

## Advanced Spying and Bomb Disposal Robot

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**Abstract** — This project is very beneficial in areas where there is high risk for humans to enter. This system makes use of robotic arm as well as robotic vehicle which helps not only to enter an area involving high risk but also to pick whatever object it wants to. The system also includes night vision camera which will not only allow viewing whatever will be recorded in day time but also during night. The whole system is controlled via RF remote. The system sends commands to the receiving circuit mounted on the vehicle through push buttons. The receiving circuit involves microcontroller and a receiver which receives commands sent by the transmitting circuit. At first the system is set to control the movement of vehicle. In order to set the system in a mode that operates the arm. At first the user needs to press the push buttons for moving the vehicle in whichever direction it wants i.e. forward, backward, right or left direction. In order to make the arm movement, the user needs to long press the forward and backward push buttons. Thus this system makes use of camera, robotic arm and robotic vehicle to enter a high risk involving area and also to pick, move and drop an object as well as record the place wherever the system goes and later view it for future reference.

Index terms – microcontroller, RF remote, robotic arm, wireless camera

### INTRODUCTION

In this construction a Robot which is used for bomb disposal purpose. Use wireless camera for video feedback so operator can operate more efficiently. The operation of robot is control by using wireless module so it can provide more range of operation. Also construct a basic bomb diffusing robot which can handle simple tasks like cutting wires, flip on switches, lift light objects, etc. and a simple autonomous robot to help in the transit of the bomb. Also gives video feedback to us so effective handling of robot can be possible. Here we use robotic arm. We are going to use servo motor as actuator, Robot base will rotate 180 degree, elbow, shoulder and gripper also will move according to their directions the input to the system is from the user. This input is first processed at the control application, serially transmitted over a Radio Link. This input is then received at the robot and processed again. The output of the system is the processed signal to the appropriate module. This module can be a motor of the base of the robot or the robotic arm or robot provides an extra layer of protection to the bomb disposal squad by allowing them to check and analyze a suspicious packet before actually approaching it for disposal. Mobile robots reduce or eliminate a bomb technician's time-on-target. A robot takes risk out of potentially deadly scenarios and lets the bomb technician focus on what to do to an explosive device rather than on the immediate danger to life and limb. Even if a robot cannot reach an item for disruption, it can still be used to relay information to aid in tool and procedure selection to moving downrange. In addition, events recorded by a robot's camera can provide evidence for further analysis

Our project is designed keeping in mind, the view of the current civil wars, military instability and terrorist scenarios across the globe. Almost every day so many trained people gets either injured or loses their lives while dealing with or trying to defuse bombs. All this can be perceived by the countless number of news articles and documentaries that appears daily on news channels and print media around the world.

Though the idea of our project is original, some projects with similar objectives can also be found. Examples of the French

Police have a bomb disposal robot, the Army of Israel possesses it and it is also in use by the bomb squads in a number of states of USA.

The main idea of the robot here is to serve the bomb disposal squad with proving safety and security from the dangers that they are facing in their daily lives. The bomb squads in India have metal detectors and may be some other equipment for detecting the bomb and disposing it, but still they have to keep their lives at risk by going near the bomb physically or the suspicious packets without any safety and precautions. Our robot will serve as an extra layer of protection to the bomb squad members by giving them the facility to simply check and analyse any suspicious packet and further if detected, the robot can be instructed to diffuse it too A mobile robot generally reduces or eliminates a bomb technician's time on target. The robot also takes the danger out of potentially deadly scenarios and allows the bomb technician to focus on his work of what he needs to do to the explosive material rather than deviating on topics of the threat to life and his limbs. Now, even if in some cases the robot may not reach near the suspicious item for disruption, it can still be used to pass the information to help the technician and deciding what needs to be done. Apart from all this, the visuals recorded by the robot's camera can provide evidences for further research and analysis

**II .LITERATURE REVIEW**

[1] Dr. R.V. Krishnan, Reddy , “Design and implementation of Bomb Diffusion sing Surveillance Robot using R F Technology” illustrates the perks of this project are robots Controlled by hand gestures and RF remote ,This project is much essential for mines detection Surveillance application. In this project, RF module is used to cover a small range

[2] Prashant limje, Shailesh Kaikali ,”Bomb Detection and Diffusion in planes by Application of Robotics” in this paper also throws lights on remote bomb detonation and automatic bomb detection .

