

PROTOTYPE OF USB STOVE ELECTRIC USING MICROCONTROLLER

Marsono^{#1}, Dicky Nofriansyah^{#2}, Jaka Prayudha^{#3}

^{#1}Prodi Sistem Informasi, Sistem Komputer^{#2,3} Prodi STMIK Triguna Dharma

^{#1}e-mail: marsono@gmail.com

^{#2}e-mail: dickynofriansyah@ymail.com

ABSTRACT

Since the conversion of gas by the government in 2006 in accordance with the Vice President of the Republic of Indonesia Number 20/WP/9/2006 of kerosene to LPG conversion, and comprehensive manner the people of Indonesia are required to use gas and leave the use of kerosene as fuel. People's dependence on gas fuel needs becomes a very big problem when gas production is declining and the public demand for gas is increasing. This resulted in the price of gas is becoming very expensive, and the government will issue a subsidy to 3kg gas becomes very large. One innovation is done is create a USB-based electronic cooking appliances microcontroller. Electric stoves are portable USB-based microcontroller. Electric stove uses low electrical power source which is about 4,5 - 5,5 VDC that can use a USB connection (Universal Serial Bus) from an existing computer or power bank (Acesories mobile). Electric stove USB has many advantages, including easy to use, energy efficient, can be controlled with a good program and can under anywhere because of its relatively small size compared to gas or electric stove on the market

Keyword : Microcontroller, USB Stove, Gas Stove, Electric Stove

ABSTRAK

Sejak konversi gas oleh pemerintah pada tahun 2006 sesuai dengan Wakil Presiden Republik Indonesia Nomor 20 / WP / 9/2006 konversi minyak tanah ke LPG, dan secara komprehensif rakyat Indonesia diminta untuk menggunakan gas dan meninggalkan menggunakan minyak tanah sebagai bahan bakar. Ketergantungan masyarakat pada kebutuhan bahan bakar gas menjadi masalah yang sangat besar ketika produksi gas menurun dan permintaan masyarakat untuk gas meningkat. Hal ini mengakibatkan harga gas menjadi sangat mahal, dan pemerintah akan mengeluarkan subsidi untuk gas 3kg menjadi sangat besar. Salah satu inovasi yang dilakukan adalah membuat peralatan memasak elektronik berbasis mikrokontroler-USB. Kompor listrik berbasis mikrokontroler-USB portabel. Kompor listrik menggunakan sumber daya listrik yang rendah yaitu sekitar 4,5 - 5,5 VDC yang dapat menggunakan koneksi USB (Universal Serial Bus) dari yang ada komputer atau bank daya (Acesories mobile). Listrik kompor USB memiliki banyak keuntungan, termasuk mudah digunakan, hemat energi, dapat dikontrol dengan program yang baik dan dapat di bawah di mana saja karena ukurannya yang relatif kecil dibandingkan dengan gas atau kompor listrik di pasar.

Kata kunci: Mikrokontroler, USB Kompor, Kompor Gas, Kompor Listrik

A. INTRODUCTION

In 2006, the government formally issued a policy in the field of energy is the conversion of oil to gas. Follow-up of the policy that the government distributed millions of tubes along with the gas stove 3 kg to the public free of charge and provide subsidy on gas commodity especially 3kg. Stove is one household that is used for cooking. Currently the stove in the community are still adopting Gas and Electric. Especially for the electricity still makes Static Electricity is used as a resource. The impact of this gas energy policy, from the government side that the increased budget and public expenditure should subsidize gas in particular that of 3 kg. From a societal perspective would increase public spending. From the illustration is in need of a solution of which was the discovery of appropriate technology.

Appropriate technology that will be tested under study originated from a kemirisan researchers as Indonesian citizens. Electric stove USB Microcontroller Based present to solve the nation's problems khsususnya bit in the energy field as well as the gas can reduce the burden on the budget and government spending should subsidize gas and electricity and can reduce the burden on the public, especially the lower middle class.

