

## MOBILE CONTROLLED HOME AUTOMATION SYSTEM THROUGH DTMF TECHNOLOGY

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**ABSTRACT:** Now a day's mobile phone has become a part of our daily life, due to low cost of mobile phones are widely used for home automation. In this paper a remotely operated "Mobile Controlled Home Automation through DTMF" is proposed. It is a DTMF (Dual tone multiple frequency) based system consist of two mobile phones, DTMF Decoder and ATmega 8 Microcontroller. One mobile phone is used as remote which may located at far distance from home through which instructions are passed through calling and another mobile phone is located at home act as a receiver. The control information are sent via the remote mobile phone as DTMF Tone, this DTMF tone is received by the mobile phone located at home, the received DTMF tone is then decoded by DTMF Decoder IC MT8870. The output logic signal of Decoder is used as input to the ATmega 8 Microcontroller. The ATmega 8 Microcontroller is previously programmed to control Home Appliances according to output of DTMF Decoder.

**KEYWORDS:** Mobile Controlled Home Automation system, DTMF, ATmega 8, Microcontroller, DTMF IC8870, Home Appliances, DTMF Decoder.

### INTRODUCTION

Automation of surrounding environment of a modern human being allows increasing his work efficiency and comfort. There has been significant development in the areas of an individual's routine task and those can be automated. In the present time, we can find most of the people clinging to their mobile phones; some daily household tasks can be accomplished by personifying the use of mobile phone. A mobile phone has become an essential component in our day to day life. Home appliances control using mobile phones can give us flexibility as cellular networks have wide range of network coverage. So, it is possible to control home appliances from a far distance. Conventional wireless control system such as Radio frequency based system, Infrared remote based system has limited working range. A mobile phone based control system has limited working range. A mobile phone based control system can overcome this drawback, It also provide some advantages like no interference with other controllers.

### METHODOLOGY

#### *Aim of the project:*

Consider the following examples-

- a) if we are working in some industry and have to reach at work place earliest to turn ON some electrical devices like boiler or conveyor belt.
- b) In our normal day to day life we go out of home and forgot to turn OFF fan / light.
- c) In summer season we want to turn ON fan or air conditioner before we reach home.

For all above situations we need a device / controller which can turn ON / OFF the device. To implement this system the consumer should send a unique code accompanied by the required function to his home control through calling.

#### *Principle:*

In the project "Mobile Controlled Home Automation System using DTMF Technology", the home appliances are controlled by a mobile phone that makes a call to the mobile phone attached to the robot. It receives DTMF tone with help of phone attached to the robot. The received tone is is processed with the help of DTMF Decoder.

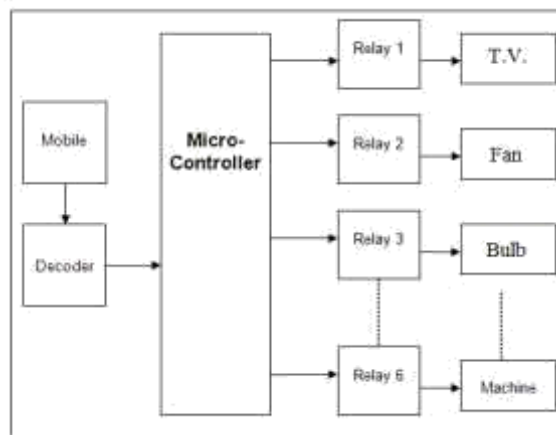
The DTMF Decoder then transmit the signal to the microcontroller to operate the RELAY i.e. in order to switch ON / OFF any appliances positioned at controller's part, the cellular phones are

connected, the appropriate tone is entered. The tone entered is decoded via the DTMF Decoder which further translates it into binary values. Binary values are the input to the microcontrollers which verifies each one individually and corresponding output is given at the output terminal. Thus, when the relay drive is activated by the microcontroller, the device either gets switch ON or switch OFF as per requirement.

It provides the advantage of robust control, working range as large as the coverage area of the service provider. In this way, this paper illustrates the techniques in which a robot is capable of receiving and decoding the commands and control signals from the distant areas and can work according to our instruction. Our project makes use of auto answer facility.

