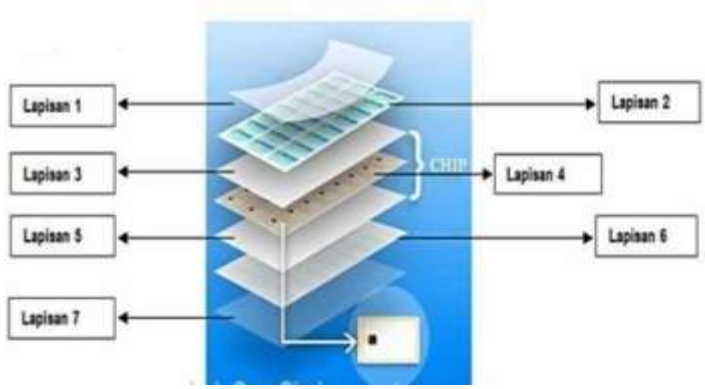

Figure 1 Layer of e-KTP

2.3 Motor Vehicle

Motorized vehicles are vehicles that are driven by technical equipment for movement, and are used for land transportation. Generally motor vehicles use internal combustion engines, but electric motors and other types of engines (eg hybrid electric vehicles and plug-in hybrids) can also be used. Motorized vehicles have wheels, and usually walk on the road. The types of motorized vehicles can vary, ranging from cars, buses, motorbikes, off-road vehicles, light trucks, to heavy trucks. The classification of motor vehicles varies depending on the country. ISO 3833: 1977 is a standard for the type and definition of land vehicles. Based on Law No. 14 of 1992, meant by technical equipment can be in the form of a motor or other equipment that functions to convert a certain energy resource into a motorized motor vehicle. The meaning of the word in this provision is attached to the place in accordance with its function. Included in the understanding of motorized vehicles are trailer trains or patch trains that are coupled with motorized vehicles as towing. As of 2010, there were more than 1 billion motorized vehicles worldwide, not including off-road vehicles and heavy vehicles. Global per capita vehicle ownership is 148 vehicles operating per 1000 people. The United States is the country that has the most motorized vehicles in the world, with 239.8 million vehicles in 2010. Vehicle ownership per capita in the United States is also the highest in the world, at 769 vehicles per 1000 population. The People's Republic of China has the second largest number of vehicles in the world, with a total of 78 million units and has since 2009 been the largest vehicle market in the world. In 2011, 80 million cars and commercial vehicles were produced worldwide, 18.4 million of them were produced in China.

2.4 Internet Shield (Gsm)

Arduino GSM Shield V2 connects your Arduino to the internet using the GPRS wireless network. Simply plug this module into your Arduino board, install a SIM card from an operator that offers GPRS range and follow a few simple instructions to start controlling your world via the internet. You can also make / receive voice calls using the audio jack / on-board microphone and send / receive SMS messages. Arduino GSM Shield 2 allows the Arduino board to connect to the internet, make / receive voice calls and send / receive SMS messages. The shield uses the M10 radio modem by Quectel. It is possible to communicate with the board using the AT command. The GSM library has a large number of methods for communication with a shield. The shield uses digital pins 2 and 3 for serial communication software with M10. Pin 2 is connected to pin TX M10 and pin 3 to the RX pin. See this note for working with Arduino Uno, Uno ADK, or Leonardo. The PWRKEY modem pin is connected to the Arduino 7 pin. M10 is a Quad-band GSM / GPRS modem that works at frequencies GSM850MHz, GSM900MHz, DCS1800MHz and PCS1900MHz. It supports TCP / UDP and HTTP protocols via GPRS connections. GPRS data downlink speeds and maximum uplink transfer speeds are 85.6 kbps.
To interface with the cellular network, the board requires a SIM card provided by the network operator. See the home page for additional information about using a SIM.

Figure 2. GSM Shield

2.5 Short Massage Service

Telecommunications technology is currently growing, one of the telecommunications technologies that is developing is the Short Massage Service or commonly referred to as SMS.

