CELL PHONE CONTROL ROBOT CAR

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ABSTRACT

In this paper a robot car is controlled by cell phone using DTMF. 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. The microcontroller then tran -smits the signal to the motor driver ICs to operate the motors & our robot starts moving.

Keywords: Microcontroller, Dual Tone Multi Frequency ,L293D IC

I. INTRODUCTION

DTMF Mobile ROBOT is a machine that can be controlled with a mobile. In this project, 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. The microcontroller then tran -smits the signal to the motor driver ICs to operate the motors & our robot starts moving .

Fig-1 Block diagram of cell phone control robot car

II. MICROCONTROLLER

Microcontroller, as the name suggests, are small controllers. They are like single chip computers that are often embedded into other systems to function as processing/controlling unit. For example, the remote control you are using probably has microcontrollers inside that do decoding and other controlling functions. They are also used in automobiles, washing machines, microwave ovens, toys ... etc, where automation is needed.

The key features of microcontrollers include:

1. High Integration of Functionality
2. Microcontrollers sometimes are called single-chip computers because they have on-chip memory and I/O circuitry and other circuitries that enable them to function as small standalone computers without other supporting circuitry.
3. Field Programmability, Flexibility
4. Microcontrollers often use EEPROM or EPROM as their storage device to allow field programmability so they are flexible to use. Once the program is tested to be correct then large quantities of microcontrollers can be programmed to be used in embedded systems.
5. Easy to Use

Most microcontrollers will also combine other devices such as:

1. A Timer module to allow the microcontroller to perform tasks for certain time periods.
2. A serial I/O port to allow data to flow between the microcontroller and other devices such as a PC or another microcontroller.
3. An ADC to allow the microcontroller to accept analogue input data for processing.

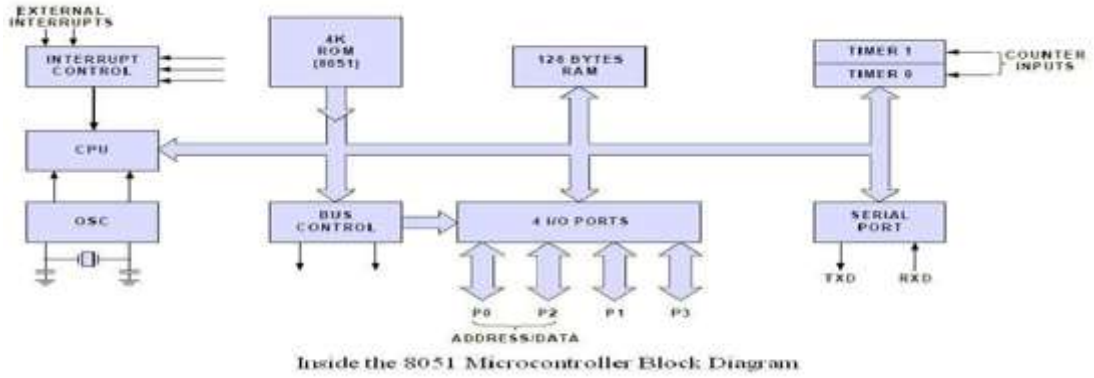

Fig-2 Block diagram of microcontroller

III. DTMF(Dual Tone Multi Frequency)

A. DTMF tone

The DTMF technique outputs distinct representation of 16 common alphanumeric characters (0-9, A-D, *, #) on the telephone. The lowest frequency used is 697Hz and the highest frequency used is 1633Hz. The DTMF keypad is arranged such that each row will have its own unique tone frequency and also each column will have its own unique tone frequency. Above is a representation of the typical DTWMF keypad and the associated row/column frequencies. By pressing a key, for example 5, will generate a dual tone consisting of 770 Hz for the low group and 1336 Hz for the high group.