### Block Diagram:

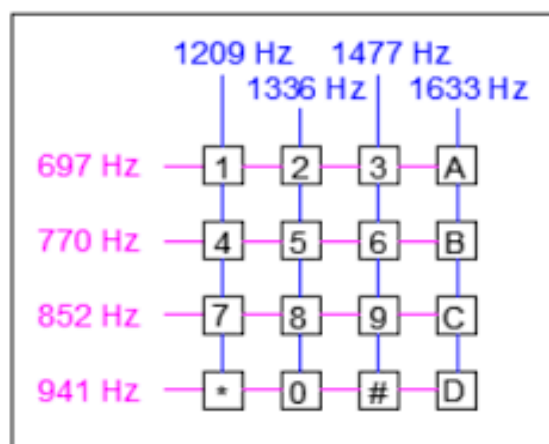
This user console has many keys, each corresponding to the device that needs to be activated. The encoder encodes the user choice and sends via a transmitter. The receiver receives the modulated signal and demodulated it and the use choice is determined by the DTMF Decoder.



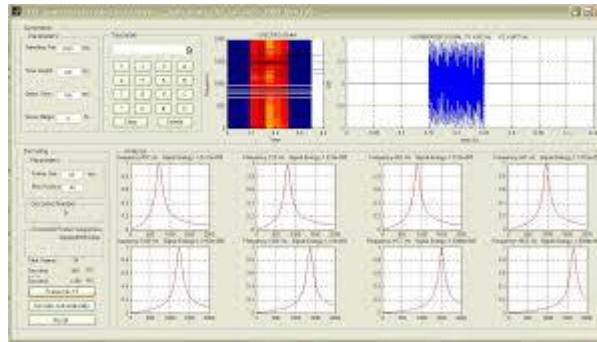
**Fig. 1 Block diagram of proposed system**

### DTMF DECODER

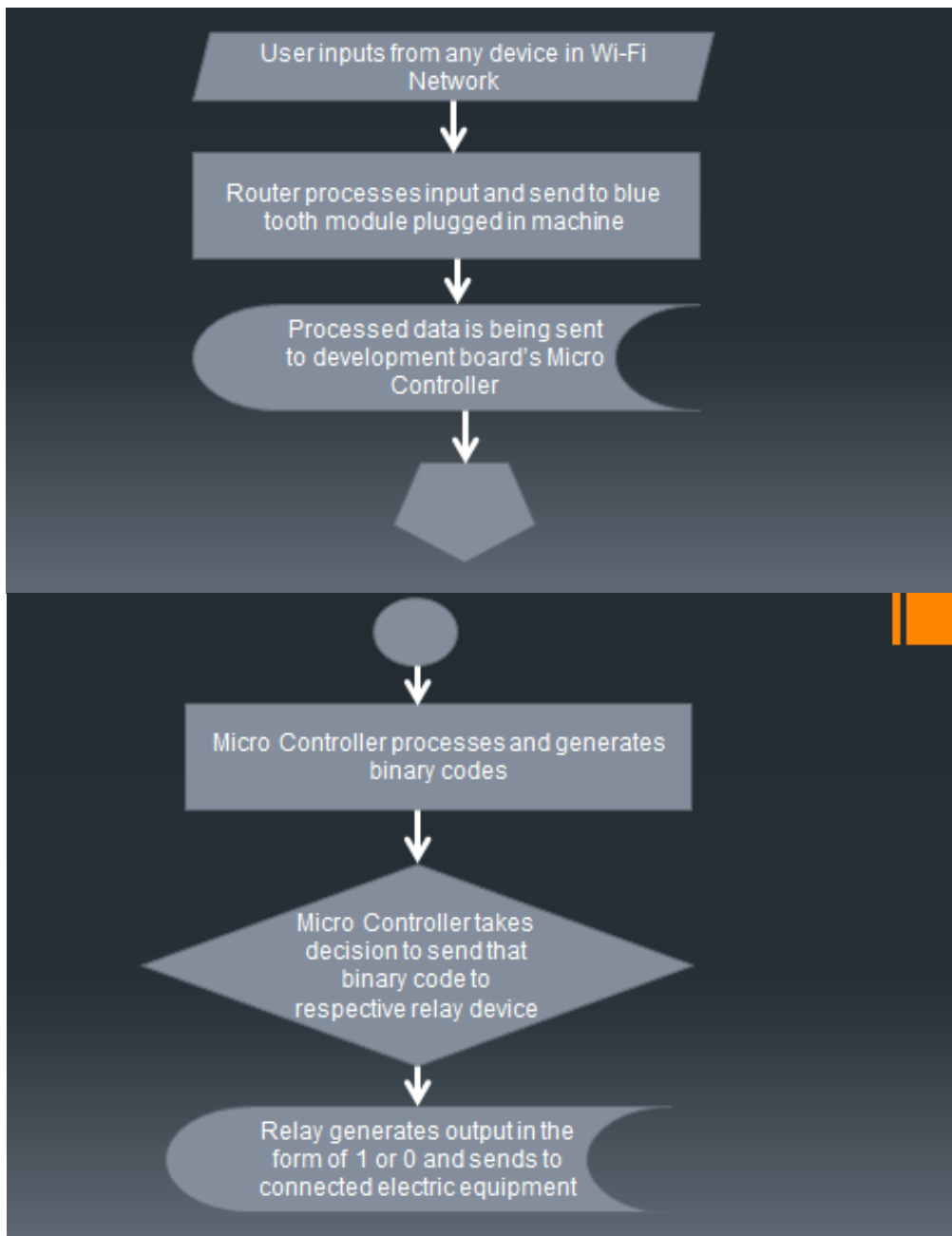
IC MT8870 is a Decoder IC which decodes the DTMF tone and fed the decoder signal to the microcontroller. According to the program in microcontroller the robot starts working.



