

# War Field Spying Robot With Night Vision Camera

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**Abstract** –With the aim of the satisfying and meeting the changing needs of human from manufacturing unit to the household unit robotics and automation has been a distinct key player throughout. This project focuses on building a RF based spying robot attached with wireless camera that can reduce the human victim. This robot sends the signal to the base station using wireless camera. One of the major application of this project can be analyzed using android based smart phone which can be used to control the movement of the robot. The robot sends the signal to the RF receiver mounted on the robot via RF transmitter at the base station. With this feature the robot can transmit real time videos with night vision capabilities and cannot be identified by the enemies in war zone.

**Index Terms**—wireless, robot, RF technology, robot, bluetooth, android.

## 1. INTRODUCTION

With the aim of developing a high-tech technology that serves high speed technology, advanced capacity to control the robots and to device new methods of control theory. The realize above standards some technical improvement along with the need of high performance robot is required to create a faster, reliable, accurate and more intelligent robot which can be devised by advanced control algorithm, robot control devices and new drivers. Earlier the robots were controlled through wired networks but now to make robot more users friendly, they are framed to make user commanded work. Therefore to attain the requirements we can use android as a multimedia to control the user friendly robot.

The design of our project encourages developing a robotic vehicle based on RF technology for the remote operation connected with the wireless camera mounted on the robot for monitoring purpose. The robot is embedded with 8051 series microcontroller for desired operation and is generally used for spying purposes. The transmitting module consist of the push buttons that send the commands to the receiving module for controlling the movement of robot either to right, left, forward, downward. In the receiving module of the robot two motors are interfaced with the 8051 series of microcontroller to control its movement via motor driver IC. The remote control (RF transmitter) has a range of 200m that transmits the signals to the RF receiver. The receiver collects and decodes the received signals before feeding it to the microcontroller to drive the DC motors via motor drivers. The wireless camera used for spying purpose also serves in complete darkness using IR lightning [1].

The distinct applications of this concept in such robot can be a smart phone controlled robots where the movement of the robot is controlled by a robot on the basis of android platform. Smart phone transmits the AT commands and data to the 8051 controller and controls the motor by motor driver L923D. The robot motions left, right, forward, backward. Interfacing is being done between device and Bluetooth. Bluetooth device HC-05 module receives the commands from smart phone via 8051 microcontroller. Component technologies used are

- (a)RF technology
- (b) C language
- (c)Embedded system.

## 2. RF COMMUNICATION

RF frequency ranges from around 3 kHz to 300GHz .this corresponds to the frequency of radio waves and the alternating current which carry radio signal. It refers to the ac having such characteristics that if the current is input to an antenna an electromagnetic field is generated suitable for wireless broadcast and communication. In order to receive radio signals an antenna must be used. This antenna will pick up thousands of radio signal at a time and for the same we need to use a radio tuner to tune into a particular frequency. This is done by using a resonator. Resonator amplifies oscillations within a frequency band while reducing the oscillations at other frequency outside the band. Any RF field has a wavelength which is inversely proportional to the frequency. In the atmosphere, in the outer spaces, or anywhere in our ambience if frequency F is in MHz and the wavelength in meters, then  $S=300/f$ . The frequency of RF signal is inversely proportional to the wavelength of the EM field to which it corresponds. At 9 KHz, the free-space wavelength is approx. 33 kilometers or 21 miles (mi). At the highest radio frequencies, the EM wavelengths measure around one millimeter (1mm). As the frequency is increased beyond the RF spectrum, EM energy takes the form of infrared (IR), visible, ultraviolet, X rays, and gamma rays.

## 3. RF SECTION BLOCK DIAGRAM

Let us take a RF transmitter wiggling an electron in one location. This wiggling will electron cause a ripple effect, somewhat same to dropping a pebble in a pond. The effect is an electromagnetic (EM) wave which travels out from the initial location those results in electrons to wiggle in remote locations. An RF receiver can detect the remote electron wiggling. The RF communication system then further utilizes

this phenomenon by wiggling electrons in a specific pattern so as to represent information. The receiver can make the same information available at a remote location by establishing a communication with no wires. In most of the wireless systems a designer has two overriding constraints: it must operate over a certain distance (range) and transfer a certain amount of information within a time frame (data rate) [1].

