

ROUND THE SPEED CONTROL MOTOR USING THE SMS BASED MICROCONTROLLER

I Daut, Suwarno, M. Irwanto

*School of Electrical Systems Engineering,
Universiti Malaysia Perlis.*

E-mail: irwanto@unimap.edu.my; arno_itm@yahoo.com

Abstract

This paper describes the setting speed of the motor using a microcontroller-based SMS. By using two HP, one HP is connected to the microcontroller circuit while the other was used to control motor speed. Motor speed is determined by selecting a menu that has been set by a program contained in the type of microcontroller AT89S51. The results are that motor control to microcontroller functions ST3 Program issued a data or commands to the relay which then drives the motor AC 1 phase. Control system by SMS via mobile phones makes it possible to govern a phase AC motors. In the design of AC motor control via an SMS-based Microcontroller AT89S51

Key words: Control, Motor, SMS, Microcontroller.

I. Introduction

In line with today's technological developments, the role of electric motors as a support in increasing production in an industry is getting bigger. Processes controlling the electric motors has produced some of the methods are also developed along with technological development. Developments in the field of controlling the electric motors has been a concern and also be a determining factor for overall propulsion efficiency, will need to control the system remotely is increasing in line with the era of globalization where the displacement and movement of people more knowledgeable and fast. During this time people can control things from a certain distance using a remote control, but control is hampered by distance, when

distance between equipment which is controlled by a controller that passes the tolerance limit, then the equipment can not function as desired.

We know there is a vast network of mobile phones which can be accessed by anyone, anywhere that can be used for multiple purposes. Various kinds of mobile phone technology can be used, and one of them is text, and connect the Internet or World Wide Web (WWW) that provide a wide range of information in the form of text, images, and sound. SMS mobile phone technology in particular can be used to overcome distance in remote control systems for example in terms of controlling electric motors in the industry, without limited by space and time, this control process can be done from anywhere from a place that has network access course. With the control system remotely via SMS then control system is no longer local but longer global, in which process control can be done anywhere and anytime without requiring experts to come, but the control system can be made via sms to test and supervision so it is more practical and efficient.

The realization of such equipment by utilizing technology as a main controller microcontroller AT89S51 working censor and control the flow of the relay so that the system can work as expected, a researcher at the pour in a thesis titled "Control of AC Motor With SMS-Based Microcontroller".

II. Methodology

1. Mobile technology

This technology into use in 1970 beginning with the use of microprocessors for communications technology. And in 1971, opened the first mobile network in Finland

called the ARP, then followed NMT in Scandinavia in 1981 and AMPS in 1983. The use of analogue technology in the first generation causes a lot of limitations such as traffic capacity is small, the number of customers that can fit in one little cell, and the wasteful use of frequency spectrum. On the other hand, the increasing number of customers can not be accommodated first generation. In addition, technology can only serve 1G voice communications, unlike the 2G can be used for SMS. NMT Nordic Mobile Telephone or mobile phone network analog is first used internationally in Northern Europe. This network operates at 450 MHz so it is often called the NMT-450, NMT-900 there are also operating at 900 MHz.

Given the market demand and the need for better quality, was born the second-generation technology, or 2G. This generation is already using digital technology. Other 2G technologies is the IS-95 CDMA, IS-136 TDMA and GPRS. The second generation not only used for voice communications, are also able to SMS and data transfer with a maximum speed of 9,600 bps (bits per second). For comparison, the modem that is widely used for internet connection speed 56,000 bps (5.6 kbps). Excess 2G than 1G in addition to better service, terms of capacity is also greater. Due to the 2G, a single frequency can be used several customers using the mechanism of Time Division Multiple Access (TDMA). Standard 2G technologies of the most widely used today is a GSM (Global System for Mobile Communication), as used by most mobile phones today. GSM operates in the 900, 1800 and 1900 MHz. GSM also supports 14.4 kbps speed data communications.