**Fig. 2 DTMF keypad frequencies**



**Fig. 3 DTMF Technology**



**Fig. 4 Flow Chart of Process**

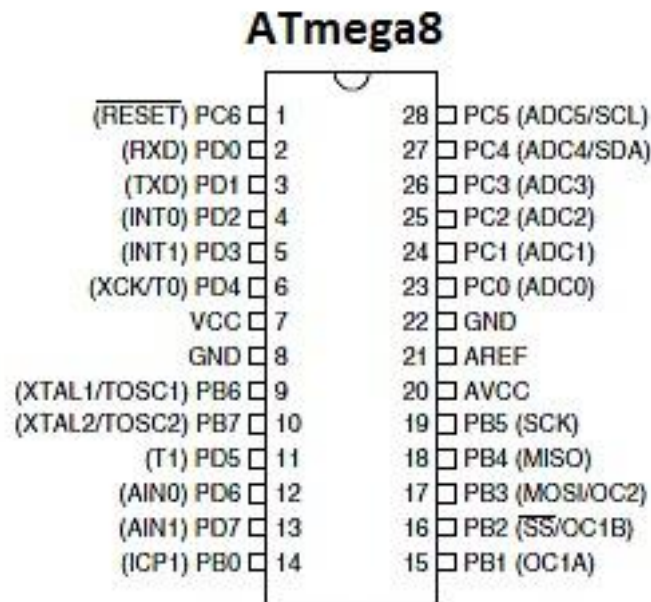


Fig. 5 Pin Diagram of ATmega 8

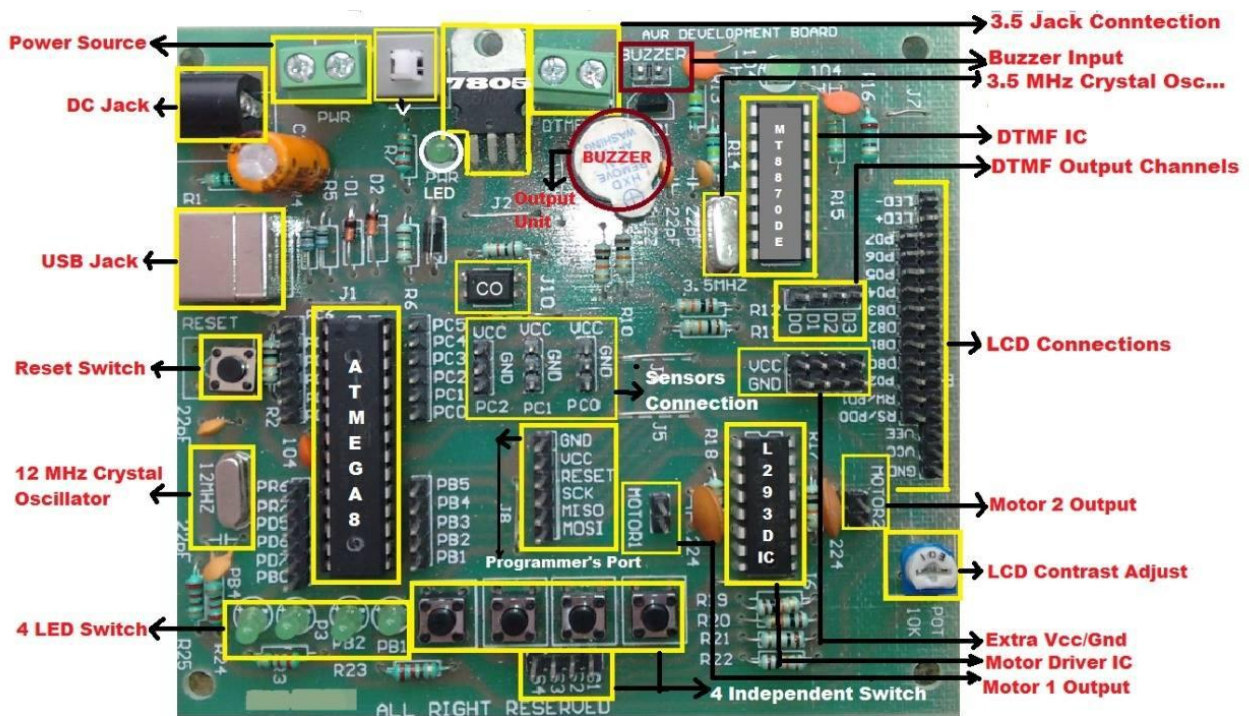


Fig. 6 Used PCB Design

## SYSTEM REQUIREMENTS

### 1) Software's Description:

a) **AVR Studio:** It is basically an IDE to make embedded programs. It is chosen for this project because of its fast and efficient so that without facing difficulties of timing problems we can fully focus on application.

b) **Extreme Burner:** It is software required for writing programs on chip.

c) **USBasp:** It is software which will be required if we will be working with TTL and Bluetooth module than for communication USBasp will be required.

### 2) Hardware Description:

a) **Microcontroller:** Atmega8 or Atmega16 microcontroller will be used to program several input and output devices.

- b) Relay:** It will play major role in controlling project because Relay is the device which changes a digital input into an analogue input and provide several useful features for home automation project.
- c) Development Board:** Is required to put all the hardware devices together to work with each other.
- d) USB Cable:** Is required to connect device with computer to write program in flash memory.
- e) LED:** Is used to test output of program.
- f) Chases:** Is required to tight development board on a hardware sheet.
- g) Switches:** They can be used to test input cases easily without attaching much of the hardware devices.

### 3) Device Description:

- a) DTMF IC 8870:** It is required to work on DTMF module.
- b) Motor Driver IC L293D:** Used to move motors in any direction either clockwise or anticlockwise.
- c) IR Sensors:** It is used to provide some special features in system.

## APPLICATIONS

- a) This project can be used in industries to control various devices from a remote distance.
- b) This project can be used for domestic purpose like controlling speed of a fan, controlling room temperature.
