

Operating Electrical Appliance From Distance Using DTMF Remote Control System

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Abstract: Dual-tone multi-frequency (DTMF) signaling is used for telecommunication signaling over analog telephone lines in the voice-frequency band between telephone handsets and other communication devices and the switching center. This is a method for instructing a telephone switching system of the telephone number to be dialed, or to issue commands to switching systems or related telephony equipment. Telephone units are ubiquitous. They can be found in almost in every house. Cellular Phones are much available all over the country and their presence could be used for other purposes instead of just making calls. Availability of cellular phone network turns us to develop a control system which can provide controlling electrical appliances remotely. Our project is one of such mobile application. The basic concept of this project is to use DTMF tones for communication between cellular mobile and electronic device (home application) connected with DTMF switch. Every cellular mobile set supports DTMF switch.

This smart home remote control system incorporates cellular phone as input module, DTMF decoder MT8870 to decode the corresponding tone frequency to coded binary digits and PIC 16F628 to provide outputs against the binary pattern detected on its input and we add relays to control household devices that respond when we call our home. This is a powerful yet reliable platform for implementing projects dealing with the control of real world available devices. By using cell phone unit anyone can make a control action to this remote system, as far as the cellular network can reach.

Keywords: DTMF, PIC 16F628 , Relay.

I. INTRODUCTION

First of all, consider what's been behind the remarkable growth of remote access. The exponentially increasing demand for remote access makes the designer to be more efficient and more reliable in design. The key factor is the technology used for remote access has changed over time. Remote access has to be compared and contrasted with other related concepts; safety, continuity, reliability. A Remote Control is perhaps the most popular device today. A remote control is an electronics device used for the remote operation any kind of electronics & electrical system. Most of these remotes communicate to their respective devices via infrared (IR) signals and a few via radio signals. Cellular system is very popular due to its versatile application. But the majority percent of people does not know about its multipurpose application. Most of them only know how to calling, call receiving, message sending/receiving and internet browsing process. But they does not know by cellular system he/she can operate any types of electronic device and home appliance effectively and efficiently through switching device this controlling procedure provides DTMF technology. By using DTMF we can automate out doors, windows and gates also. In this project we have developed a remote control which operated

via cellular phone communication using DTMF code and the sense scheme we use; microcontroller to make it more handfult. Since modern small microcontrollers are so cheap it's very common to implement control systems, including feedback loops in an embedded system. In a well designed system, these features must complement each other.

II. USING FIELD OF DTMF

Dual-tone multi-frequency (DTMF) signaling is used for telecommunication signaling over analog telephone lines in the voice-frequency band between telephone handsets and other communications devices and the switching center. As a method of in-band signaling, DTMF tones were also used by cable television broadcasters to indicate the start and stop times of local commercial insertion points during station breaks for the benefit of cable companies.

Dual Tone Multi-Frequency, or DTMF, is a method for instructing a telephone switching system of the telephone number to be dialed, or to issue commands to switching systems or related telephony equipment.

The DTMF dialing system traces its roots to a technique developed by Bell Labs in the 1940s called MF (Multi-Frequency) which was deployed within the AT&T

telephone network to direct calls between switching facilities using in-band signaling. In the early 1960s, a derivative technique was offered by AT&T through its Bell System telephone companies as a "modern" way for network customers to place calls. In AT&T's Compatibility Bulletin No. 105, AT&T described the product as "a method for pushbutton signaling from customer stations using the voice transmission path."

III. FUNTION DESCRIPTION

Here is a circuit of a remote control unit which makes use of the DTMF tone signal to control various electrical appliances. This remote control unit has 4 channels which can be easily extended to 12. In this circuit we gave DTMF tone as an Input Signal. Here C1 acts as a blocking Capacitor. Here R1 is input resistance and RZ is feedback resistance. Through this resistance we can set gain of the internal OP amp of the decoder. The operational amplifier in this IC is operated at inverting mode and negative feedback is applied. Crystal oscillator X1 is used for generating clock pulse at 3.579545 MHz. Vdd is applied for biasing the circuit. Here we make use of DTMF (dual-tone multi frequency) signals (used in telephones to dial the digits) as the control codes. When someone presses a number, the phone unit encodes the number into two unique frequencies. A DTMF tone signal from a cell phone is used as input signals in the module. When a user wants to operate the DTMF switching device, he/she calls to the connected mobile number. Then the Mobile itself Hooks of the Call and connects its speaker line to the Circuits input. Then the user presses keys in the mobile. Then it's corresponding DTMF tones are passes to the circuit and enters to pin 2 of 8870 IC. In 8870 it's processed by a band split filter which split tones for high and for low. These two tones are decoded and it produces corresponding output through Q1, Q2, Q3, and Q4 and it's fed into microcontroller PIC 16F628A pin's 17, 18, 1, and 2 respectively. DTMF decoder block does the DTMF detection and decodes it into unique binary digits. A specific IC MT8870 is used for decoding the DTMF tone. MT8870 interfaces with microcontroller unit. This microcontroller unit is the extension module which detects the coded binary digit from the DTMF detector and then it drives optimal output for the corresponding binary pattern. A delayed steering output (StD) is found from pin 15 of IC 8870 is entered to microcontrollers pin for detecting the received tone pairs which is registered and the output latch is updated. For each successful DTMF tone Microcontroller checks whether the StD pin is Active or not. If this Pin is not active then the program starts from beginning. This DTMF Decoder IC requires 5 volts for its operation. Here we use a regulator IC 7805 for regulate the voltage fixed to 5 volts. The relay driver consists in 4 transistors and four relays. The relays are connected to 4 electrical plugs. The power supply is a 6V adaptor that