SMS is the ability to send and receive short messages in the form of text from a wireless device, which is a cellular telephone telecommunications device, in this case the wireless device used is a cellular telephone. The text can consist of words or numbers or alphanumeric combinations. Another opinion regarding the meaning of SMS was stated by Romzi Imron .which revealed the meaning of SMS as follows:
"Services that are widely applied to wireless communication networks that allow sending messages in alphanumeric form between customer terminals (cellphones) or between customer terminals and external systems such as e-mail, paging, voice mail and so on" .

2.6 Microcontroller

Microcontroller is a chip that functions as an electronic circuit controller and generally can store programs in general consisting of CPU (Central Processing Unit), memory, certain I / O and supporting units such as Analog-to-Digital Converter (ADC) which has been integrated in it . The main advantage of a microcontroller is the availability of RAM and supporting I / O equipment so that the size of the microcontroller board is very concise. [1]

a. Arduino Nano Module
   Arduino nano can be a single board microprocessor that is open source that is designed to facilitate an electronic user application in designing a device, Arduino aims to make the electronic circuit read the input, process the input and then produce the desired output. from the front and back, called the development board because this board does function as a prototype arena for microcontroller circuits. by using a development board it will be easier to assemble the electronic circuit ATmega328 microcontroller. Why does this prototype use Arduino Nano? What is the difference with Arduino Nano? there is a difference in an input voltage on the foot (VIN) equipped with a Jack (DC) and whereas arduino nano does not, because arduino nano can use the power supply directly from the mini-USB port from outside. The advantages of Arduino Nano do not need to use a USB ASP cable, but enough to use a Mini USB cable. As for the work system of this Arduino Nano is to use an analog pin on the Arduino board that uses a voltage of 5V.

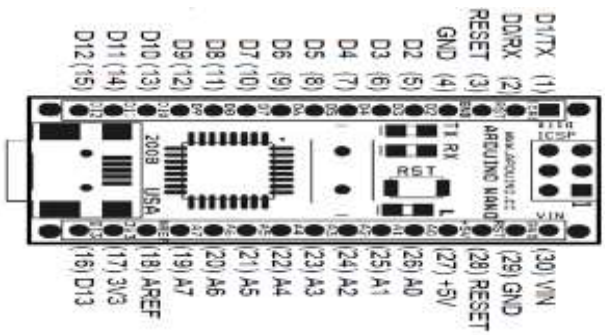

Figure 3. Arduino Nano Atmega328

3. RESEARCH METHOD

The research method in implementing using the design method is a method or stage carried out in a design process, this method is needed to facilitate the designer in developing the design idea. The pattern of development is to carry out several stages of analysis accompanied by literature studies that support the theory. This analysis uses qualitative analysis. Qualitative analysis is an analysis by collecting data in the form of detailed stories or actual conditions.

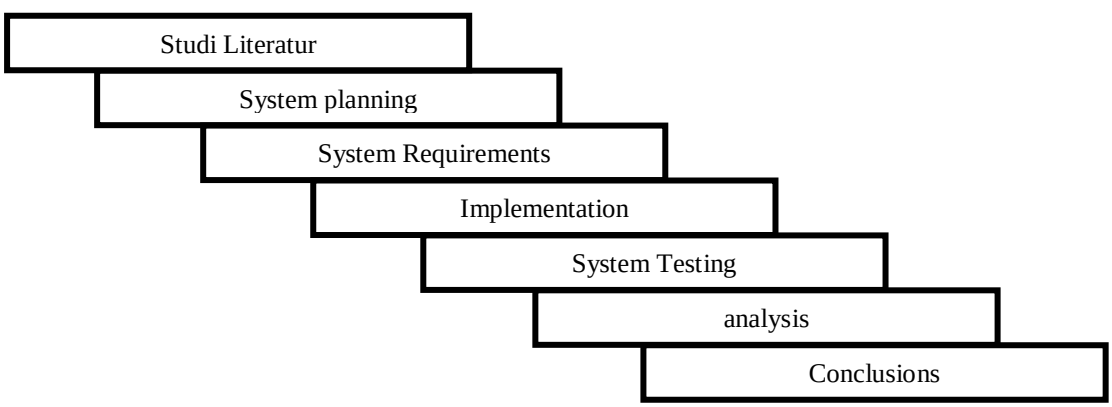

Figure 4. Research Flow

1. Study of literature

   At the literature study stage, it conducts a series of activities looking for various references on supporting theories related to research conducted from various sources including articles, journals, books and also searching through the web.

