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HOME AUTOMATION SYSTEM USING MOBILE PHONE

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ABSTRACT

This paper enumerates the effective technique for us to control the house, industrial or office appliances and various electrical and electronics appliances via cell phone. Our work is based on AVR Atmega 16 microcontroller. The knowledge of embedded system has been utilized. Our project proposes an efficient system for home automation with the use of AVR Atmega 16 microcontroller paired with Dual Tone Multi Frequency Convertor (DTMF). The scheme provides wireless control of various appliances used in house, industry or office. Instead of using separate transmitter and receiver for wireless control cell phones have been used.

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INTRODUCTION

Amidst the automation era the need for an effective home automation becomes must. For the same purpose our proposed idea provides a user friendly home automation system. In the conventional method used today the various appliances are controlled with the ON/OFF switches present on the switch board mounted on the wall. But the wireless control is not available. Also the chances of fatal accidents caused by the short circuiting in the switch board are very high. Thus the wireless control with the help of mobile phones comes as a boon for preventing such accidents. The similar principle has been used in various robotic industries. The simplicity and the cost effective project adds to the advantages of our work. DTMF works as an interface between the appliance to be controlled and the coded microcontroller. AVR Atmega 16 being a 40 pin microcontroller provides an easy way of controlling ample number of appliances. The problem of wide range control faced by present day remote controlled systems has been completely removed as we are using the mobile phone networks for the purpose of wireless control. The simulation of the hardware has been done on ISIS Proteus software.

The coding of the microcontroller has been done using Atmel Studio software. The use of the mentioned two soft wares has provided an easy and efficient technique for analyzing the system before completing hardware. Another security features like password protection and LCD monitoring system can be synchronized with the system. Home automation has also been achieved using PLC but the cost of the system is very uneconomical. Thus our project provides a system which has optimum cost and is economical. The average cost will be around Rs. 600-700.

AIM OF THE WORK

The aim of our work is to provide wireless control of each and every home appliance present in the home using cell phone. Also the prevention of various electric shocks while operating switches have also been taken into consideration. The following situations will depict the need of the microcontroller based home automation.

- If, we are out for some work with children left at home and they want to switch on some appliances like television, fan etc then we can simply call the cell phone connected with the automation system and can control the appliance. This also provides an increased safety factor.

- If we are running late for office and forget to switch off ac or fan then it can be easily turned off from any location.

The basic idea is to provide an easy and efficient control over appliances accessible from any remote location.

PRINCIPLE

In our project the port A of the AVR Atmega 16 microcontroller serves as the input port. Here the input pins are controlled with the cell phone connected to the microcontroller with DTMF as interface between the two. Port C of te microcontroller will serve as the output used for driving the relay circuitry. Each key of the phone has a separate tone. When the key is pressed directly on the phone or on the keypad of other phone through which phone call will be made on cell phone connected to automation system with auto answer facility. The generated tone will be decoded by DTMF which will be given as input to the microcontroller. The coded microcontroller will accordingly set the corresponding output pin high which will turn on the relay connected to that pin and finally the home appliance to be controlled.

BLOCK DIAGRAM

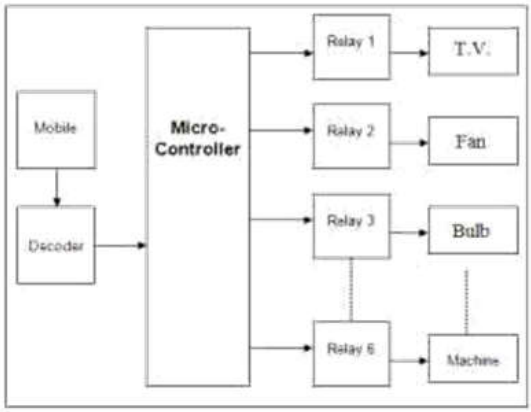

Figure 4. Showing Block Diagram

Dual Tone Multiple Frequency Decoder

MT8870 is a decoder IC which decodes the DTMF tone and then the decoded signal is fed to the microcontroller. It is an on board processor. According to the designed program code the microcontroller starts working.

DTMF frequency table is given in the "Table 4.1":

Table 4.1 Dtmf Tone Assignments

FREQUENCIES	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

Introduction to Atmega 16

- ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR RISC architecture.
- The performance is maximized because the AVR microcontroller uses Harvard architecture.

1pin Out of Atmega 16

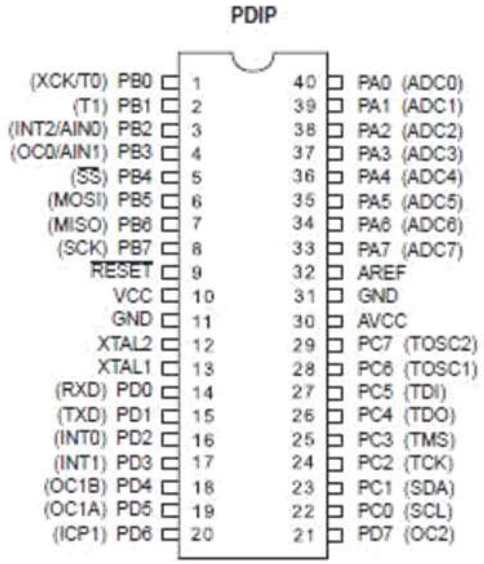

Figure 4.2.1. Showing Pin Out of ATMEGA 16

Features of Atmega 16

- 32x8 general purpose working register.
- 512 K Bytes EPROM.
- Programming lock for software security.
- Extensive on-chip Debug support.
- 8-channel, 10-bit ADC.
- Operating voltages; 4.5-5.5 V for ATMEGA 16.
- Speed Grades; 0-16 Mhz for ATMEGA16.

APPLICATIONS

- This project can be used in Industries to control various devices from a remote distance.
- This project can be use in home for domestic use.

ADVANTAGES

- This project is simple and easy to access.
- It can be accessed from remote areas.
- There is low power consumption.
- It can be operated from a long range.

FUTURE ENHANCEMENT OF THE PROJECT

- It can be used as controlling speed of fan.
- It can be used to control room temperature.
- It can be also used for increasing the life of Induction Motors used in various industries by applying a low voltage protection scheme.

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Conclusion

We have developed the project "HOME AUTOMATION SYSTEM USING MOBILE PHONE". In this project, the home appliances are controlled by the mobile phone used by user that makes a call to the mobile phone attached to the microcontroller system. It receives DTMF tone with the help of the phone attached to the system. The received tone is decoded with the help of DTMF decoder. The DTMF convertor then transmits the signal to the microcontroller which further operates the relay. It provides the advantage of wide range control, safety against fatal accidents caused by the short circuiting in switch board. In this way, we have developed an effective and efficient system of home automation.

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