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# Hand Gesture Based Bomb Detection Vehicle

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***Abstract*** — Generally, robots are programmed to perform specific tasks which humans cannot. To increase the use of robots where conditions are not certain such as fire fighting or rescue operations, robots can be made which follow the instruction of human operator and perform the task. In this way decisions are taken according to the working conditions by the operator and the task is performed by the robots. Thus, we can use these robots to perform those tasks that may be harmful for humans[2]. This paper describes about the gesture control robot which can be controlled by your normal hand gesture. It consists of mainly two parts, one is transmitter part and another is receiver part. The transmitter will transmit signal according to the position of your hand gesture and the receiver will receive the signal and make the robot move in respective direction. This robot can also sense presence of bomb by using bomb detector and a cell phone jammer is incorporated in it to avoid a cell phone triggered bomb from being triggered.

***Keywords***- Robot, hand gesture, bomb detection, wireless robot, flex sensor.

## I. INTRODUCTION

This robot is a prototype but its applications are vast. It makes use of tilt Flex sensor to move forward/reverse/ right/left. The Flex sensor is an Electronic component whose resistance increases if it is bend to a certain angle. A Flex sensor is located on a remote glove. The glove and robot are connected/do communication using wireless technology. When we bend our finger to a predefined position the robot moves right/left/forward or reverse depending upon the programming. Robot can be easily controlled at a range of within 100 meters range. This project employs a hand-gesture based control interface for navigating a car-robot. The data is transmitted wirelessly via an RF module. The received data is then classified for navigating a car-robot[6]. A bomb detector is also incorporated in this robot which can be used to detect bomb by security agencies without putting man's life at risk. A cell phone jammer is also incorporated in this robot so that any attempt to trigger a cell phone based bomb can be stopped. A wireless camera is installed on it so that a user can control robot from quite a long distance. In this robot we have incorporated different technology/systems to make it advanced as compared to other existing systems.

## II. PROJECT DESCRIPTION

### 2.1. Block diagram

#### 2.1.1. Transmitter

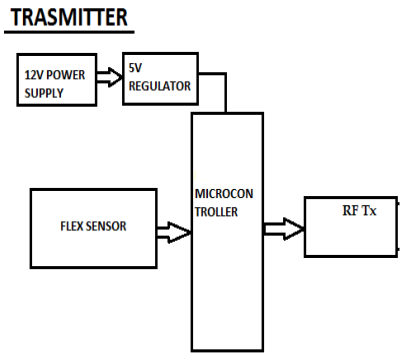


*Fig 1:- Block diagram of transmitter*

Above figure shows the general block diagram of transmitter unit of the model. Flex sensor is interfaced with microcontroller. Here microcontroller is given 5v regulated supply with the help of regulator IC. Flex sensor will detect will detect the gesture and send analog output to the ADC of Atmega16 on the corresponding axis. The microcontroller

 

will send the command based on threshold set on the ADC of respective axis to the RF encoder Module. The Encoder Module (IC HT12E) will send the corresponding Data bit using RF transmitter to the RF Receiver.

### 2.1.2. Receiver

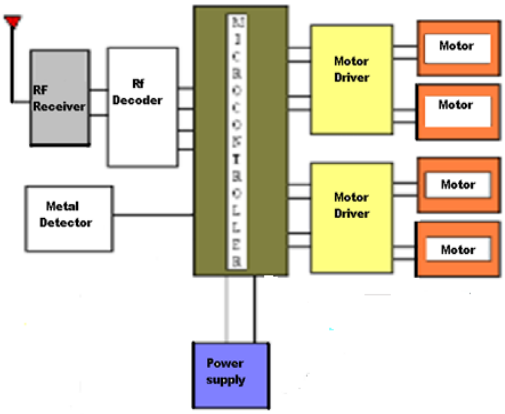


*Fig 2:- block diagram of receiver*

RF Receiver will send the command received from RF receiver to IC HT12D and the corresponding Data bit will be pulled high. By checking the status of Data bits of the Decoder IC the microcontroller will send the command to the motor Driver to start or stop the motors. It will receive the commands from the Atmega16 and will reverse the polarity/direction whenever required.

