Controlling Home Appliances Using Cell Phone

Murali R, Johny Richards R, Manoj Ramesh Rao R

ABSTRACT: - This project deals with the application of the Dual tone multi-frequency(DTMF) technology used in telephones and mobile communication, in real time for controlling electrical appliances in our daily use. It uses a DTMF decoder along with a microcontroller (adruino) to control appliance from a remote location.

INTRODUCTION

This experiment brings out the use of home appliances with the help of a remote. The remote can emit only ir radiations and this radiation is alone involved in the process of communication between the appliance and the handicapped person. This idea can be brought out practically which could help out the disabled.

Dual-tone multi-frequency signaling (**DTMF**) 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. **Multi-frequency signaling** is a group of signaling methods that use a mixture of two pure tone sounds. Various MF signaling protocols were devised by the Bell System and CCITT. The earliest of these were for in-band signaling between switching centers, where long-distance telephone operators used a 16-digit keypadto input the next portion of the destination telephone number in order to contact the next downstream long-distance telephone operator. This semi-automated signaling and switching proved successful in both speed and cost effectiveness. Based on this prior success with using MF by specialists to establish long-distance telephone calls, *Dual-tone multi-frequency* (DTMF) signaling was developed for the consumer to signal their own telephone-call's destination telephone number instead of talking to a telephone operator.

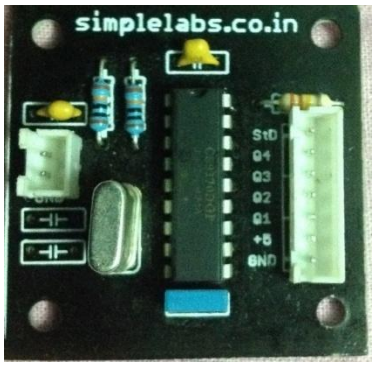
I. KEYPAD

The DTMF keypad is laid out in a 4×4 matrix, with each row representing a *low* frequency, and each column representing a *high*frequency. Pressing a single key (such as '1') will send a sinusoidal tone for each of the two frequencies (697 and 1209 hertz (Hz)). The original keypads had levers inside, so each button activated two contacts. The multiple tones are the reason for calling the system multifrequency. These tones are then decoded by the switching center to determine which key was pressed.

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

II. DTMF DECODER

The purpose of DTMF decoding is to detect sinusoidal signals in the presence of noise. There are plethora of cost effective integrated circuits on the market that do this quite well. In many (most ?) cases, the DTMF decoder IC interfaces with a microcontroller. In these instances, why not use the microcontroller to decode the sinusoids? Well the answer is because the typical microcontroller based decoder requires an A/D converter. Furthermore, the signal processing associated with the decoding is usually beyond the scope of the microcontroller's capabilities. So the designer is forced to use the dedicated IC or upgrade the microcontroller to perhaps a more costly digital signal processor.



Above is the picture of a 4 bit DTMF decoder

III. ATMEGA 328

- Murali R, Johny Richards R, Manoj Ramesh Rao R
- B. E (third Year) Electronics and Communiccation Engineering
- St. Joseph's College of Engineering
- ilarum3@gmail.com, Johnyrich.cooldude@gmail.com, manojrameshrao@gmail.com

Datasheets	ATMEGA48/88/168/328 (A,P,PA) ATmega(48,88,168,328)(A,PA,P)
Product Photos	28-DIP
Product Training Modules	**MCU Product Line Introduction** **megaAVR Introduction**
Standard Package	14
Category	Integrated Circuits (ICs)
Family	Embedded - Microcontrollers
Series	AVR® ATmega
Core Processor	AVR
Core Size	8-Bit
Speed	20MHz
Connectivity	I²C, SPI, UART/USART
Peripherals	Brown-out Detect/Reset, POR, PWM, WDT
Number of I /O	23
Program Memory Size	32KB (16K x 16)
Program Memory Type	FLASH
EEPROM Size	1K x 8
RAM Size	2K x 8
Voltage - Supply (Vcc/Vdd)	1.8 V ~ 5.5 V
Data Converters	A/D 6x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C
Package / Case	28-DIP (0.300", 7.62mm)
Packaging	Tube

V. RELAY

Relay is a typical switching device that switches a 230V supply upon the application of a 5V input. These relays are however available in the market as per the user specifications. In this project they are used at the output of the microcontroller to switch on the desired electrical appliance ON or OFF using a HIGH or LOW respectively.

TARA RELAYS PVT. LTD.

Above is the picture of Sugar cube relay

VI. OVERALL PROJECT CIRCUIT

Firstly, the DTMF decoder gets the DTMF signal input from the 3.0mm jack.The CS9370DGP IC on the DTMF decoder, decodes the input signal to a equivalent 4-bit binary value. This value is sent to the microcontroller(ATMEGA) via 4-bit serial wires.The controller converts this binary value into a equivalent decimal value using the shift-left operator. If the received decimal value matches with that of the required value then the microcontroller sends a HIGH to the Relay's Input using one of the output pins. Once the relay receives a HIGH at the input it switches the 230V supply directly.Thus achieving the required functionality.

VI. CONCLUSION

This project demonstrates the remote access of the electrical appliances using the Dual tone multi-frequency technology, eliminating the use of manual switches itself.

References:

[1]. www.wikipedia.org

[2]. www.atmel.com

[3]. www.polar-electric.com

[4]. www.alldatasheet.com