# DTMF Based unmanned vehicle

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***Abstract-*** *In this article, vehicle is controlled by the Robot using Dual Tone Multi Frequency (DTMF) technology. Now a days DTMF technology is most useful technique in Robotic vehicle control. It is worked on to methods digital signal processing (DSP). Wireless-control of robots uses RF circuit that has the drawbacks of limited working range and limited control. This DTMF is gives advantage over the RF; it increases the range of working and also gives good results in case of motion and direction of robot using mobile phone through micro controller. This type of wireless communication gives the remote handling operation of Robot using DTMF and with the help of the motor driver we will control vehicle directions.*

***Keywords****- DTMF, Microcontroller (Atmega328p), Motor driver, Binary sequence DTMF.*

## I. INTRODUCTION

A robot is electro-mechanical machine which is guided by computer, Mobile phone or programming, and is thus able to do tasks on its own. The Robot Institute of America define "A robot is a reprogrammable multifunctional manipulate to designed to move material parts, tools or specialized device through variable programmed motions for variety Conventionally, wireless controlled robots use Circuits which have drawbacks of limited working range frequency range, use of mobile phones can over It provides the advantages of robust control, working range as large as the coverage area of the service provider, no interference with other controller DTMF Mobile ROBOT is a machine that can be controlled with a mobile.

In this work, the robot is controlled by a mobile phone that makes a call to the mobile phone attached to the robot. In the course of a call, if any button is pressed, a tone corresponding to the button pressed is heard at the other end of the call. This tone is called "Dual Tone Multiple-Frequency" (DTMF) tone. The robot perceives this DTMF tone with the help of the phone stacked on the robot. The received tone is processed by the microcontroller with the help of DTMF decoder L293d IC the decoder decodes the DTMF tone is to its equivalent binary digit and this binary number is send to the microcontroller, the microcontroller is pre-programmed to take decision for any give input and output its decision to

motor drivers in order to drive the motors for forward or backward motion or a turn.

## II. LITRATURE SURVEY

The authors Awab Faikh, Jovita Serao presented a paper titled "Cell phone operated robotic car". In this paper the authors used IC89C51, DTMF, radio control, remote control vehicle and design the new method of construction of cell phone controlled robotic car. The RF circuit are used for limited distance so to overcome this problem authors uses the DTMF which will used for long distance. The main aim of this project is to control a robotic car using DTMF frequency. In the year April 2014 the author Amy kelkar presented a paper "Implementation of unmanned vehicle using GSM network with Arduino" In this paper author used robot, GSM, Arduino, DTMF decoder. In this paper they represented a vehicle development which is controlled by GSM and an Arduino is used for design of the vehicle. This system used DTMF frequency and it can be controlled over very long distance. The C & C++ language is used as programing language in this system
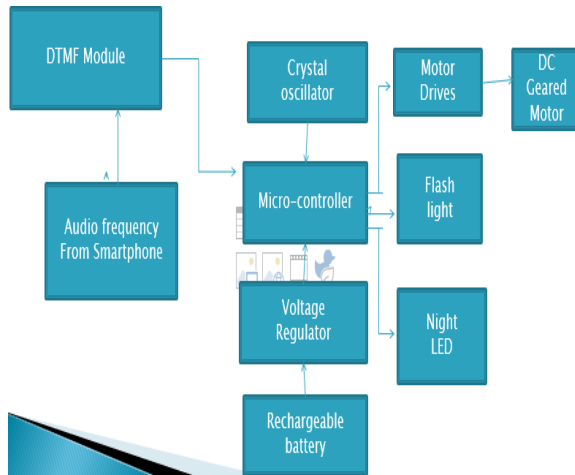
## III.BLOCK DIAGRAM



**Fig.1 block diagram**

Mobile phone which is connected to the robot is kept for the control of robot, we have to make a call to the mobile phone which is attached to the robot using earphone. Thus two mobile phone are connected via mobile network. When the call is received then press the button in your mobile. DTMF tone is received by the mobile that is connected with the robot through headphone. These signals are received by the DTMF decoder that decodes the signal in binary sequence to the microcontroller. Sequences are given in table 1 Due to the programming in controller robot will move when pressing key in the mobile. –Microcontroller outputs are in binary form. The high output of the controller drives the motor driver to drive the motor in forward direction. Similarly we can move the motor in backward, left, right motion and stop condition. According to the source code given here key 2 is for forward, key 4 is for left rotation, key 6 is for right rotation, key 8 for reverse rotation in this robot navigation.

### IV. COMPONENTS USED

- Mobile Phones
- DTMF decoder
- Motor driver IC
- DC Motor
- Power Supply

### a. MICRO CONTROLLERAT 89S52

AT 89S52 is a low power, high performance cmos 8-bit micro controller with 8K bytes of in system programmable Flash memory. The device is manufactured using Atmel's high-density non-volatile memory technology and is compatible with the industry standard 80C51 Instruction set and pin out.AT89S52 is a32K 8-bit microcontroller based on

AVR architecture. ATS8952 is commonly used in many projects and autonomous systems where a simple, low-powered, low-cost micro-controller is needed. It has 14 digital input/output pins (out of which 6 can be exploited as PWM outputs), 6 analog input, 16 MHz crystal oscillator. The high performance Atmel AVR RISC-based microcontroller combines 32KB ISP flash memory with read-while-write capabilities, 1KB EEPROM, 2KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8 to 5.5 volts.