2. Mobile Network Function

The more rapid development of technology and the high level of competition in the business world, a challenge that must be faced by all parties, especially in industries that can not be separated from the

telecommunications and information technology. Changes and developments that have been achieved such as cellular phones and Internet telecommunications has been growing so fast and demanding industry and the people who engaged in it to be better prepared to face any progress. Meanwhile, on the one hand there is still a gap between our education, especially from the universities, with the real world of work. The fact that we get today are graduates of university scholars only as a resource that is ready to train, not ready. The main cause is the omission of Higher Education to the development of technology and information that exist in the outside world. In addition to working to make and receive phone calls, mobile phones also generally also has the function of sending and receiving short messages (short message service, SMS). There is also a provider of mobile telephone services in several countries that provide third generation (3G) by adding videophone services, as a means of payment, as well as to televisions online on their phones. Now, cell phones into multifunctional gadgets. Following the development of digital technology, now mobile phones are also equipped with a wide selection of features, such as can capture radio and television broadcasts, software audio players (MP3) and video, digital cameras, gaming, and internet services (WAP, GPRS, 3G). In addition to these features, the phone now has embedded computer features. So on the phone, people can change the functions of mobile phones into mini computers. In the business world, this feature is very helpful for business people to do all the work in one place and makes the job completed in a short time.

3. Short Message Service (SMS)

Short Message Service is a service performed by a mobile phone to send or receive short messages. SMS was originally designed as part of the Global System for Mobile communication (GSM), but are

now already available on other mobile network including a network of Universal Mobile Telecommunications System (UMTS). As one service in the GSM system, no single party can ever claim to be the originator of the idea of SMS. The idea of adding text messaging as a service for mobile users who are raised in many communities of mobile komunikasi ministry that began in the early 1980's. Experts from the community to contribute ideas in the arena of discussion. Most of them want the SMS as a notification tool, such as notification of incoming voice mail, but there is also wanted as telemetry. But few believe SMS will be used as a tool for sending text messages to mobile users across.

In early February 1985, after discussion with the sub-group of the GSM-WP3, chaired by J Audestad, SMS to be considered in the main GSM group as a new service in digital cellular systems. In GSM document about the services and facilities provided by the GSM system (GSM Doc 28/85 Rev2, June 1985), in both mobile originated and terminated on mobile, including point-to-point and point-to-multipoint, short messages are present in GSM teleservice system. The first commercial SMS sent on December 3, 1992 from a personal computer (PC) by Neil Papworth of Vema Group to Richard Jarvis on the Vodafone GSM network in the UK. SMS was originally designed for GSM but is now present in various tissues, including 3G networks. Meskipun Thus, not a text messages using SMS. In Japan, known as Skymail, J-Phone and Mail Short product of NTT DoCoMo.

In simple sending an SMS to the destination number is as follows:

1. SMS messages sent to the SMS Center (SMSC) from the operator's SMS.
2. After the message is processed internally, the SMS Center sends a request message recipient information to the Home Location Register (HLR).

3. Then the SMS Center sends an SMS message was to the Mobile Switching Center (MSC).
4. In the MSC is information about the condition of the recipient line obtained and collected, the data taken from the Visitor Location Register (VLR). In this process that sometimes requires authentication, whether SMS can be received by the destination number or not.
5. After the MSC forwarding the message to the server operator.
6. Setelah SMS sent, the MSC returns the successful delivery of information to the SMS Center.
7. Finally the SMS Center reports delivery status of SMS back to the sender of the message. The process of sending SMS can be seen in Figure 1 below.

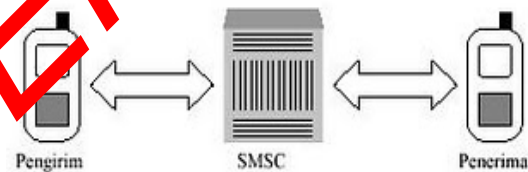


Figure 1. Method SMS Work Scheme

4. AT89S51 Microcontroller Pin Configuration

1. Microcontroller port

Microcontroller AT89S51 has a pin numbered 40 and is generally packaged in a DIP (Dual Inline Package). Each pin on the microcontroller AT89S51 has a purpose as follows:

a. port 0

Port 0 is a function of the two ports are on pins 32-39 of the AT89S51. In the design of a simple system of these ports as I / O ports versatile. For a more complex design with an external memory involving this pathway dimultiplek to the data bus and address bus.