2. Design System

   System design stage activities carried out to design the system to be built which starts from the input system, process, and output that will be produced with the aim of facilitating and minimizing the occurrence of errors in the system to be built. The system description of the design research on the use of E-KTP as a car security system is illustrated below.

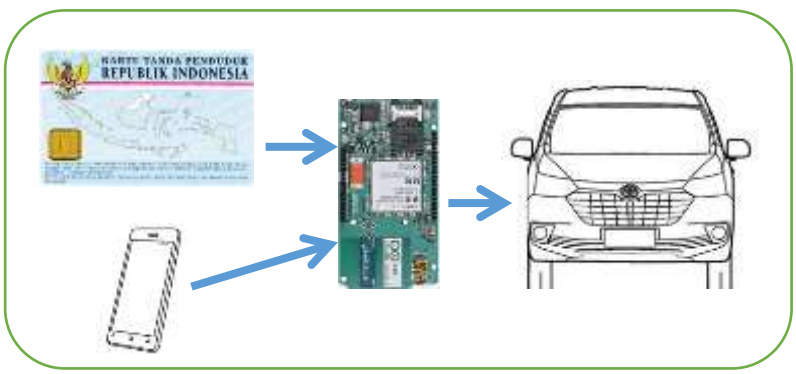

Figure 5. overview of the security system

3. Hardware Design

   The design of hardware aimed at making the circuit design of the system and sub-system to determine the components that will be used in building systems.

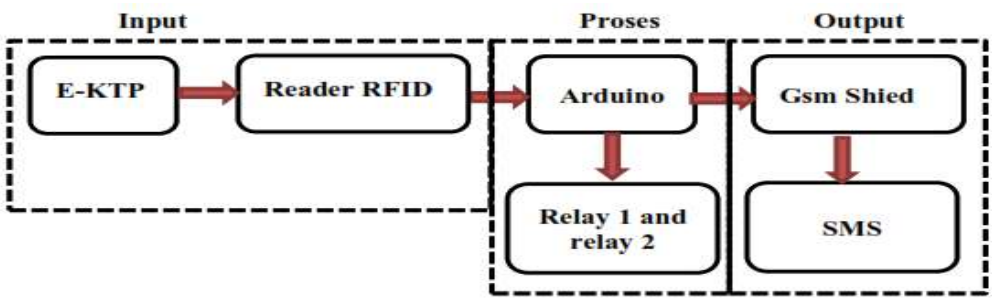

Figure 6. System Block Diagram

The input on the system uses an RFID reader to get an ID from the E-KTP, which will then be forwarded to Arduino, then Arduino processes for execution to be carried out in relay and / or GSM Shiled. The relay will turn on the electricity and start the engine, GSM Shiled will send a message.

4. Software Design
   Software in research is a stage in building a system that is by making programming commands to activate hardware that has been assembled and subsequently uploaded into the circuit system, in addition to ensuring the system can run based on functions that have been strung together in each sub-system.