[3] Sagar ,Neha ,Apoorva Kamat, Shubhrojit Chakraborty, Vishal Pande, “Hand Gesture Recognition Bomb Diffusing surveillance Robot”, Explains that hand gesture Recognition enables the robot to be more user friendly, though the need of improving the Range of wireless communication is compensated

[4] V.Prasanna Balaji,” A Multipurpose Robot for Military Tribute to Defence Ministry” Describes realization of Dynamic 3D videogame. This explains the feasibility for a mission to locate and dispose a bomb placed inside an airplane inspite of its practical implications

**III. OBJECTIVES**

The main goal of our project is to give safety to the bomb squad members and serving an extra line of defense while dealing with the bomb. The main objective will be accomplished only by completing several sub objectives. These sub objectives are as given below –

- Serve as distant monitoring and controlling device to check any suspicious packet (or bomb).
- To allow the user to manipulate the suspicious packet using the robotic arms.
- To give visual display from the place of the packet.
- To make the controlling of the robot such that it can be controlled very easily.
- This uses project serves as a control application, at the user end to control the robot from some distance using wireless technology.
- The bomb technician will also control the robot using a switch box. This input from the user will be transmitted serially by RF signals to the robot, where it will receive, identify and will further instruct the robotic module.
- Here the inputs from switches will be first processed at the user side, serially transmitted over a Radio Link. This input is then received at the robot and will be processed again.

**IV.COMPONENTS USED**

There are some spying robots which are controlled by remotes, spying robot also have a camera in it and it also transmits video material or information to the mediation group or spying group. The size of these types of robots are usually suitably small so can

travel more efficiently. we have used AT89S52. These type of robots which should be handle in a secret manner it have camera which will also controlled by remote, batteries, an antenna. We have used two different PIC’s to control the robot and whole system through remote.

**MICROCONTROLLER AT89S52**

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller 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. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non volatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, 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.

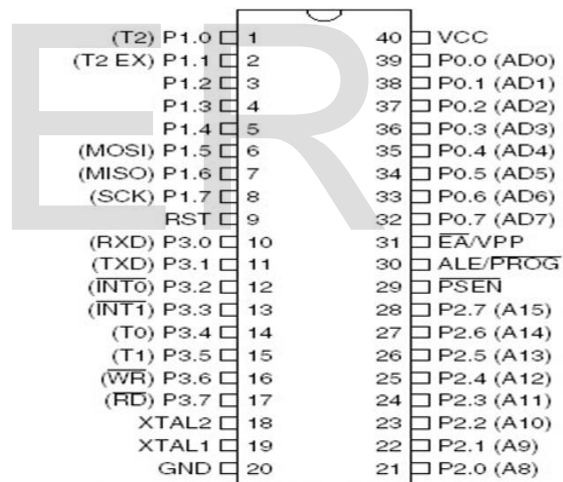


Figure taken from a datasheet provided by ATMEL™

Fig: PIN DIAGRAM OF AT89S52

**MOTOR DRIVER (L293D)**

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.

Enable pins 1 and 9 (corresponding to the two motors) must be high for motors to start operating. When an enable input is high, the associated driver gets enabled. As a result, the outputs become active and work in phase with their inputs.

Similarly when the enable input is low, that driver is disabled, and their outputs are off and in the high-impedance state.

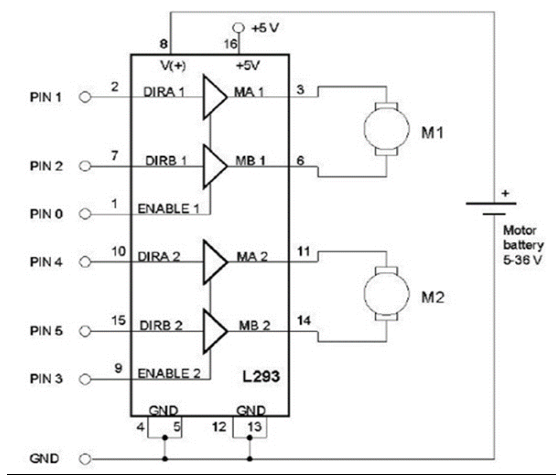


FIG: BLOCK DIAGRAM OF L293D

**RF MODULES**

RF itself has become synonymous with wireless and high-frequency signals, describing anything from AM radio between 535 kHz and 1605 kHz to computer local area networks (LANs) at 2.4 GHz. However, RF has traditionally defined frequencies from a few kHz to roughly 1 GHz. If one considers microwave frequencies as RF, this range extends to 300 GHz. The following two tables outline the various nomenclatures for the frequency bands. The third table outlines some of the applications at each of the various frequency bands.

**RF TRANSMITTER**

The ST-TX01-ASK is an ASK Hybrid transmitter module. ST-TX01-ASK is designed by the Saw Resonator, with an effective low cost, small size, and simple-to-use for designing.

Frequency Range: 315 / 433.92 MHZ.

Supply Voltage: 3~12V.