b. port 1

Port 1 is reserved as I / O ports and is on pins 1-8. Some of the pins on this port has a

specific function of P1.5 (Motion), P1.6 (MISO) P1.7 (SCK) is used to track download the program.

c. port 2

Port 2 (pins 21-28) are the two functions as port I / O versatile, or as high byte address bus for external memory designs involving

d. port 3

Port 3 is a port of two functions that are on pins 10-17, this port has multiple functions

2. PSEN (Program Store Enable)

PSEN (Program Store Enable) is an output signal is found on pin 29. Its function is as a control signal to allow the microcontroller to read the program (code) from external memory. Normally this pin is connected to pin EPROM. If program execution from internal ROM or from flash memory (ATMEL AT89SXX), then it is in the off state (high).

3. ALE (Address Latch Enable)

ALE output signal which is at pin 30 the same function with ALE on microprocessor INTEL 8085, 8088 or 8086. ALE signal is used to demultiplex address bus and data bus. ALE signals generate pulses of 1 / 6 the oscillator frequency and can be used as a clock that can be used in general.

4. EA (External Access)

There is a signal input on pin 31 that can be logic low (ground) or logic high (+5 V). If given a logic high then the microcontroller will access the program from an internal ROM (EPROM, flash memory). If given a logic low the microcontroller will access the program from external memory.

5. RST (Reset)

Reset input at pin 9 is a master reset for AT89S51. Pulse transition from high to low for 2 cycles will reset the microcontroller.

6. Oscillator

Provided on chip oscillator driven by XTAL connected at pin 18 and pin 19. Stabilizer is required by 30 pF capacitors. Great value XTAL about 3 MHz to 33 MHz. XTAL1 is the input to the reversal of the oscillator amplifier (inverting oscillator amplifier) and an internal clock input to the

operation of the circuit. While XTAL2 is the output of oscillator amplifier inversion.

III. SYSTEM DESIGN

1. Working Principle Series

The series of AC motor control system through SMS-based microcontroller has several major parts of which are: microcontroller, Interface circuit, Driver Current (amplifiers), Relays, circuit controlling alternating currents

a. Microcontroller

Microcontroller is a major part of the system which serves to control the work of the entire system, the microcontroller is a component of the IC can be reprogrammed with such functions and work of the microcontroller has been in the bunk in the program or software, thus the function and characteristics of the controller can be changed according to the needs, the microcontroller is in use on this circuit is the microcontroller which has 4 ports IO, the microcontroller has an internal memory timer and oscillators thus the role of materials in the form of components outside the microcontroller can establish a minimum system very simple. Type microcontroller AT89S51 which in use is shown in the picture sequence in the microcontroller circuit that is connected with some external components that can work well, the output on the microcontroller output to control the motor load in the program at P1 while receiving input commands from the SMS program on port 3 that the serial microcontroller, research on the microcontroller serves to research the microcontroller so that the program will work to start from scratch, Kristal the pins 18 and 19 serves to activate the bell-shaped internal microcontroller, input voltage VCC is 15 volts for the microcontroller in the program at Pin 40 and while microcontroller pin is at Pin 20 to activate the load on the output mikrkontroller way is by providing a logic 1 on output port.

b. Interface circuit

Interface is the part that is needed by the system to communicate with external devices serially where in the circuit with a cell phone, work is as interfaces to convert the logic level difference between TTL serial communication with RS232 serial communication so that the flow of communication can be done, This type of interface used is the IC HIN Pin 232 by the number 16 and number of input lines and output as much as two pairs, different levels of logic 10Volt while for logic 1 is 5 volts while the voltage level of logic 0 is 0 Volt.

c. Current driver (amplifier)

Current driver (amplifier) is the part that works to strengthen the flow of the microcontroller in order to move larger loads so that the load can be in life or turn off the amplifier circuit comprises a transistor BD1319, a resistor on the base and diode rectifiers, transistors will strengthen the current in provided by a 10K resistor microcontroller what if the output when the output logic 1 while the microcontroller logic 0 then the transistor will be CUT off because it had no forward bias on its base.