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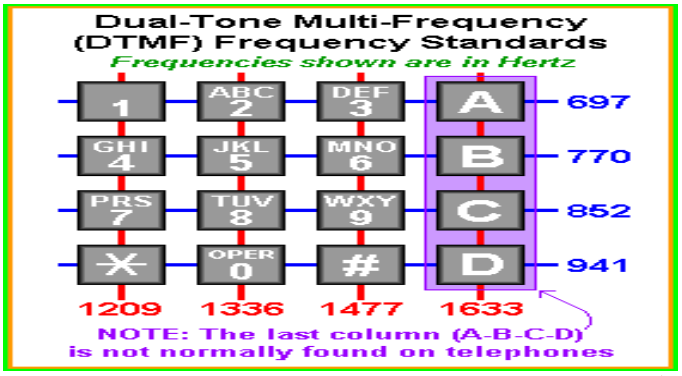

Fig-3 DTMF keypad

B. ***DTMF decoder-***

The MT-8870 is a DTMF Receiver that integrates both band split filter and decoder functions into a single 18-pin DIP or SOIC package. It is manufactured using CMOS process technology. The MT-8870 offers low power consumption (35 mW max) and precise data handling. Its filter section uses switched capacitor technology for both the high and low group filters and for dial tone rejection. Its decoder uses digital counting techniques to detect and decode all 16 DTMF tone pairs into a 4-bit code. Minimal external components required includes a low-cost 3.579545 MHz color burst crystal, a timing resistor, and a timing capacitor. The filter section is used for separation of the low-group and high group tones and it is achieved by applying the DTMF signal to the inputs of two sixth order switched capacitor band pass filters, the bandwidths of which corresponds to the low and high group frequencies. The filter section also incorporates notches at 350 and 440 Hz for exceptional dial tone rejection. Each filter output is followed by a single order switched capacitor filter section which smoothes the signals prior to limiting. Limiting is performed by high-gain comparators which are provided with hysteresis to prevent detection of unwanted low-level signals. The outputs of the comparators provide full rail logic swings at the frequencies of the incoming DTMF signals. Following the filter section is a decoder employing digital counting techniques to determine the frequencies of the incoming tones and to verify that they correspond to the standard DTMF frequencies.

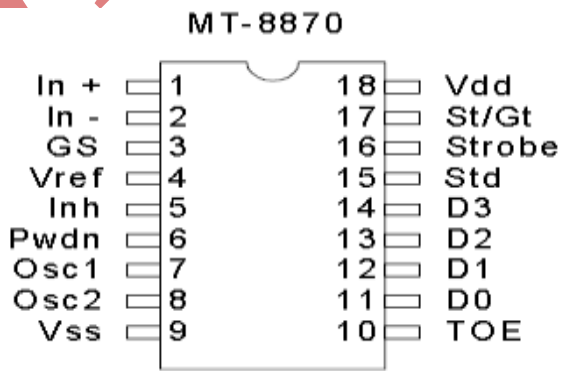

Fig-4 DTMF decoder pin configuration

IV. L293D : MOTOR DRIVING IC

The Device is a monolithic integrated high volt- age, high current four channel driver designed to accept standard DTL or TTL logic levels and drive inductive loads (such as relays solenoides, DC and stepping motors) and switching power transistors. To simplify use as two bridges each pair of channels is equipped with an enable input. A separate supply input is provided for the logic, allowing operation at a lower voltage and internal clamp di- odes are included. This device is suitable for use in switching applications at frequencies up to 5 kHz. The L293D is assembled in a 16 lead plastic package which has 4 centre pins connected together and used for heatsinking The L293DD is assembled in a 20 lead surface mount which has 8 centre pins connected together and used for heatsinking.

Table-1 L293D configuration

D_0	D_1	D_2	D_3	DESCRIPTION
0	0	0	0	Both motors stops
1	0	0	1	Both motors rotate clockwise
0	1	1	0	Both motors rotate anticlockwise
1	0	0	0	Right motor rotates clockwise
0	0	0	1	Left motor rotates clockwise

V. APPLICATION

1. Cell phone controlled robot can be used in the borders for displaying hidden Land mines
2. The robot can used for reconnaissance or surveillance
3. The robot can be used anywhere there is the service provider tower of the connection provided that is mounted on robot.
4. Robot is small in size so can be used for spying

VI. CONCLUSION

The primary purpose of the mobile phone operated robot car with DTMF decoder is to know the information in the places where we cannot move. The robot perceives the DTMF tone with the help of the phone stacked in the robot. It provides the advantage of robust control, working range as large as coverage area of service provider.

By developing this robotic vehicle with its multi-tasking feature, I have overcome the drawbacks of RF communication which have a limited range whereas this car can be controlled from anywhere just using this DTMF technology. The main advantage of this robot is that it is password protected so that any other person cannot communicate with the robot.

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