- c) It can also be used for security purpose burglary, gas detection and smoke detection.
- d) Automatic Dialling to any Telephone Using I2C Protocol on Detecting Burglary
- e) Display of Dialed Telephone Numbers on Seven Segment Display
- f) Cell Phone Controlled Robotic Vehicle using DTMF Technology
- g) Automatic Garage Door Opening System

## ADVANTAGES

- a) This project is simple and easy to access.
- b) It can be accessed from remote areas.
- c) There is low power consumption.
- d) Low cost of implementation.
- e) It can be operated from a long range.

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## CONCLUSION AND FUTURE WORK

This paper present an effective technique for the user to monitor and control the house / office appliances and other equipment's via mobile phone. The home automation improves the life style of control of the home device. Our work is based on Embedded system. We have designed a project in which we proposed a unique system for Home Automation utilizing DTMF that is paired with Relay device. We can operate our robot from any distant or remote area. The principle used for "Mobile Controlled Home Automation System" is decoding of DTMF tone.

Future scope for the Home automation system involves making home / offices even smarter. Home and workplaces can be interfaced with sensors including Motion sensors, Light sensors and Temperature sensors and provided automated toggling of devices based on conditions. More energy can be conserved by ensuring occupation of the houses before turning ON devices and checking brightness and turning OFF lights if not necessary. The system can be integrated closely with home security solution to allow greater control and safety for home owners.

The next step would be to extend this system to automate a large scale environment such as offices and factories.

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## BIBLIOGRAPHY



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