d. Relay

Relay is an electromechanical switch that is controlled with a switch on the electric current in the design of the relay function is to control the alternating current circuit mensuite behind so that they could control the speed of AC motors, the design has a 3 pieces Relay TMDT who work separately from each other, to control the flow of motor modules in the use of type-I MK2P Relay GMRON Brand.

e. The controller circuit of alternating current

Control circuit of alternating current circuit which serves to control the motor speed by controlling the motor current circuit is composed of several components, among others: Thyristor / Triac, Resistors and DIAC, Triac is a type of thyristor to an

alternating current, which in use bertype Triac BT 136 where as in the picture, when the gate of the triac is triggered with a larger gate currents will cause the current drain drain currents as well. AC Motor Control Block Diagram Through SMS-Based Microcontroller AT89S51.

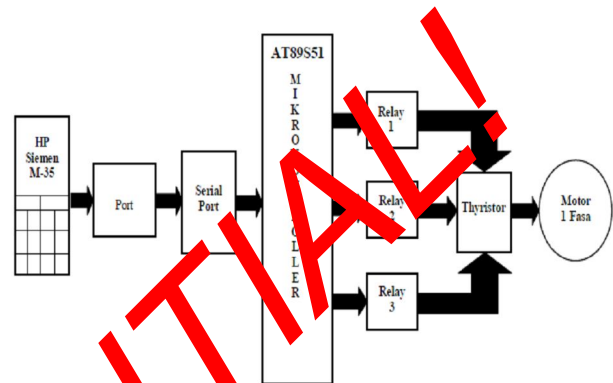


Figure 2. AC Motor Control Through SMS-Based Microcontroller



Figure 3. forms of motor control design that has been assembled

IV. RESULTS AND DISCUSSION

1. Measurement Microcontroller:

- Mikrokontrolller in the measure in advance and must be noticed on the first leg on the microcontroller in the mark Δ Ordinary or O.
- After that the measuring instruments on the cable multimeter (-) Negative is connected to the body of the IC regulator and feet (+) Positive on

multimeter is connected to the foot of the microcontroller.

- Then in view of how much value each - each leg on the microcontroller, this measurement is the same way by measuring an IC.

2. Foot Measurement AT89S51

Microcontroller:

Measurement of Pin-Pin Microcontroller IC is used as a match between the measured voltage with the program that created, with a microcontroller circuit can thus test whether the fit between the measurements made with the program.

3. Foot Measurement IC

- Measurement of IC Pin IC 232 to determine whether it works or not.

Sign of Power Supply Voltage: 12 Volt

- Voltage Regulator IC Output: 4.88 Volts

4. Driver Voltage Measurement

Table 1. Driver Measurement Results

	Logika	V (Basis)	V (Kolektor)	Status Relay
TR1	0	0,07	12,88	OFF
	1	0,75	0,1	ON
TR2	0	0,07	12,88	OFF
	1	0,73	0,11	ON
TR3	0	0,07	12,84	OFF
	1	0,7	0,13	ON

table 1 represents the results of measurements of the driver or amplifier circuit that serves to determine whether the driver has worked well or not and to obtain measurement data for the analysis.

V. CONCLUSION

- Control is done via SMS from Mobile and all processed from the cellular network.
- Controlling the AC motor as a load can be done or on the run remotely via SMS Mobile.
- ST3 program the microcontroller to function at issue data or commands to the relay which then drive the AC motor 1 Fasa.
- Sistem control via SMS via mobile phones makes it possible to govern a phase AC motors.
- In the design of AC motor control via an SMS-based Microcontroller AT89S51, not just a phase motors are biased in control but also biased Motor 3 Phase Thyristor only additions.

VI. REFERENCES

- Academic Information Systems application development with Java-based SMS, Publisher Salemba Infotek Grand Wijaya Center, 2005.
- Quickly learn easily and Language Program C with SDCC (Small Device C Compiler), Style Media Publishers, 2005.
- AVR microcontroller series ATMega 8535 Simulation, Hardware, and Applications, Andi Publishers, 2006.
- WWW.GOOGLE.COM, AC Motor Control Theory Via SMS, Thyristor, Microcontroller AT89S51.