

3-PHASE MOTOR ON-OFF CONTROL USING MOBILE WITH FEEDBACK

**Prof.Somanath M. Lambe¹, Ms.Nagma M.Mulla², Ms.Aishwarya V.More³,
Ms.Shweta S. Gharpure⁴, Ms.Poonam P.Kadam⁵**

^{1,2,3,4,5} Dept.of Electronics & Telecommunication,

Karmayogi Engineering college shelve-Pandharpur (India)

ABSTRACT

Nowadays, the increasing role of advanced electronic Systems, Mobile networks, wireless communications and digital technologies affects many methods used in remotely controlled Systems. One of these methods is the mobile –based control system design and analysis, which is practical and applicable in read-time development. This paper suggests a new remote control technique based on mobile capabilities to control a driving motor circuit which in turn will monitor and control the 3-phase ac motor. The proposed system can generate a control signal through a Global system for mobile communications (GSM) modem by Dual Tone Multi-Frequencies (DTMF) techniques to drive the ac motor .The system is more efficient for the farmers to access the motor without any extra efforts by using mobile. An experimental study was done and the obtained result showed the effectiveness of the proposed method.

Keywords: Mobile, DTMF Decoder, 3-Phase Motor

I. INTRODUCTION

The main earning source of 75% of Indian population is nothing but the agriculture so,the main focus of this paper is to show how to monitor and regulate the control of a ac-motor remotely using mobile techniques. The actuality of the use of mobile in tele-remote system was inspired by many factors:

- The Huge number of people that use mobile phones in their daily lives.
- The low cost of mobile communication.
- The existing infrastructure that supports mobile communication across the globe (such as GSM).
- The experimental results verify that the DTMF control drive system is highly effective, reliable, proper and applicable to achieve remote control of motor.

II.SURVEY

The use of DTMF Signals instead of Radio Frequencies (RF) signals. These Factors encouraged many researchers to work in this area, for example the problem of implementing of home automation system were considered by (Delgado,et.al.,2006) and (Ciubotaru,et al.,2006) who presented designs and implementations of SMS -text based control . On the other hand, some research works were interested in remotely controlled system

based on DTMF signals such as D.Manoj Kumar that considered in his work industrial applications .In additions, shatnawi and his group were interested in such a problem in their work “ Digital Reciever for DTMF signals,(Mghawish,et al.,2012), and also related research work was done by Callahan in his article “Integrated DTMF receiver(Callahan,1979).

II.THE BLOCK DIAGRAM FOR THE PROPOSED WORK SYSTEM

The Proposed system was done to serve remote control of a 3-phase ac motor and DTMF signals based on GSM modem, DTMF decoder. Driving circuit, and other required electronics such as (transistors, resistors, LEDs, etc.....) as shown in the figure1 below

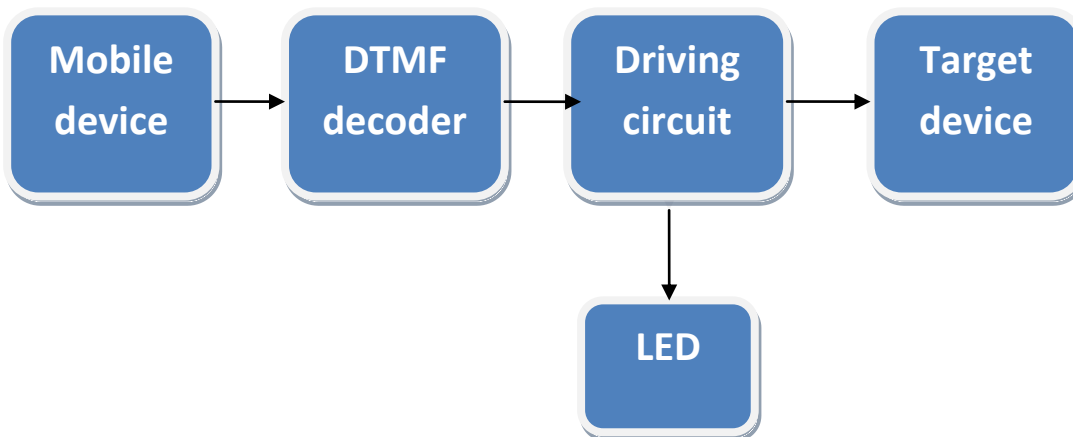


Figure 1. A Block Diagram for the Remote Control System

The mechanism of the system consists of following aspects:

The aspect uses the DTMF model to generate the call signal that will be served later after its processing as tele-control signal for electronic appliance .

A short Description of some devices used in the system.

- A mobile phone is used to send the DTMF code from a user (remote location) to the control system regardless of time and space.
- A DTMF decoder decodes the signals and sends them to Driving system.

A driving system consists of relays, transistors, resistors, LEDs, and other required electronics. The driving system gets signals from DTMF and directs them to regulate the 3-phase motor.

III. DTMF

DTMF is a system of signal tones used in telecommunications. There are twelve standard signals and four extra buttons “A”, “B”, “C”, “D”, which normally are unseen on telephone keypad.

Each signal is comprised from two tones “**low**” and” **high**” as shown in this table:

Table 1. The frequencies used for each DTMF signal.

	1209Hz	1336Hz	1477Hz	1633Hz
697 Hz	1	2	3	A
770Hz	4	5	6	B
852Hz	7	8	9	C
941Hz	*	0	#	D

When a button is pressed on a keypad, a connection is made that generates two tones at the same time. These two tones identify the pressed key to controlled device

The calculation of the frequency for each keypad button is performed by adding the frequencies of a row and a column for every corresponding button.

For example, in order to generate the DTMF tone for "1", you mix a pure 697 Hz signal with a pure 1209 Hz signal, like so:

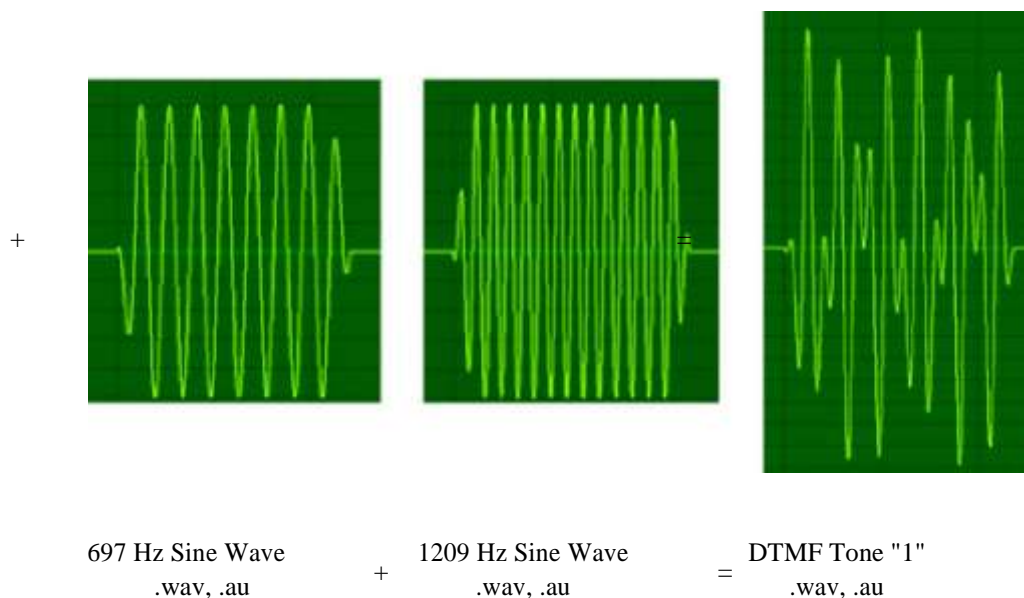


Figure 2. Two Pure Sine Waves combine for form the DTMF Tone for "1" and so on.