Output Power: 4~16dBm

Circuit Shape: Saw

**RF RECEIVER**

The ST-RX02-ASK is an ASK Hybrid receiver module. A effective low cost solution for using at 315/433.92 MHZ. The circuit shape of ST-RX02-ASK is L/C. Receiver Frequency:

315 / 433.92 MHZ Typical sensitivity: -105dBm

Supply Current: 3.5mA IF Frequency: 1MHz

**1N4007**

Diodes are used to convert AC into DC these are used as half wave rectifier or full wave rectifier. Three points must be kept in mind while using any type of diode.

1. Maximum forward current capacity
2. Maximum reverse voltage capacity
3. Maximum forward voltage capacity

The number and voltage capacity of some of the important diodes available in the market are as follows:

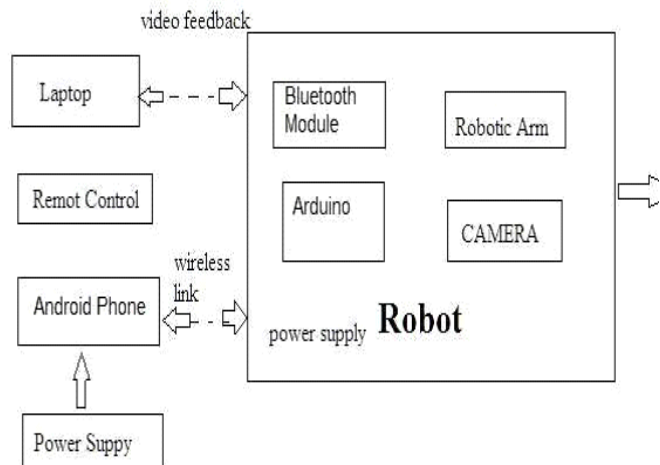
- Diodes of number IN4001, IN4002, IN4003, IN4004, IN4005, IN4006 and IN4007 have maximum reverse bias voltage capacity of 50V and maximum forward current capacity of 1 Amp.
- Diode of same capacities can be used in place of one another. Besides this diode of more capacity can be used in place of diode of low capacity but diode of low capacity cannot be used in place of diode of high capacity. For example, in place of IN4002; IN4001 or IN4007 can be used but IN4001 or IN4002 cannot be used in place of IN4007. The diode BY125 made by company BEL is equivalent of diode from IN4001 to IN4003. BY 126 is equivalent to diodes IN4004 to 4006 and BY 127 is equivalent to diode IN4007.

**WIRELESS CAMERA**

- Wireless Small size camera for Surveillance and robotics. The very small size and low power operation makes it useful for mounting on wireless robots to transmit the video to receiver. The received signal can then be directly seen in tv or in pc through TV Tuner or Video Capture Card. For Laptops USB TV Tuners can be used.
- Small Size
- Low Power consumption
- Inbuilt Microphone, also transmits audio along with video
- RF Receiver included in package.
- Range upto 25 feet in open space.
- Auto Gain and white balance control
- Camera working voltage from 5V to 12V
- All cables and connectors required are included
- Video can be taken to PC through Video capture/TV tuner for image processing

**VI. METHODOLOGY**

The system works in this way that firstly, the commands are given to the receiver via the remote which is then processed and transmitted to the driver circuits which moves the motors. Then the commands are passed to the camera's motor and the rare wheel's motors which then moves accordingly. The footages obtained through the wireless camera are real-time transmitted to capture card of the camera and then is displayed on the screen.



## RESULT

The essential metric for our paper would be precision. This has been tried to the best of our capacity. We have the ability to see exactly the things that are going on. As far as we can tell, our structure has created no disturbing influences. Depending on the course of the engine, the robot moves depending on the information we provide via the remote control. With the help of the camera, we can see the things going on in the region where the robot is hidden. By keeping the circuit direct, most customers have the capacity to use it effectively

## VII. DIRECTION FOR FUTURE SCOPE

This spying robot can be modified and made it for prolonged ranged and can be make it more useful by consuming more operational procedures and modules like Wi-Fi module, raspberry pi. Future scope of this robot is very efficient it may have gas sensors to detect the harmful or hazardous gases in the surroundings. It can also be used as bomb diffuser and bomb disposal team can also use these type of robot in many ways and reduces the risk factor of human loss. Further, a terminating framework can be set on the robot, to fire any foe when he is spotted. The innovation can be enhanced further by offering directions to accepting circuit and control it by utilizing satellites correspondence. It will utilized in shopping centers for pickup, drop trolleys and car vehicle painting. Likewise, the framework can be made android based, where all controlling should be possible through an advanced mobile phone. There is a light called halogen light which is useful for the camera's vision which is attached on the robot. This robot can also be controllable by giving commands through voice it will response to the voice commands also.

## VIII. CONCLUSION

It detects the signal which is transmitted and according to that control robot in forward, backward, left turn, right turn movements.

Metal/Bomb detector can detect the metals and alert with LED to notify the Metal/Bomb. The camera detects the exact location of the robot. In this manner our project plays a crucial role in Military as well as in police department.

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