ELCONAS Electronic Control Using Android System With Bluetooth Communication And Sms Gateway Based Microcontroller

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***Abstract*— ELCONAS (Electronic Control with Android System) is a tool designed to control electronic devices. This control Android via Bluetooth communication and SMS Gateway that can be controlled by the user. Control using Bluetooth, applied for a certain distance which is connected to android, Bluetooth with limited distance range of services and the use of the remote system is used SMS Gateway is connected via a short message that is sent to the microcontroller through a module that has been installed on the microcontroller, using ArdunioMega 2560. ELCONAS designed to minimize the occurrence of short circuits and even prevent fires because the user can handle it via the application without having to interact directly with electronic devices that are at home or office.**

***Keywords*—ELCONAS, Android, Bluetooth, SMS Gateway, Microcontroller**

I. INTRODUCTION

Technological developments make electronic circuits applications to replace the role of man as the thoroughness and accuracy in work. Need a good installation by a qualified electrical appliance supported in accordance with established standards of course, very necessary so that electricity can be used safely and comfortably, so they can avoid things that are not desirable, such as short circuit that could cause fire.

Data based on the Fire Department and Disaster Management (Damkardan PB) Jakarta, in the period January to August 2013 has been 509 fire incidents occurred in the capital Jakarta, and the main cause of the fire is still dominated by short circuit (State Intelligence Agency, September 27 2013).

Fire prevention can actually be done by increasing citizen awareness of the dangers of fire. Residents must be able to anticipate potential threats early fires in their respective communities.

With regard to the issue of researchers intend to create an instrument to control electronic devices through Bluetooth communication via Android and SMS gateway that can be controlled by the user.

The purpose of this electronic control device he designed to help humans work in controlling electronic devices using Bluetooth communication on the use of near and distance using SMS gateway for longer distances as well as the design of which is controlled by a microcontroller-based smartphone with the Android OS.

The system design is made with implementing the analog input function based on microcontroller ATMega 2560 Arduniomega 2560 gets input from the Bluetooth Module with Baseboard for a limited distance and SMS Gateway system uses Quad-band GPRS / GSM Shield For Arduino Mega for the remote already integrated internally on ATMega 2560. Using Arduino programming language Software hex format that will be downloaded to the Arduino board or other board microcontroller systems and using the Android Development Tools (ADT) plugin for Eclipse create a new application on Android. The output of the microcontroller is connected to the Relay Module with Opto Isolated Inputs are already connected to the electronic device can be enabled / disabled by Opto-Isolated digital input is indicated by the on / off switch on the appliance electronics. Overall the system is connected to a smartphone with Android OS already installed application ELCONAS.

Hope the author is that ELCONAS tool is expected to minimize the occurrence of short circuits and even prevent fires because users can overcome through the application without the need to interact directly with electronic devices that are at home or office.

II. METHOD

The method applied in the event of a framework that encapsulates and describes in outline the sequence carried by Figure 1. The first begins the process of preparation tools and materials. The main equipment needed include laptop / computer, software / application Proteus Professional 7:10 to make the simulation program, the Arduino software compiler to compile the program, Downloader software and the Android Development Tools (ADT) plugin for Eclipse create a new application on Android. While the main ingredient that is based ATMega Microcontroller ArdunioMega 2560 2560 Bluetooth Module with Baseboard, Quad-band GPRS / GSM Shield For Arduino and Relay Module with Opto Isolated Inputs. As well, do initialization in electronic devices at home ELCONAS miniature.

Furthermore, the design stage is the stage of doing the design tool, making simulation program, perform the Arduino programming and programming on Android. Then do the stages of implementation by creating a simulation program using Proteus 7:10 Professional application, simulation is the

real design of the tool so that we can know the error to minimize errors in tools that will be made.