The use of four extra buttons "A" "B" C D" is to prevent to control remote device.

The calculation of frequencies of all characters placed on the keypad of the mobile phone is summarized in this table:

Table 2. The high and low frequencies for each key of the keypad

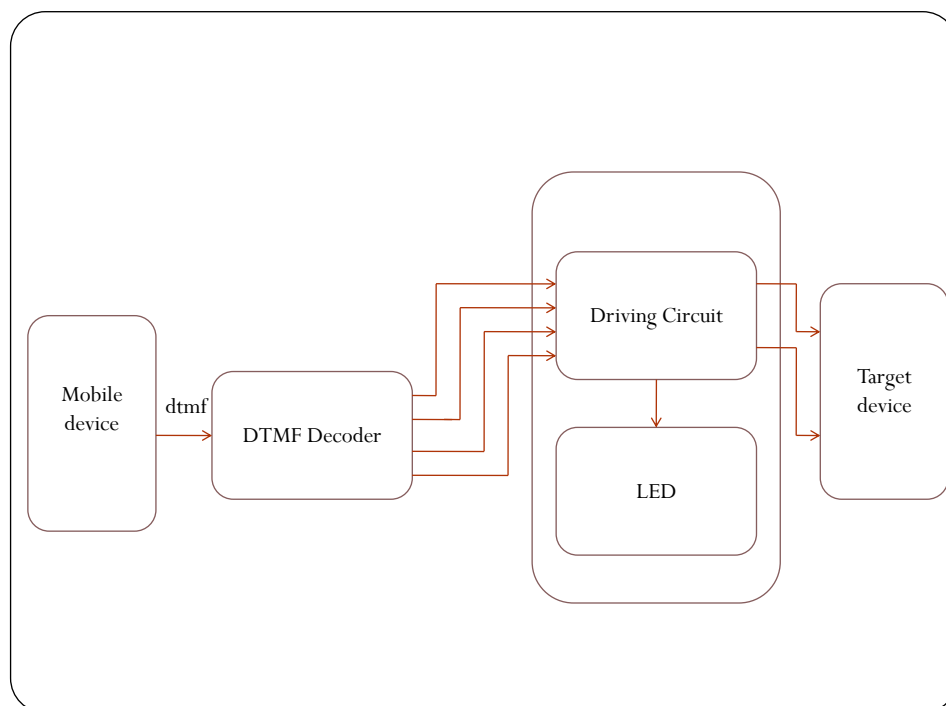
Number	High Frequency	Low Frequency	BCD
1	1209	697	00000001
2	1336	697	00000010
3	1477	697	00000011
A	1633	697	00010000
4	1209	770	00000100

5	1336	770	00000101
6	1477	770	
B	1633	770	00010001
7	1209	852	
8	1336	852	00001000
9	1477	852	00001001
C	1633	852	00010010
*	1209	941	
0	1336	941	00000000
#	1477	941	
D	1633	941	

IV REMOTE CONTROL SYSTEM METHODOLOGY

In this paper a remote control system is developed to perform controlling actions using a mobile phone. The proposed system can receive DTMF signals and sends them via DTMF decoder to a driving system that in turns will control the target device (Xuehua C.P,2008).

The DTMF signal are sent from the user – mobile phone to a GSM modem with a DTMF decoder connected to the main circuit of the controller an shown in figure2:



The DTMF signal is generated when the keypad button is pushed by the user – mobile phone, then this signal is decoded to Binary Decimal Digits (BCD) by the DTMF decoder, after that the BCD is sent to microcontroller (Sharma K.,et al.,2006).

The following steps describes how the proposed system operates:

1. The user sends DTMF tone to the GSM through the DTMF decoder.
2. GSM modem will send to DTMF decoder the appropriate signal coded DTMF tone in a form of BCD .