A microcontroller is the brain of an electronic system such as a microprocessor as the brains of the computer. However microcontroller has added value because in it there are already memory and input / output system in sutau IC packaging. AVR microcontroller (Alf and Vegard's RISC processor) has a standard 8-bit architecture, where all instruction is packaged in 16-bit code and diesekusi most instructions in one clock cycle. In

contrast to the MCS-51 instruction which requires 12 clock cycles as it has a CISC architecture.

With an electric stove USB-based microcontroller expected aspects of the problem would be solved. With the above illustration, the researchers are trying to design a microcontroller-based tool that is portable ie USB Electric Stove-based microcontroller. Stoves are expected with this USB can help the parties including Housewife, Nature Lovers and other parties that require mobility.

1. Formulatin Of Problem

The formulation of the problems that exist in this study are as follows:

1. How to analyze problems that occur in the community regarding the use of appropriate technology so as to assist the government in reducing the burden of subsidies and an increase in public spending?
2. How to design USB-based Prototype Electric Stove Mikrontroller?
3. How to implement a microcontroller based USB Electric stove has been designed so that people do not depend on gas energy during the cooking process in the following years?
4. The extent to which the benefits can be felt for those who require the presence of USB-based microcontroller Electric Stove?

2. Special Purpose Research

Based on the formulation of the problem, it can be summarized destination research is as follows:

1. To help the middle class economy in fulfilling the needs and daily activities.
2. To design a prototype Stoves USB-based microcontroller that can be a solution appropriate technology, especially for those who need it.
3. As one of the inventions to be developed by parties who have an interest and assist the government in appropriate technology innovation.

3. Inovation of Research

The latest technology researchers are trying to offer that in this gas stove implanted a microcontroller capable of programmed so that it can help users to control the cooking process. And also to the efficiency of resource use is electricity

with low voltage that does not require too much electric current as the electric stove on the market. In addition the nature of these tools can be taken anywhere (Portable).

B. LITERATURE RIVIEW

Literature is the cornerstone of thinking to a work or study. Here is a review of the literature of this study are:

a. Requirement Components

1) LCD

LCD display not only numbers, but also letters, words, and all means of symbols with better and versatile than the performer-viewer which uses seven segment LED in general. The LCD module has a pretty good basic interface that corresponds to the minimum system microcontroller. The shape and size are used adalaha 16 x 2 characters (length 16, line 2, character 32) and 16 Pin (Iswanto, 2008: 251).



Figure.1 Liquid Crystal Display

2) Buzzer

Buzzer is an electronic component that serves to convert electrical vibration into sound vibrations. Basically working principle is almost the same dngan buzzer loud speaker, so the buzzer also consists of a coil attached to the diaphragm and then the coil is energized so that it becomes an electromagnet.



Figure.2 Buzzer

3) Relay

Relay is an electronic switch that can be controlled from other electronic circuits. Relay consists of 3 main parts:

1. Coil : coil of the relay
2. Common: part connected with the NC (under normal circumstances)
3. Contact: consists of NC and NONC (Normally Closed) is the switch of the relay are in normal state (not rated voltage relay) connected with common while the NO (Normally Open) is the switch of the relay are in normal state (the relay is rated voltage) is not connected to the common



Figur.3 Relay

4) Application Programming (AVR Code Vision)

CodeVision AVR is a software used to program the microcontroller. Ranging from the use of a simple control until control is quite complex, the microcontroller can function if it has dition a program, charging this program can be done using a compiler which then downloaded into mikrontroler using the downloader. One commonly

used program compiler Code Vision AVR is the use of the C programming language



Figure.4 Main Menu Of Code Vision AVR

b. State Chart Of Research

In this section there are several explanations that researchers pointed them are those who have studied in respect of gas cookers and others. Research related to them by a gas stove (FajriVidian, 2009) entitled "Biomass Fuel Gas Stove" In this study, using rubber wood fuel and corn cobs. Before being put into a wood burner cut first approximately 3 cm.

There was also a study about the "Modifications and Form Design on the efficiency Gas Burner Fuel LPG One Furnace System Mechanic Lighters" (FanyAditama, et al, .2010) which is the essence of research is how to conduct the fuel efficiency by increasing the efficiency of the combustion process that occur and increase the efficiency of the combustion process is not independent of the form of fuel (Burner) but it is also a way to modify the variation amount Burner hole at the top to two (2) burner design models.