powers directly to the relays and a 7805 linear regulator in order to obtain 5v for the PIC micro controller.

IV. FIGURES

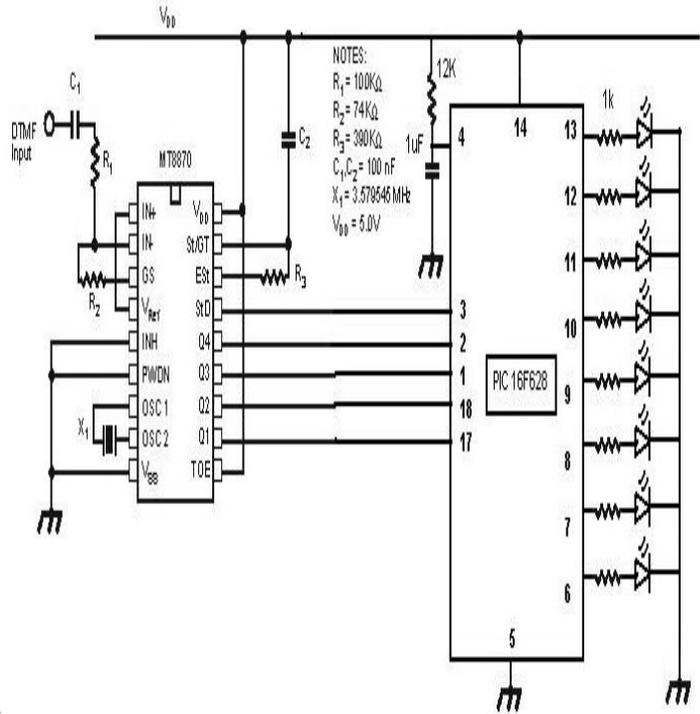


Figure 1: DTMF Remote Controlling System

V. DTMF KEYPAD FREQUENCY

	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

Table: DTMF Keypad Frequency

VI. FLOWCHART

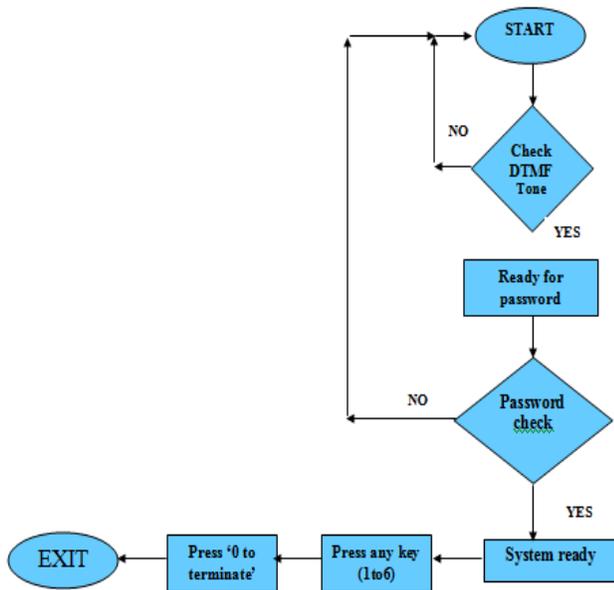


Figure 2: System Flowchart

VII. CONCLUSIONS

On the road towards the information age the enormous demand of remote control system by explosive growth of new innovative design has been developed by so many tech engineers. The developments of remote systems closely linked to the growth of development in technology and that require special emphasis and considerably greater effort. In this project we depict a complete picture of remote system to control the home appliances from almost any places where the cellular network reaches. We select the best way to make this project for high performance, efficient and reliable work by cost effective components. The main objective of our project was to develop a system through which we can control any device remotely with more reliable and secured way. Finally, we represent a complete structure of reliable Remote control system and hopefully this project will help the tech people a direction for further development with Remote control system.

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