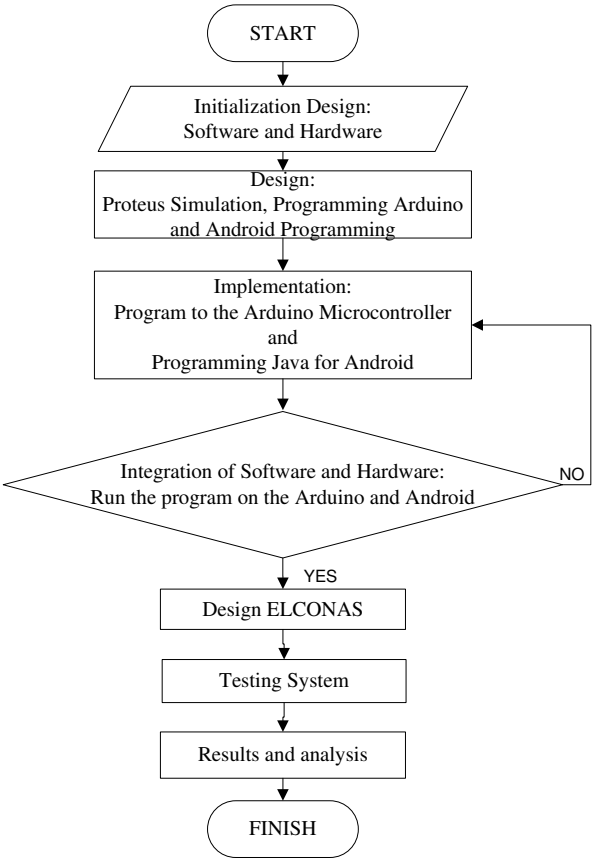

Fig.1 Framework ELCONAS

When the simulation is running as expected then the next step of simulation in the form of a prototype. Components - components such as the Arduino microcontroller, relays, transistors, resistors, LED and electronics assembled as props appropriate simulations we created earlier in the program Proteus Professional 7:10. And then performed on the components of the program are to be connected using cable connectors and rainbows. Then download the Arduino software program compiler results that have been made to the Microcontroller ATmega2560. How to download the program into Microcontroller ATmega2560 use to the downloader.

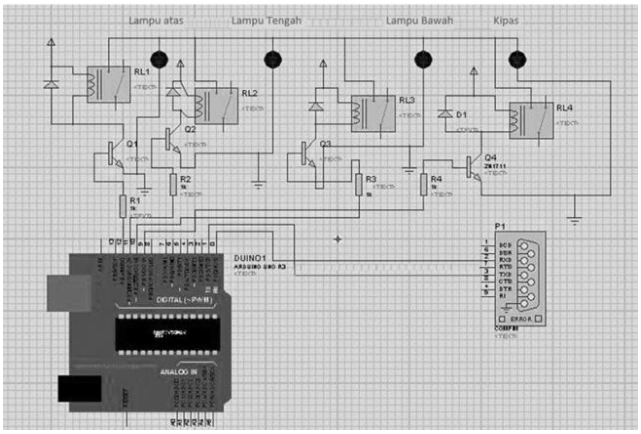

Fig.2 The Circuit Simulation in Proteus 7 Professional Program

In making the pairing condition VSPE between software prototype software simulator can communicate with programs created using Arduino IDE controller ADT as an interface tool. Then be checked against the prototype software controlling life and death so that the LED display relay can live and die as expected then the simulation has been running well.

The next stage is integration of hardware and software perform a stage makes these components into a single unit. A program on the microcontroller, an application in android, which is integrated with the hardware on the microcontroller, Bluetooth, SMS gateway implementation, and testing of the responsibility to relay / switch automatically to the tests performed on electronic devices.

Furthermore, do the designing miniature house ELCONAS therein contained electronic equipment such as lights and fans so that tools neatly arranged.

Once the house is finished miniature optimization testing and feasibility testing of electronic devices on a miniature house ELCONAS by applying some android component that has been designed with a microcontroller that is android and test the connection using SMS gateway ELCONAS tool to control the tool with long distances and using Bluetooth for control tool with limited distance. And test electronic equipment contained in a miniature house that will ELCONAS control via android.

The final stage is the identification of a problem or problems that occur when ELCONAS not working properly. Later analysis of the results of performance testing tools ELCONAS whether the tool has given results consistent with established specifications.

All these stages of processing tools ELCONAS done at the Laboratory Automation Industry Fasilkom Sriwijaya University.

III. RESULT AND DISCUSSION

ELCONAS is a controller electronic devices at a relatively far using Android with based Microcontroller Arduinomega 2560 R3 effectively minimize the possibility of fire events caused short circuiting.