### b. DTMF DECODER:

DTMF means Dual-Tone-Multi-Frequency. DTMF signalling is used for telecommunication signalling over analog telephone lines in the voice-frequency band between telephone handsets and other communication devices and the switching centre. The DTMF system generally uses eight different frequency signals transmitted in pairs to represent sixteen different numbers, symbols and letters. A DTMF signal is generate unique tone which consists of two different frequencies one each of higher frequency range (> 1KHz) and lower frequency (<1KHZ) range. The resultant tone is convolution of two frequencies.
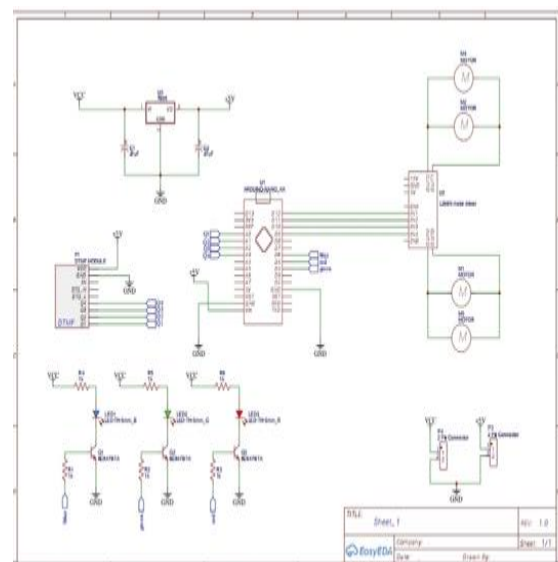
### V.CIRCUIT DIAGRAM AND WORKING



**Fig.2 block diagram**

The DTMF signal from the user (Sender) mobile phone is picked up by the system (Receiver) mobile phone. Then the connection is established between the two phones, whatever phone key is pressed at the Sender mobile phone, the corresponding DTMF tone is heard in the ear piece of the receiver phone. Received DTMF tone is fed to the DTMF decoder. The DTMF decoder will give the corresponding BCD value of the tone. This Output is connected to Q4, Q3, Q2, Q1 pin of MT8870 V Decoder IC and this output is fed to AT89S52 Microcontroller pin 4,5,6,7 respectively. Based on the equivalent binary digit of the DTMF tone received by the Atmega328P Microcontroller, a decision is made for Pins 8,9,10 and 11 regarding which pins should be high or low. These pins are fed to the L293D IC as input. Based on the Controller decision, the Pins are either high or low which activates the motors and moves the vehicle.
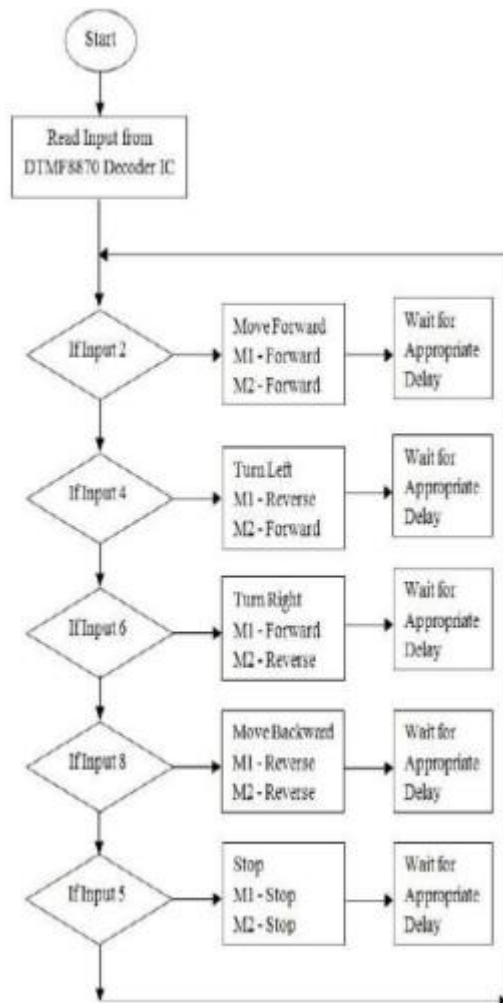
## VI. FLOWCHART



Fig.3 FLOWCHART

## VII. SOFTWARE DESIGN

It is a software suite containing schematic, simulation as well as PCB designing. ISIS is the software used to draw schematics and simulate the circuits in real time. The simulation allows human access during run time, thus providing real time simulation.

## VIII. RESULT

The Simulation of the circuit has been done on Proteus Professional v7.8 software package. The Simulation of the circuit At89S52 Microcontroller has been used in simulation. Four DC Motor are connected to Port B (Pin 2, 3, 4, 5) of Microcontroller through H-Bridge driver circuit.

## VIIII.CONCLUSION AND FUTURE SCOPE

Mobile controlled robot using DTMF technology has been set up. Advantage of wide range of control is possible even from a faraway distance. DTMF robots can be used for wide applications

- Remote control vehicles like unmanned aerial vehicles in space exploration and military
- IR sensors can be added to detect obstacles
- Camera can be used to monitor surroundings
- Can be interfaced with micro-controller for automation.

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