### 2.2. Circuit diagram

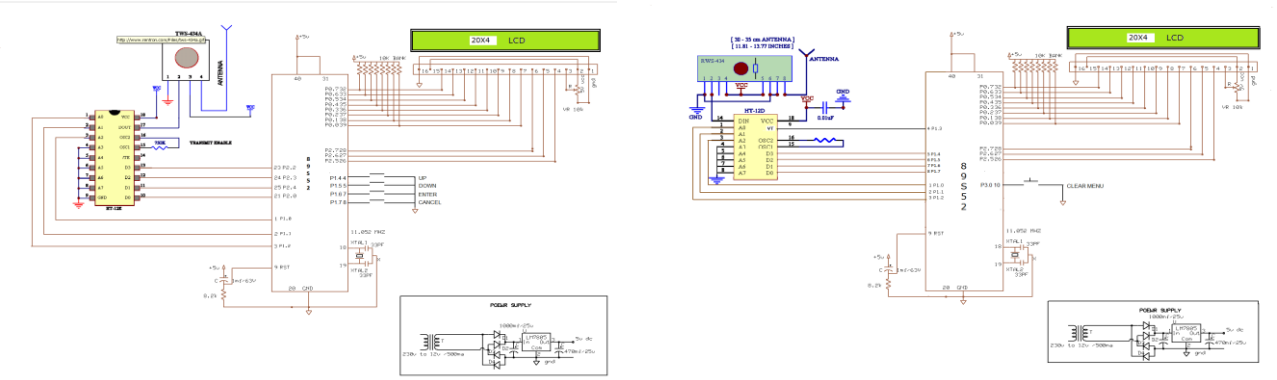

*Fig 3:- Circuit diagram of transmitter and receiver.*

In this paper “Hand gesture based robot” using PIC microcontroller is an exclusive system which is used for detection of bomb by a microcontroller based system. According to the program dumped onto the microcontroller, the gripper, motors and other devices starts working to obtain the successful output. When the power is supplied to the setup, the 230V supply is converted to constant 5V and then supplied to the microcontroller and its components. For this purpose an LCD panel is used & it is interfaced with microcontroller through its output port. This display is having two rows & each row can display 16 characters. The flex sensor incorporated in hand glove generates signals corresponding to the bend of sensors. This signals are applied to LM358 comparator IC, this IC compares the input provided by flex sensors.

The output of LM358 comparator IC is given to AT89S52 microcontroller where the signal under goes needful process according to the already fed program in microcontroller, the final command output is generated by microcontroller. The output of microcontroller is then encoded by HT12e IC. This decoded signal is then transmitted through RF transmitter of 433 MHz

On the- receiver side RF receiver of 433 MHz receives the transmitted signal. This signal is then decoded by HT12d Decoder used on receiver side. The output of decoder is given to AT89S52 microcontroller which provides command to L293 driver IC which makes motor function as per the command given by the user. The voice generator IC on receiver circuit generates voice on detection of bomb.

## III. HARDWARE DESCRIPTION

### 3.1 Microcontroller

 

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset[8].

- 8K Bytes of In-System Programmable (ISP) Flash Memory
- 4.0V to 5.5V Operating Range
- Fully Static Operation: 0 Hz to 33 MHz
- Three-level Program Memory Lock
- 256 x 8-bit Internal RAM
- 32 Programmable I/O Lines
- Three 16-bit Timer/Counters
- Eight Interrupt Sources
- Fast Programming Time
- Watchdog Timer

### 3.2. Flex sensor

Flex sensors are analog resistors. These resistors work as variable analog voltage divider. Inside the flex sensor are carbon resistive elements with thin flexible substrate. More carbon means less resistance. When the substrate is bent the sensor produces resistance output relative to the bend radius. The flex sensor achieves great form-factor on a thin flexible substrate. When the substrate is bent, the sensor produces a resistance output correlated to the bend radius. Smaller the radius, higher will be the resistance value[7].

### 3.3. Driver IC

L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-current signal. This higher current signal is used to drive the motors.
L293D contains two inbuilt H-bridge driver circuits. In its common mode of operation, two DC motors can be driven simultaneously, both in forward and reverse direction. The motor operations of two motors can be controlled by input logic at pins 2 & 7 and 10 & 15. Input logic 00 or 11 will stop the corresponding motor. Logic 01 and 10 will rotate it in clockwise and anticlockwise directions, respectively[11].

### 3.4. LM358 IC

These devices consist of two independent, high-gain frequency-compensated operational amplifiers designed to operate from a single supply or split supply over a wide range of voltages. The LM358 is a low power dual operational amplifier integrated circuit originally introduced by National Semiconductor. It is used in detector circuits. The abbreviation LM358 indicates an 8-pin integrated circuit, comprising two operational amplifiers at low power. The LM358 is designed for general use as amplifiers, high-pass filters and low, band pass filters and analog adders[9].

### 3.5. Cell phone jammer

A mobile phone jammer is an instrument used to prevent cellular phones from receiving signals from base stations. When used, the jammer effectively disables cellular phones. These devices can be used in practically any location, but are found primarily in places where a phone call would be particularly disruptive because silence is expected.

### 3.6. Bomb detector

A proximity sensor is a sensor able to detect the presence of nearby objects without any physical contact. A proximity sensor often emits an electromagnetic field or a beam of electromagnetic radiation (infrared, for instance), and looks for

 

changes in the field or return signal. The object being sensed is often referred to as the proximity sensor's target. Different proximity sensor targets demand different sensors. For example, a capacitive or photoelectric sensor might be suitable for a plastic target; an inductive proximity sensor always requires a metal target[10].

### 3.7 RF Module

An RF module (radio frequency module) is a (usually) small electronic device used to transmit and/or receive radio signals between two devices. In an embedded system it is often desirable to communicate with another device wirelessly. This wireless communication may be accomplished through optical communication or through radio frequency (RF) communication. For many applications the medium of choice is RF since it does not require line of sight. RF communications incorporate a transmitter or receiver.

## IV. CONCLUSION.

From this paper we proved that we can control robot through simple hand gestures which can detect bomb and can temporarily disable the cellphone triggered bomb by using cellphone jammer. This robot provide safety to many life and is very usefull for security forces and defence forces.

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