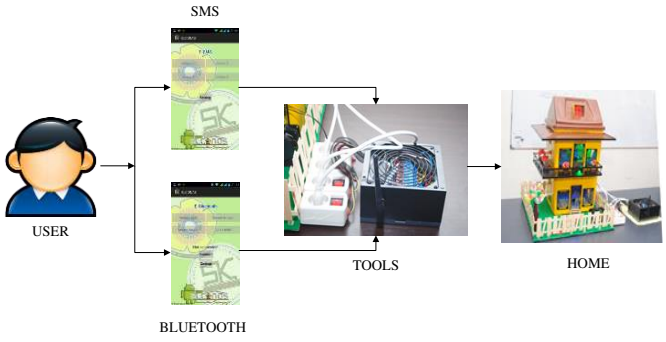

Fig.3 The Working System ELCONAS

ELCONAS working system that the user can control electronic equipment via the Android through Bluetooth communication and the SMS Gateway. In the android interface, as shown in Figure 3.1 is explained that the main view of the ECLONAS, there is a choice of control using Bluetooth or SMS.

When selecting commands via SMS are display devices that will be in control, previously to facilitate users to control

electronic devices is done setting the name of the device in accordance with the layout of the main house ELCONAS, and also setting the destination number, and a brief message that will be delivered to the tool ELCONAS and the reply given in the form of an on / off on electronics and indicators given instructions on / off on the application form when electronics flaming red color.

Fig. 4 Android Interface

Likewise, when using a Bluetooth control for implementation at close range. By doing paired Bluetooth advance of Android with the tools ELCONAS. Then, the next display as well as SMS, but the Bluetooth is not required setting the destination number.

Bluetooth and SMS Gateway is connected via a short message that is sent to the microcontroller through a module that has been installed on microcontroller ArdunioMega 2560 is connected to the relay. Relay is connected directly to the appliance electronic using a electrical terminals.

Fig. 5 Implementation of The Tool is Connected to The Electrical Terminals

Fig.6 Miniature Of ELCONAS House's

The advantages of ELCONAS how to use it easily just by pressing a button on the Android app without having to interact directly with electronic devices at home. Then be helped, effectively minimize losses due to an electrical short or fire. ELCONAS can be tailored to the wishes of users (user customizable) based on the number of use of electronic equipment in the home.

After PKM ELCONAS is expected to be implemented in the community, especially in controlling the electronic devices at home, the office, or the industry in general. In order ELCONAS through increased security on electronic devices and reduce the occurrence of fire.

IV. CONCLUSION AND SUGGESTION

A. Conclusion

1) ELCONAS is control electronic devices using Android System with Bluetooth communication and SMS Gateway. Using the main components of the microcontroller ArduinoMega 2560 R3, Bluetooth Module, GPRS / GSM Shield, and Relay is applied directly to a miniature house ELCONAS.
2) ELCONAS been shown to work effectively with turn on / off electronic devices.
3) Easy to use by pressing a button on the application Android without having to interact directly with electronic devices at home.
4) ELCONAS effectively minimize losses due to short circuit or fire occurs.

B. Suggestion

1) ELCONAS is a prototipe that can be used by the user, but hope can be implemented directly in the home, office or industrial.
2) ELCONAS should be given a password for user convenience.

REFERENCES

[1] Badan Intelijen Negara Republik Indonesia 2013. **Waspadai Ancaman Kebakaran**. Jakarta Selatan: Badan Intelijen Negara.
[2] Linsley, Travor. 2004. *Instalasi Listrik Dasar.* Jakarta: Erlangga. ISBN: 979-741-409-4

[3] Labcenter Electronics, 2002, **User Manual Intelligent Schematic Input System (ISIS)**.
[4] Sayed Y. Hashimi and SatyaKomatineni, 2009. **Pro Android**. Apress Inc.
[5] Arduino, 2014, **Arduino Software**, diakses 1 Juli 2014, <http://arduino.cc/en/main/software>
[6] Arduino, 2014, **Arduino Mega 2560 R3 Board**, diakses 1 Juli 2014, <http://arduino.cc/en/Main/arduinoBoardMega2560>
[7] Arduino, 2014, **Arduino GSM Shield**, diakses 1 Juli 2014, http://arduino.cc/en/Main/ArduinoGSMShield>
[8] Douglas V., 1988, **Microprocessor and Interfacing: Programming and Hardware**, John Wiley & Sons, Inc., New York.
[9] *Bluetooth*, 2014. ***Bluetooth*** **SIG**, diakses 2 Juli 2014. <http://www.*bluetooth*.com/Pages/about-*bluetooth*-sig.aspx>