

MOBILE PHONE BASED INTERNAL APPLIANCE CONTROL USING AVR DEVELOPMENT BOARD

TEJASWINY SINGH, RAMANDEEP SINGH

PG Student, EECE Department, ITM University, Gurgaon, INDIA
Assistant Professor, EECE Department, ITM University, Gurgaon, INDIA

ABSTRACT

Traditionally we control our electrical appliances using switches that supply the electricity to these devices. Technologically evolution results in finding new technology that make our lives easier. Home automation is becoming has increasing popularity around the world. The process of home automation regards to making everything in the house controlled automatically in this we use technology to control the appliances and perform the jobs that are generally done manually. This project performs of a lot of different activities in the house such as controlling light, television, fans, air conditioner etc. This can also be used in industrial automation.

Keywords- Appliance control, DTMF, AVR, home automation

1. INTRODUCTION

The project is utilized in controlling appliances which are placed far away from the user using mobile phone. The electrical appliances which are connected at home or in office generally consume electrical power and they should be switched ON/OFF as per therequirement. Generally, it was done manually. But now it has become a necessity to control these devices technologically in a more effective and efficient way at anytime from anywhere well as turn them on and off.

The basic aim of the suggested system is to develop a solution that is cost effective and that will allow remote user to control home appliances using DTMF(Dual Tone Multi-Frequency) [4,6] technology. For instance when we are out of our home and recall that we forget to switch off the air conditioner it would be highly convenient if we wereable switch off the appliance without going back to home and thereby save electricity, fuel and time. In the proposed system, we willdevelop a mobilephone based internal appliance control device for controlling the connected appliances remotely [1]. The required components include a mobile phone connected to the system using a head set. We make a call to the mobile phone connected to the device and keep the receiver mobile phone in auto answer mode; in response the user should enter a password to access the system to control devices. As the caller presses the specific button on the mobile phone keypad [7] according to the pre-assigned code, it results in switching ON or OFF specific appliances connected to the device using relays.The maximum number of appliances that are controlled using this projectdepends on the number of buttons present on the keypad of transmitter mobile phone being used.

2. BASIC CONCEPTS OF DTMF

In our mobile phone keypad, each number (including '#' and '*') is associated with unique frequency, this frequency is the sum of a high frequency and a low frequency component, i.e. mixture of two pure tone, hence Dual Tone Multi Frequency.

To be clearer, when a call channel is established, if you press a key on the keypad, you and the called party hear a distinct sound, this is the dual tone which is associated with that number pressed and is passed through the DTMF channel to the called party. Similarly, all 10 numbers (0-9), including '#' (hash) and '*' (asterisk) has a unique dual tone [5] associated with it.

The 2 individual pure tones which constitute the dual tone for each number is as shown below, wherein the corresponding rows give the low frequency tone and the columns, the high frequency tone[3].

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

*A B C D was removed from standard keypads and is now used in military for priority call. If you press 7, your phone sends a signal having a frequency of $852\text{Hz}+1209\text{Hz}=2061\text{Hz}$ and the receiver receives the same.

The main advantage of such a concept is that the dual tone frequency is relatively higher than that of the average environmental noise; hence the DTMF channel only transmits the dual tone and not the relatively low noise frequencies. Also the receiving station can be automated. i.e. the receiving device can be designed (using pass



filters) to receive and decode the dual tone using dtmf decoder [10] and programmed to carry out specific functions corresponding to the number pressed.

3. BLOCK DIAGRAM

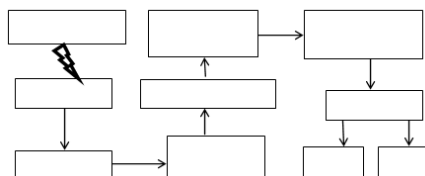


FIGURE 1 BLOCK DIAGRAM OF DTMF CONTROLLER

Traditionally the wireless controlled switch appliances use R.F. circuits [2] but there are certain drawbacks such as limited working range, limited frequency range which limits the control. Using of mobile phones for switching appliances can overcome the present limitations. In order to control the switches, we make a call to the mobile phone attached to the device (in which phone is attached) to a system(through headphone) from any phone, which sends a DTMF tune on pressing the numeric button which sends a DTMF tune on pressing the numeric button.

The cell phone in the system is kept in ‘AUTO ANSWERING’ [9] mode (if the mobile phone does not have the auto answering facility, then receive the call by pressing ‘OK’ key on the switch appliances connected mobile & switch to its hands free mode) [8] so, after a ring the mobile phone accepts the call automatically. Now we press any of the keys present in the keypad of our mobile phone. The decoder decodes the DTMF tones received and sends the equivalent binary number to the 8-bit addressable IC CD4099 [11]. When you press key 4, the binary equivalent (0100) is generated through mobile phone is referred. The 8-bit addressable latch in which output pin 13 is in logic high states, then the number 4 relay is switched on and the appliance connected to it turns on. When you press key 5, 6, 7 then appliances on respective relays 5,6,7 turn on. But when you press keys 8 it gets turn off button on your mobile to perform desired action as listed. The DTMF tones [12] produced are received by the headset of the receiver mobile phone in the system.