3. These signals will send to the driving system that contained the relays, which must regulate the switching of motor.

V THE EXPERIMENTAL PART

The general kit of the implemented circuit, which has been used to test a practical developed remote controlled system(Mghawish,et al.,2012), is shown in the figure.3 below :



Figure 4. Testing circuit.

The main hardware parts using in designing the proposed system are as follows

- Power supply.
- DTMF decoder.
- Light Emitting Diodes (LEDs).

VI MAIN IMPLEMENTING PROCEDURE

The implementation part of the proposed system has been done following the below procedure

- Analyzing and testing the sending and receiving processes for DTMF signals to ensure their correctness.
- The verifying of DTMF signals has been done by repeatedly generating sample signal tones for some keypad buttons and testing the output of the DTMF decoder to ensure that the obtained signals are decoded to BCD format. This is done by verifying the DTMF decoder:
- The DTMF decoder receives the decoded DTMF signal and converts them to desired form for use to drive the driving circuit.

The results obtained by the experimental study are summarized in the following table:

DTMF		Action to be performed by driving circuit
Pressed key	BCD	
'1'	00000001	Motor rotation 'counter clockwise within specific units of time'
'2'	00000010	Motor rotation 'clockwise within specific units of time'
'3'	00000011	A motor driver drops
'4'	00000100	LEDs will glow
'5'	00000101	LEDs stop glowing
'6'	00000110	Whole system drops

Table3. Results of experimental study

The sending the DTMF signals will be control the motor ON-OFF. so, as to access the motor by user from anywhere by using mobile with feedback.

VII CONCLUSION

The proposed paper demonstrates the remotely controlled system based on mobile phone device which can operate using the following method: DTMF coded signals to affect the driving system for controlling ON-OFF of a 3-phase motor.

The main advantages of the proposed system are its reliability, low cost, and wide area using.

REFERENCES:

- [1] Alkar, A. Z., & Buhur, U. (2005). An Internet Based Wireless Home Automation System for Multifunctional Devices. IEEE Consumer Electronics, 51(4), 1169-1174.
- [2] M J. Callahan, Jr., "Integrated DTMF receiver," ZEEE J. Solzd-State Czrcuzts, vol.,1 Sc-14, pp. 85-90, Feb. 1979.
- [3] Ciubotaru-Petrescu, B., Chiciudean, D., Cioarga, R., & Stanescu, D. (2006). Wireless Solutions for Telemetry in Civil Equipment and Infrastructure Monitoring. 3rd Romanian-Hungarian Joint Symposium on Applied Computational Intelligence (SACI) May 25-26, 2006.
- [4] Delgado, A. R., Picking, R., & Grout, V. (2006) Remote-controlled home automation systems with different network technologies. Proceedings of the 6th International Network Conference (INC 2006), University of Plymouth, 11-14 July 2006, pp. 357-366.
- [5] Afif Mghawish, Akram A. AbdelQader, Mahmoud A. Al-Jezawi, Mohammad AbuMahfouz. Multi Function Control System using GSM modem Based SM5100B Module. ICITST-2012 London, Technical Co-Sponsored by IEEE UK/RI Computer.
- [6] Murthy, M. V. R. (2008). Mobile based primary health care system for rural India. W3C workshop on Roleof Mobile Technologies in Fostering Social Development, Jun 2008.

- [7] R.Sharma, K. Kumar, and S. Viq, "DTMF Based Remote Control System," IEEE International Conference ICIT 2006, pp. 2380-2383, December 2006. Suvad Selman, Raveendran Paramesran "Comparative Analysis of Methods Used in the Design of DTMF Tone Detectors", IEEE International Conference on Telecommunications and Malaysia International Conference on Communications, 14-17 May 2007.
- [8] Chen Peijiang Xuehua, "Design and Implementation of Remote Monitoring System Based on GSM", 2008 IEEE Pacific-Asia Workshop on Computational Intelligence and Industrial Application.
- [9] Yun Chan Cho and Jae Wook Jeon "Remote Robot control System based on DTMF of Mobile Phone", IEEE International Conference INDIN 2008, July 2008.