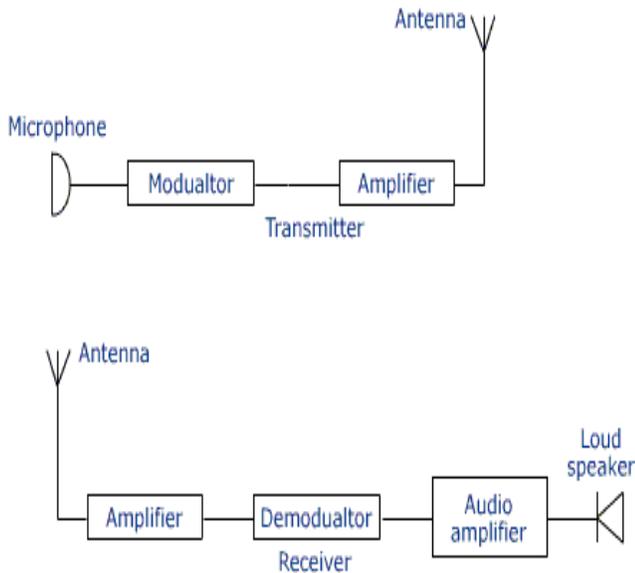


Figure 1: Block diagram of RF module

#### 4. HARDWARE IMPLEMENTATION

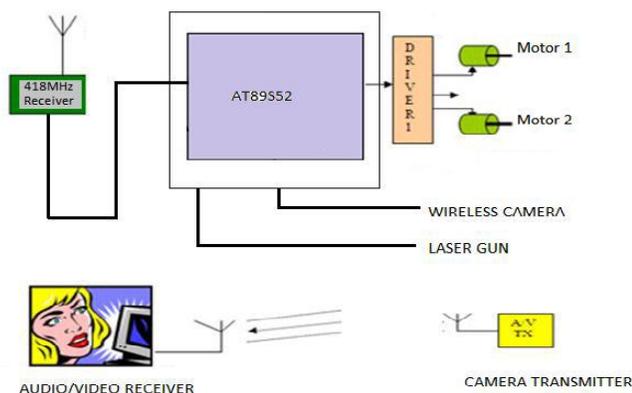


Figure 2: Block Diagram of Intelligent Combat Robot

The block diagram of the hardware implementation of the robot is as shown in the Figure1. This robot is operated at radio frequency, self-powered and has all the controls like a

normal car. Wireless camera is used to send real time video and audio signals from the war field, which could be seen on a remote monitor at the base station, and action can be taken accordingly. Heart of this robot is Atmel's AT89S52. Microcontroller is the master controller that decodes all the commands received from the transmitter unit and give commands to slave microcontroller.

It also acts as Slave microcontroller at the receiver unit which is responsible for executing all the commands received from the master and also generates PWM pulses for the speed control of the robot [2]. Based on the input codes given by the user master will give command to slave microcontroller and robot will behave as follows.

- moves back and forth
- turns left or right while moving forward or backward
- Controls speed in both the direction.

#### Transmitting Unit

For modulating the frequency variable frequency oscillator1 is used i.e. to be transmitted and output is obtained a high frequency oscillator 2 for generating a carrier wave. Antenna radiates carrier wave into space.

