MOBILE CONTROLLED ELECTRICAL EQUIPMENT

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ABSTRACT

This paper demonstrates a novel method which enables users to control home appliances from remote using a cell phone-based interface. To access the control unit, the user should send an authentication code (DTMF) along with the required / desired function/action to his/her home control system via Global System for Mobile communication (GSM). Conventionally, wireless controlled system uses RF circuits, which have the drawbacks of limited working range, limited frequency range and limited control. Use of mobile phone for home appliances control can overcome these limitations. It provides the advantage of robust control, working range as large as the coverage area of the service provider. We can use mobile as a remote in range of Bluetooth. Controlling Electrical equipment using switches are common. From a few decades controlling devices using remote control switches like infrared remote control switch, wireless remote control switches, light activated switches are becoming popular. But these technologies have their own limitations. Laser beams are harmful to mankind. Some technologies like IR remote control are used for short distance applications. In such case if we have system which does not require any radiations or which is not harmful, long remote control switch!! Yes here is the solution. This system does not require any radiations, any laser beam which has no limitation of range, mean it can be used from any distance from meters to thousand kilometers using a simple telephone line or mobile phone.

Keywords: DTMF (Dual Tone Multiple Frequency), Mobile controlled electrical equipment.

I INTRODUCTION

Embedded system is an interesting field where every engineer can showcase his creative and technical skills. Mobile phones today became an essential entity for one and all and so, for any mobile based application there is great reception. In this scenario making a mobile phone operated home appliance control system is a good idea.

In this project the appliances are controlled by a mobile phone that makes a call to the mobile phone attached to the a control box which is connected to appliances needed to be control from outside home or when we are present at we need not to go near to appliance for turning on the switch, just press key from your mobile and the switch is on. In the course of a call, if any button is pressed a tone corresponding to the button pressed is heard at the other end called 'Dual Tone Multiple frequency' (DTMF) .The control box receives these tones with help of phone stacked in the box. The received tone is processed by the Microcontroller with the help of DTMF decoder IC HT 9170.

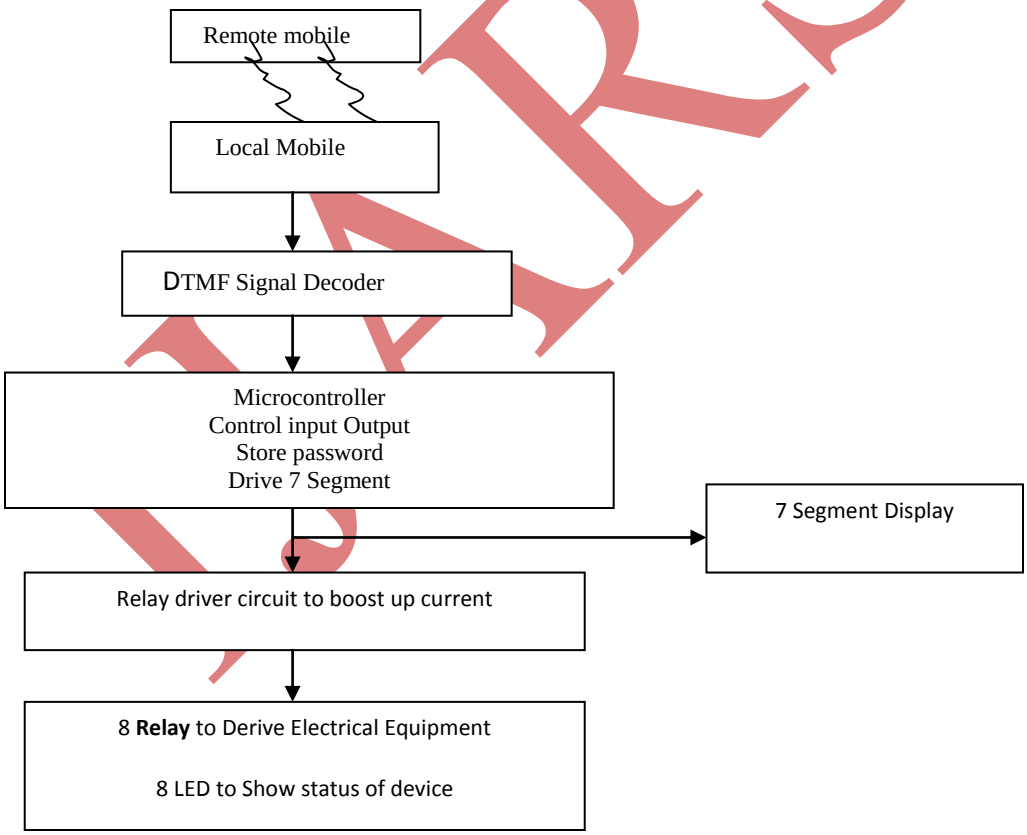
This decoded signal is sent to the microcontroller and further microcontroller sends corresponding signal to the motor driver IC l293d and relay driver IC ULN2803 which derives the relays. Conventionally, wireless controlled appliances use RF circuits, which have the drawbacks of limited working range, limited frequency range and limited control. Use of mobile phone for robotic control can overcome these limitations. It provides the advantage of robust control, working range as large as the coverage area of the service provide. This Project "DTMF Control Area" is used to control the devices in home as well as in industries, Banks, and also in Remote areas.