And in 2012 students at the University of Indonesia (Farah Inayati., 2012) conducted research on optimization of the performance of a gas stove with a low-emission biomass-fired carbon monoxide Biopellet of rubber wood. The description of this study highlight the mechanism of gas stoves burning biomass combustion include Fassa 1 supplier of air blower still produce CO above the threshold limit of 25

ppm. Best stove combustion chamber 15 cm in diameter with a height of 58 cm the combustion chamber is in the ratio of secondary air flow to the primary air emissions of CO 6:29 with an average of 14 ppm and a thermal efficiency of 52.8%.

C. RESEARCH METHOD

a. Data Collection And References

The literature study was obtained from international journals, textbooks that are relevant to the study and research on the aircraft undercarriage with a motor drive ever undertaken. One of the books used in this research work is the microcontroller.

b. Analysis Problem

The system to be built in this study originated from ideas and thoughts on a cooker (stove) electrically USB as a media-based electricity. It is known generally stove using fossil fuels include petroleum and natural gas, but these energy sources are increasingly depleted and can not be renewed, although at this time there has been an electric stove, but the resources are used is large enough that 220-240 VAC which still uses considerable energy source and consequently the use of many existing electric stove could not be easier and menggunakan absolutely stove manually considering the price, and the care and resources are still many to be the calculation of the public at large. For that conducted research on how North seek solutions to problems that exist on the stove electrically at this time, then the energy resources and functional stove electrically to be designed is a change from the stove electrically existing at the moment, stove this electric-based resource are low, approximately 4,5 - 5,5 VDC that can use a USB connection (Universal Serial Bus) from an existing computer or power

bank (Acesories mobile). In this system, given some information and system settings so that the system can run both as desired. As well as indicators of sound as a warning alarm when the temperature is hot electric stove has reached the maximum temperature and the duration of use of the stove too long, which aims to avoid the accident in the process of implementing this USB-based electric stove.

Based on these ideas, this study aims to design a USB-based electric stove that will provide *pengehematan* changes in energy resources currently used to manually kerosene stoves and natural gas. The tool is also designed in a way based on an overview of the system, both system design, system implementation to carry out analysis of problems that occur in the processing system of this USB-based electric stove. The systematics in this study include:

- Create a picture of the real problems of the system to be implemented on the device.
- Determine the appropriate algorithm to solve problems that occur on the system.
- Creating a circuit schematic for the system can select the appropriate components in the system.
- Create a system design tool USB-based electric stove.
- Implement a system to be able to know the system works according to the concept and problems.
- Analyze the system in case of problems when the system works.

After obtaining a picture of the real problems in the system, then the system can be described shape. Before doing the design of the system made the process diagram that will explain the flow of input and output process.

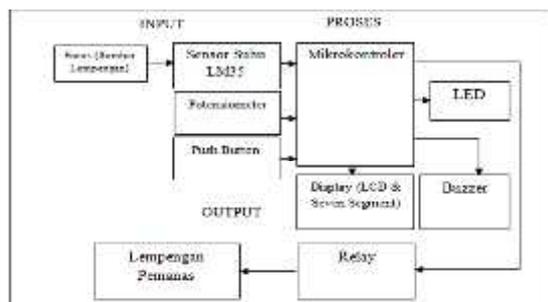


Figure.5 Block Diagram



Figure.6 Chasis

c. System Design

In this case the algorithm or procedure design is research on a system design, hardware and software. System design procedure can be known, it can be read from the identification of the problem and then look for the formulation of the problem and the solutions to problems that arise after the determination of the design or system to be built and it starts with the block diagram to bring up the system. After the start of the design of the circuit design of the control system and software design. Once the system was designed and assembled the complete testing and measurements to determine the error of design performance. Through analysis of test results and measurement, will bring a conclusion to obtain the formulation ketahap system specifications.

1) Hardware Design

Hardware Design is designed with a minimalist concept and easy diimplemtasikan by system users. The hardware design stage is done as follows:

a) Chasis

In the design of the chassis is made with the concept of stove is generally intended that the same function with stoves fossil fuels (petroleum and natural gas)

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