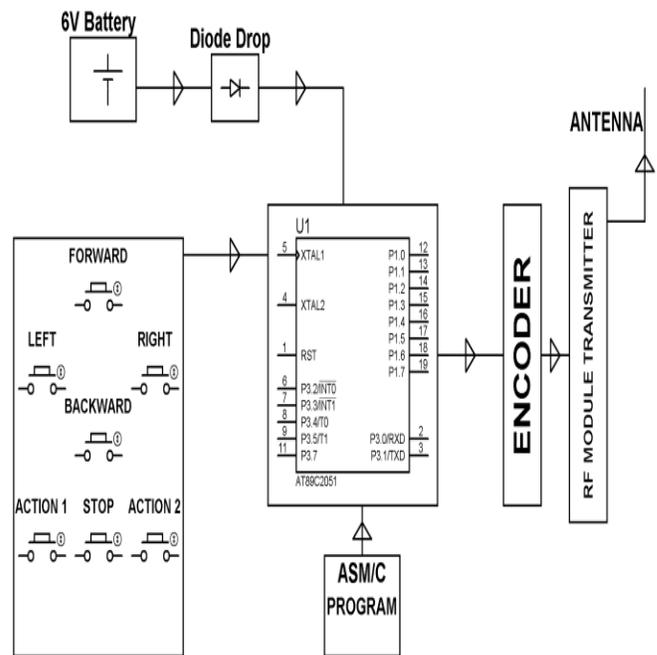


Figure 3: Transmitter Module

#### Receiving Unit

The receiving antenna for detecting the waves transmitted by transmitter antenna is connected to a tuned wave detecting circuit [2].The tuned wave detecting circuit's output is

connected to amplifier which in turn has its output connected to the input of the low pass frequency as well as the filter to a high pass frequency filter.

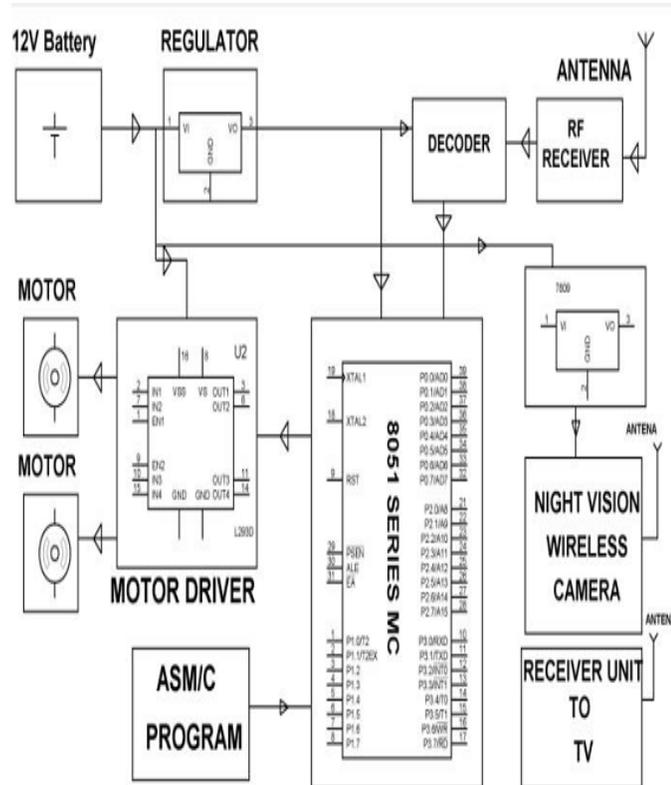


Figure 4: Receiver

The amplifiers outputs are connected to separate motors and other side of motors are connected to voltage potential. The high frequency is extracted from the high pass frequency filter and low frequency is extracted from low pass frequency filter.

#### Microcontroller Circuit (AT89S52)

It is the heart of the system as it controls all the activities of transmitting and receiving. AT89S52 IC is used. The AT89S52 Microcontroller is an 8-bit microcontroller of 8051 series with 8K Bytes of In-System Programming Flash Memory. Atmel's high-density nonvolatile memory technology is used for manufacturing of the device and is compatible with the industry standard 80C51 instruction sets. The on-chip Flash memory allows the program memory to be reprogrammed in-system or a conventional nonvolatile memory programmer is used [3]. Atmel AT89S52 is a powerful microcontroller by combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, it provides a cost-effective and highly-flexible solution to many embedded control applications. The Idle Mode is used to stop the CPU while allowing the RAM, serial ports, timer/counters, and interrupt system to continue functioning.

The Power-down mode is used to save the RAM contents but freezes the oscillator, and disables all other chip functions until the next interrupt or hardware reset occurs[3].

#### Power Supply Circuit

Power supply is the main building block of any electronic system used to provide required power for their operation and is as shown in the Figure 4. For the microcontroller, keyboard, RTC, LCD, GSM, +5V are required and for driving a buzzer +12V is required. The power supply gives regulated output of +5V and non-regulated output of +12V [3].