II TECHNOLOGY USED

DTMF decoding and speech recognition are used to interpret the caller's response voice prompts. Equipment installed on the customer premises.

- Equipment installed in the PSTN(Public Switched Telephone Network)
- Application service provider (ASP)

2.1 Block Diagram



2.2 Working

DTMF: When you press a button in the telephone set keypad, a connection is made that generates a resultant signal of two tones at the same time. These two tones are taken from a row frequency and a column frequency. The resultant frequency signal is called **"Dual Tone Multiple Frequency"**. These tones are identical and unique.

Each of the low and high frequency groups comprise four frequencies from the various keys present on the telephone keypad; two different frequencies, one from the high frequency group and another from the low frequency group are used to produce a DTMF signal to represent the pressed key. The row and column frequencies are given below

Table1: Row and Column Frequencies

Pressed Mobile key	D3	D2	D1	D0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
*	1	0	1	1
0	1	0	1	0
#	1	1	0	0

i. DTMF Receiver

Mobile work as a DTMF receiver and encoded hybrid frequency DTMF code tone is decoded by 9170 IC. 9170 Decode DTMF tone and convert into BCD code, output depending upon which key is pressed at the transmitter side. The table shows decoded output.

ii. Number Display Unit

This unit displays the received device code from mobile dialed from remote section using microcontroller. A seven segment display has seven LEDs connected in a sequence to give a regular shape and a LED to display the dot for decimal point. It has 10 pins. Out of this two pins are common for all LEDs and remaining are another polarity terminals of the LED. When common anode seven segment display is used, two common terminal pins are connected to +5v or logic high state and another terminal are kept at logic low state. Then respective LED glows. The device selected from the Remote Section for control purpose, its code is displayed in this seven segment display

iii. Microcontroller and Driver Circuit

The output from IC HT9170 is connected to the next stage, 8051 microcontroller. Port1 of microcontroller is input port and port3 of microcontroller is output port connecter to ULN2803 IC. The current supplied by microcontroller is not sufficient to drive relay, so to boost up current we are using ULN2803 IC. The main function of microcontroller is to store password. The default password is stored in memory of microcontroller is *2409. When we press password *2409 in sequence microcontroller start comparing stored password and entered password if match, microcontroller start scanning for device number. Now when we press the number 1 of the remote mobile, Relay1 is switched ON (Through 2803) and the electrical circuit is completed. So any electrical equipment connected to Relay1 start working. Now again when we press the No.1 then microcontroller output is shifted to zero and the relay is OFF and so the electrical appliance connected to it Stop working.

iv. Power Supply Unit

For the proper working of this local control section a permanent 5V back up needed continuously. This is achieved by using a 230V to 12V transformer, Bridge rectifier, capacitor filter and 5V regulated power supply from a voltage regulated IC 7805. This 5V source is connected to all ICs and relays.To switch on/off any appliance positioned at controller's part, a call is made and after the call is tended to automatically, the appropriate tone and password are entered. The tone entered is decoded via the DTMF decoder which further translates it into binary values. Binary values are the input to the microcontroller which verifies each tone individually and corresponding output is given at the output terminal. This output from microcontroller is used to drive the matching relay driver where in each relay drive is coupled to a home appliance. Thus when the relay drive is activated by the microcontroller, the device either gets ON or is switched OFF as per the requirement. **Mobile controlled electrical equipment** project makes use of auto answer facility and hence eliminates the need of a ring detector circuit.

This project is targeted at the average consumer who desires to access remote control over home devices which can be controlled electrically. Additional features like audio interaction as well as feedback

mechanism to determine the current state could serve as add-ons for this project. However it must be ensured that the consumer must be living in an area which has strong signal connectivity and only one person should be authorized for the controlling of these devices to ensure maximum security.

III ADVANTAGES

- No limit of distance.
- Password protection.
- Device number display.
- Programming in C Language.
- Each device has a unique code.
- It uses 8051 programmable IC which can be reprogrammed 1000 times to fit user need.
- There is no risk for false switching.
- You can control up to 8 electrical or electronic devices.
- You can control devices from landline or mobile.

IV APPLICATION

MCEE-8051 is an advanced technology which can be used anywhere like in:

- In houses
- In industries
- In offices
- In farm houses
- Security systems & Access control
- Entertainment Systems
- Communication systems
- Thermostats
- Irrigation
- Data System
- It does not have any limit of its range neither do it have any false switching.

V CONCLUSION

This project is targeted at the average consumer who desires to access remote control over home devices which can be controlled electrically. Additional features like audio interaction as well as feedback mechanism to determine the current state could serve as add-ons for this project. However it must be ensured that the

consumer must be living in an area which has strong signal connectivity and only one person should be authorized for the controlling of these devices to ensure maximum security

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