4. PROCESS FLOW

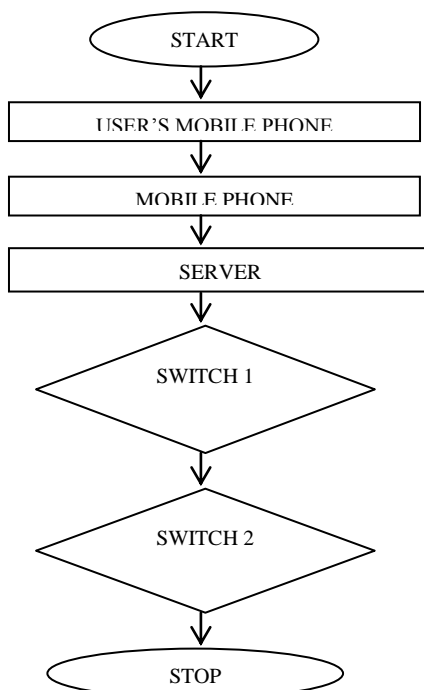


FIGURE 2: PROCESS FLOW DIAGRAM

A call is made to the mobile phone connected to the DTMF decoder. The call is picked and then the phone is checked for the switch been pressed. If switch 1 is pressed then the appliance 1 is switched on and so on. If none of the switches are pressed then all the appliances are switched off.

5. APPLICATIONS

We can turn on & off the lights at a required place from the distinct location (whatever the distance may be) during the day as well as night. We can turn on & off the lights at a required place from the distinct location

(whatever the distance may be). An additional programming circuit may help you to receive a call or a pre-defined message through the phone attached to the circuit, on your phone. Thus, if someone tries to enter your house by opening the window or a door, then you will receive a pre-defined opening of a window or a door, then you will receive a pre-defined message so that you can take immediate action and prevent a possible theft. It can be used to operate industrial appliances where too much smoke or harmful gases may harm humans. This project finds immense importance.

6. ADVANTAGES AND LIMITATIONS

Quick response is achieved. Construction is easy. Easy to maintain and repair. Comparatively the operation cost is less. Design is efficient and low cost. Power consumption is low. We may control electrical devices wirelessly. Conserves electricity (when we forget to switch off and go out). The appliances can be controlled from any place round the globe. This feedback status of the devices being operated is not shown. There is a need of a cell phone to be placed in circuit of this system. Anyone knowing the code and the phone number can control our electrical appliances. The numbers of electrical appliances that can be controlled by this circuit are limited.

7. RESULT

In these my making these the circuit as the device is connected to a corresponding circuit, its gets activated as soon as the call is made to the circuit in which mobile or equivalent GSM module is present to perform a specific operation as per the relay device is connected. In these as the keypad has 12 different key, it can perform 12 distinct operation as per connected to a relay. It can also made off by pressing 8.

8. CONCLUSION AND FUTURE SCOPE

This project is used to switch on/off various home appliances using mobile phone.

9. ACKNOWLEDGEMENT

In this I would take opportunity to acknowledge the lab assistants, professors and the teachers of ITM, Gurgaon.

REFERENCES

- [1] Roshan Ghosh. DTMF Based Controller for Efficiency Improvement of a PV Cell & Relay Operation Control Smart Home Systems, International Journal of Engineering Research and Applications. Vol. 2, Issue 3, May-Jun 2012, pp.2903-2911
- [2] H. H. Goktas, N. Daldal, —A Cellular Phone Based Home/Office Controller and Alarm System, I G. U. Journal of Science, vol. 19, pp.21–26, 2006.
- [3] C. K. Das, M. Sanaullah, H. M. G. Sarower and M. M. Hassan, —Development of a Cell Phone Based Remote Control System: an Effective Switching System for Controlling Home and Office Appliances, I International Journal of Electrical and Computer Sciences (IJECS), vol. 9, No. 10, pp. 37–43.
- [4] R. Sharma, K. Kumar, and S. Viq, “DTMF Based Remote Control System,” *IEEE International Conference ICIT 2006*, pp. 2380-2383, December 2006. [5] C. H. Wu and R. H. Jan, —System Integration of WAP and SMS for Home Network Systems I Journal of Computer Networks, vol. 42, pp. 493-502. 2003.
- [6] M J. Callahan, Jr., “Integrated DTMF receiver,” *ZEEE J. Solzd-State Czrcuzts*, vol., 1 Sc-14, pp. 85-90, Feb. 1979..
- [7] 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, Penang, Malaysia*.
- [8] Malik Sikandar, Hayat Khoyal, Aihab Khan, and Erum Shehzadi. SMS Based Wireless Home Appliance Control System (HACS) for Automation Appliances and Security. Journal of Informing Science and Information Technology, Volume 6, 2009.
- [9] Kamrul Hassan, Raziul Islam Siddiqui, Md. Takdirul Islam, Nahid Alam Siddique, and Syed Mohammad Enam Uddin, GSM Based Automatic Motor Control and Protection System, International Journal of Advancements in Research & Technology, Volume 2, Issue 2, February-2013.
- [10] K. Aruna, A. Sri Ramsagar, and G. Venkateswarlu, Mobile Operated Landrover Using Dtmf Decoder, International Journal of Modern Engineering Research, Vol.3, Issue.2, March-April. 2013 pp-898-902.
- [11] Tuljappa M Ladwa, Sanjay M Ladwa, R Sudharshan Kaarthik, Alok Ranjan Dhara and Nayan Dalei, Control of Remote Domestic System Using DTMF, ICICI-BME 2009 Bandung, Indonesia.
- [12] Er. Zatin Gupta, Payal Jain and Monika, A2Z Control System – DTMF Control System, Global Journal of Computer Science and Technology, Volume 10, Issue 11, October 2010.
- [13] GSM SYSTEM SURVEY, Student text, EN/LZT 1233321, R5B revised upgrade edition. p. 192