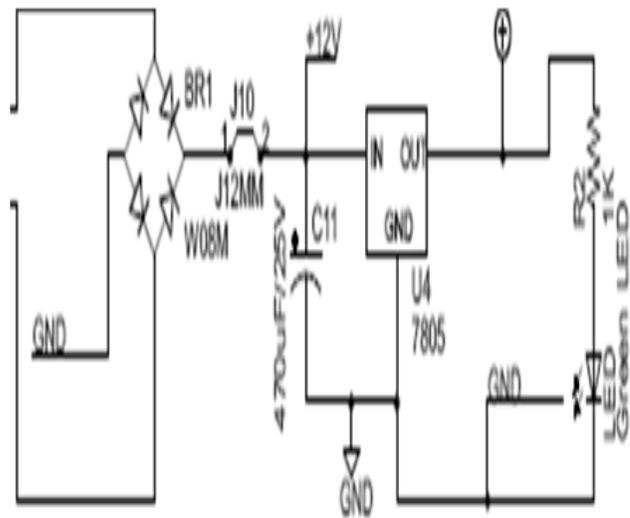


Figure 5: Power Supply Module

The three terminals IC780 provides +5V. The rectification of secondary voltage from the main transformer is done by electronic rectifier & filtration by capacitor. The unregulated DC voltage is supplied to the input pin of voltage regulator IC.

#### Wireless Camera

We are using a wireless CCD camera, which are commonly available in the market. This camera works on 12 volts DC supply. The camera has a receiver, which is placed in the remote station. Its output are in the form of audio and video signals. These signals are directly sent to a television or a computer through a tuner card. This CCD camera is placed on the robot. The camera captures the audio and video signals and sends those signals to the remote station and with the help of the camera receiver which is connected to the television or a computer through we will be able to see the captured signals. This is a mini wireless monitoring video camera and wireless receiver set for home and small business surveillance, security and is used by us for demonstration purpose [4]. We need to install the wireless camera in the

room where we want to monitor and set the wireless receiver in the next room (up to 15 meters away) and hook it up to a TV or DVR to watch the action or record the footage for the security purpose. Here we are placing this wireless camera in the combat robot which would be present in the war field.

## 5. SOFTWARE IMPLEMENTAION

### Audacity

1. It is free software available for the removal of noise.
2. It is a free open digital audio editor and recording computer software application, available for Mac OS X, Windows, Linux and other operating systems.
3. We can remove the unwanted noise from the audio/video which is coming at the receiver end [5].