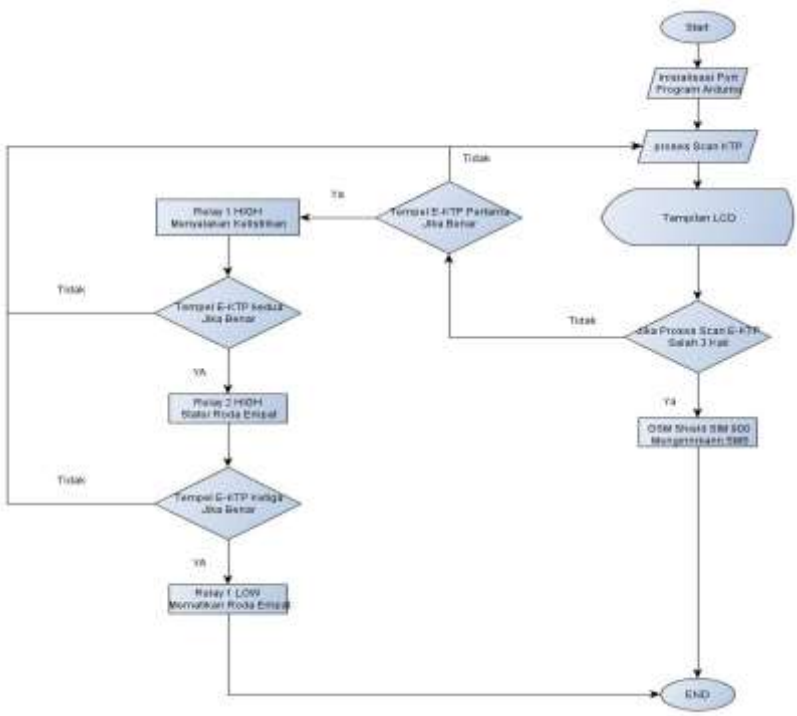

Figure 7 System Flow Diagram

5. Testing
   Circuit testing is done to ensure appropriate systems and can function in accordance with the designated beforehand, on testing done in stages beginning in a series of sub-sub-system to the entire system circuit.

4. FINDINGS AND DISCUSSION

This test includes E-KTP testing, relay, GSM Shield Sim900 and the whole circuit.

1. E-KTP Scan Test
   This test aims to ensure that there are no errors in the command to the output obtained. At this stage the researchers conducted tests with 2 different E-KTP cards so that 1 E_KTP was registered.

Table 1. RFID Testing Results

NO	Number E_KTP	Description
1	136497101136	Access Received
2	215220821312	Access denied

The results of the MQ2 Sensor test it can be seen Retrieval of data with this Mq2 sensor can be known if the distance that can be read by the MQ2 sensor is 30 cm whereas if more than 30 cm distance the sensor can not read from the input.

2. Relay Testing
   This test is carried out to find out whether the E-KTP can properly input the vehicle to start the vehicle, starter and turn off the four-wheeled vehicle.

Table 2. Relay Test Results

Number E-KTP	Scanning			Status Relay		Description
	Electrical System On	Engine On	Engine Off	1	2	
136497101136	√			High	Low	Turn on Electricity (electricity ON)
		√		High	High	Stater (engine ON)
			√	Low	Low	Deadly Vehicles

The results of the 1st to 3rd trials with the registered E-KTP number, it can be seen that if only one scan is performed, relay 1 will be HIGH to turn on the electrical system while on the 2nd test, the 2nd scan will then start the engine. Test to 3, the scans into 3 generating low output or with the output of the relay will turn off the car engine and electrical systems.

3. Gsm Shield Testing

Table 3. Gsm Shield Test Results

Number E=KTP	Scan Error			Status *Gsm Shield*	SMS sending response time
	`1	**2**	**3**		
215220821312	√			*GSM Shield does not send SMS*	-
	√	√		*GSM Shield does not send SMS*	-
	√	√	√	*GSM Shield Sends SMS*	5 seconds

From the results of the above table it can be seen that in the experiment to 1 up to a free trial to 3 with the number of E-ID card that is not registered, it can be known if the errors in the scan 3 times then GSM Shield will send an SMS to the owner of the vehicle and the system will be blocked for 5 minute.

5. CONCLUSION

The results of trials that have been done, the results, if only do one scan then relay 1 will be HIGH to turn on electricity while on the second trial do 2 scans which means the owner will turn on the electrical and vehicle stater namely relay 1 and 2 will be HIGH and on the third try do 3 times scan which means the vehicle is turned off. And if there are errors in scanning 3 times the GSM Shield will send an SMS to the vehicle owner and the system will be blocked for 5 minutes.

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