## 6. RESULT

### 6.1. Import audio

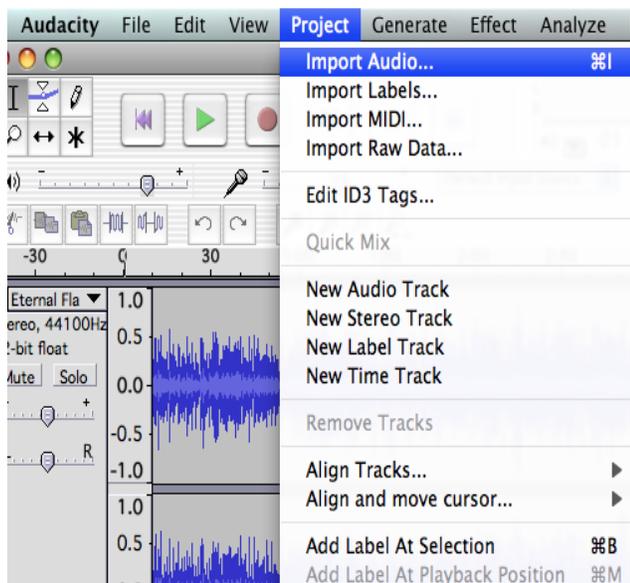


Figure 6: Import Audio

### 6.2. Isolate the quiet moment

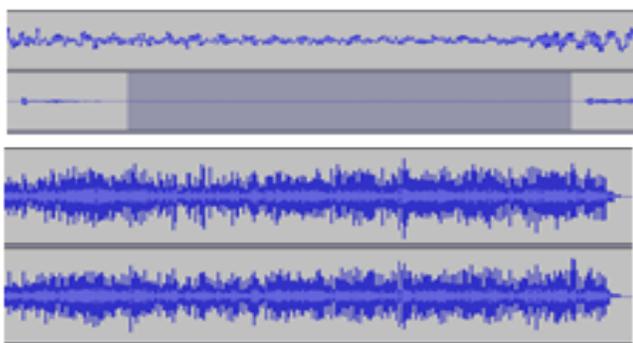


Figure 7: Isolate the Quiet Moment

### 6.3. Get noise profile

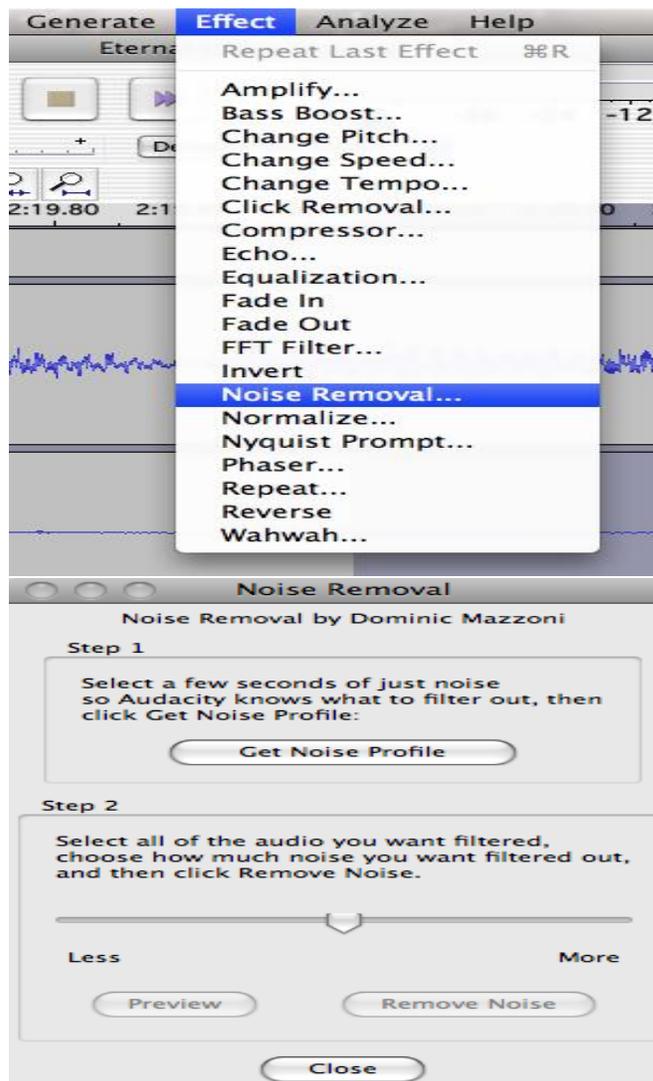


Figure 8: Fetch the Noise Profile

With the help of this we aimed at obtaining the accuracy. It has been tested to best of our ability. We were able to view the things accurately that were happening. In our view. Our design has not caused any sort of disturbances. This robot will move based on the motor direction depending upon the input we give through command via remote section unit. With the help of camera we are able to view the things that are happening in the war field where the robot is hidden. The importing and exporting features of 'AUDACITY' in this project have helped to remove the unwanted audio signals. By using this software we can post process all type audio including broadcast by adding effects such as normalizing, trimming fading in and fading out.

## 7. CONCLUSION

The primary need for our paper would be accuracy. We have been able to view the things accurately that are currently happening in the surrounding area. Our design has not caused any sort of disturbances. The robot will move depending on the motor direction based upon the input we give through command by remote section unit. It display the current operation is going on as example left robot, near to object, clear up. With the help of the camera we are able to view the things that are happening in the surrounding areawhere the robot is hidden. By keeping the circuit easy and simple, most users will be able to use it easily. Thus we should be able to manipulate its path when necessary, to create the robot safely. To all that, a control unit is needed, where control units RF signal is used. By using these signals encoding is done & signal is sent through the transmitter. At the receiver end these decoded signal are given as input to drive the motor. Not for long range applications it can be used as a spy robot within short distances.

## 8. FUTURE ENHANCEMENT

We can connect this system directly to internet by using zig-bee with Wi-Fi. By using internet we can control the system via remote location. We do not require any simulation tool by using GUI software. Halogen light can be used for the vision of the robot. We can also control the device by giving it voice command thereby making it a voice recognition system.

## REFERENCES

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