

## Design and Fabrication of Robotic Landmine Defuse

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**Abstract**— This Wirelessly controlled Pick and Place land rover mounted with metal detecting sensors to generate alarms on sensing planted land mine. The movement is wirelessly controlled by a hand held RF transmitter. RF receiver is mounted on the land rover. The main aim of this project is to remotely control the robot primarily using the RF mode with an encoder duly interfaced to a microcontroller. The RF (Radio Frequency) remote control has the advantage of adequate range (up to 200 meters with proper antenna) besides being Omni directional. The receiver uses a decoder and a controlled duly interfaced to the microcontroller that drives the DC motors through driver IC. This robot is a command and control robot. It takes commands from the user in the form of control signals and performs the required action. The central idea of this robot is to provide a line of defence to the bomb disposal squad against the life threatening risk faced by them in the event of an explosion. It provides the squad a safe distance to dispose of a bomb, which one has to normally do with bare hands. It can also be used for many other applications based on manufacturing and fabricating industries just by changing the end part of the arm.

**Keywords**— Radio Frequency (RF) transmitter, RF receiver, DC motors, land rover, Pick and Place

### I. INTRODUCTION

One of the foremost important challenges baby-faced by any post war human re-settlement program is to hide a huge unstructured land of minefields as quick as doable with a guarantee of safety for civilians. Landmines cause a heavy threat to troopers and civilians worldwide and conjointly offer major challenges to agriculture, infrastructure and road development in post-conflict regions. For many of the developing countries, landmine removal could be a pre-requisite to economic development. Apparently, demining is AN operation attended with tons of risk to human deminers. Therefore, manual deminers inch. Analysis of the movements of the human deminers shows that the quality half are often simply and safely performed by robotic systems. Then the challenge is reduced to sensing the landmines.

The undertaking points planning a robot which is fit for distinguishing land mines in its way, cautioning through alert framework and in its transfer. Additionally, the robot is worked through a remote made utilizing RF innovation.

The advent of new high-speed technology provides realistic opportunity for new robot controls and realization of new methods of control theory. This technical improvement together with the need for high performance robots created faster, more accurate and more intelligent robots using new robots control devices, new drivers and advanced control

algorithms. This project describes a new economical solution of robot control systems. The presented robot control system can be used for different sophisticated robotic applications.

RF Communication goes in the middle of 30 KHz to 300 GHz. RF correspondence works by making electromagnetic waves at a source and having the option to get those electromagnetic waves at a specific goal. These electromagnetic waves travel through the air at close to the speed of light. The wavelength of an electromagnetic sign is contrarily corresponding to the recurrence; the higher the recurrence, the shorter the wavelength.

The controlling device of the whole system is a Microcontroller. Land mine detector, RF receiver, DC motors and buzzer are interfaced to Microcontroller. The Microcontroller receives input from RF receiver and operates the dc motors accordingly written in the program. The Robot is attached with a land mine detector which continuously monitors the landmines in its presence and feds as input controller which horns a buzzer, if they are present.

To perform this intelligent task, Microcontroller is loaded with a program written in embedded 'C' language.

### II. MAIN OBJECTIVES OF THE PROJECT

1. Controlling Robot wirelessly.
2. Alerting through buzzer, if a bomb is detected in its path.
3. Picking up the bomb for disposal.

### III. THE MAJOR BUILDING BLOCKS OF THIS PROJECT

1. Regulated power supply.
2. Microcontroller.
3. RF transmitter and RF receiver.
4. Encoder and Decoder.
5. Metal detector
6. Motor Driver.
7. Buzzer.
8. LED Indicators

### IV. SOFTWARES REQUIRED

1. C compiler for Embedded C programming in keil software.
2. Program ISP for dumping code into Micro controller.
3. Proteus for Circuit design.

### V. BLOCK DIAGRAMS AND DESCRIPTION

#### TRANSMITTER

In the Transmitter circuit we are utilizing 9v control stock. This circuit comprises of HT12E Encoder. This encoder fills in as parallel to sequential converters. We give input physically by squeezing the switches of the transmitter. The location lines of encoder are grounded for motivation behind coordinating location. In this circuit we are utilizing four resistors for four changes to empower the dynamic low transmission empower pin of encoder. The sequential yield of the encoder is transmitted through RF transmitter utilized for remote correspondence. The square graph of transmitter comprises of control catches to control the movement of Land Rover. In this we are utilizing 9v control inventory from the battery. The encoder is utilized to parallel to sequential changes. The yield of the encoder is given to RF transmitter is utilized for the remote transmission of information.

#### Block Diagram:

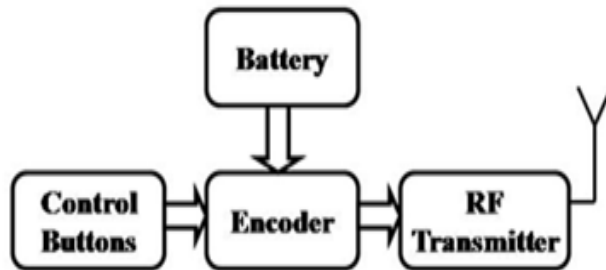


Figure 1. Transmitter block diagram

#### Circuit Diagram:

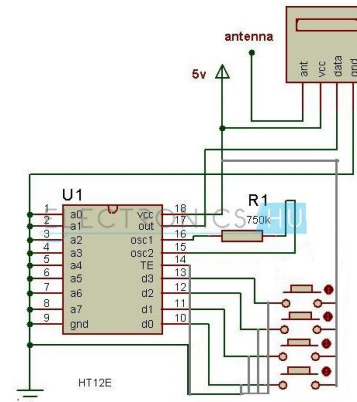


Figure 2. Transmitter Circuit Diagram

#### RECEIVER:

9V control stockpile is utilized in this circuit, when the power supply is given to the beneficiary circuit the LED will shine. The sequential yield of encoder will be gotten by the decoder through RF recipient. The decoder four yield information pins are associated with the pins of the smaller scale controller.

#### Block Diagram:

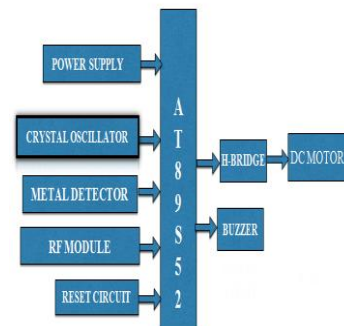


Figure 3. Receiver block diagram

The microcontroller has four ports, port1 pins are utilized as info pins, port2 pins are utilized as yield pins and port0 is utilized for the associating the signal. The sensor is associated with the port1 p1.5 pin of the smaller scale controller.

The program is written in keil programming and it is dumped into miniaturized scale controller. The port2 higher pins are utilized as the yield pins of miniaturized scale controller, these pins are associated with engine driver. Here we are utilizing the outside power supply i.e.12V to run the engines. The controller is utilized to give the ideal voltage to the smaller scale controller and the closeness sensor is utilized to distinguish the metals up to 5mm.

**CIRCUIT DIAGRAM:**

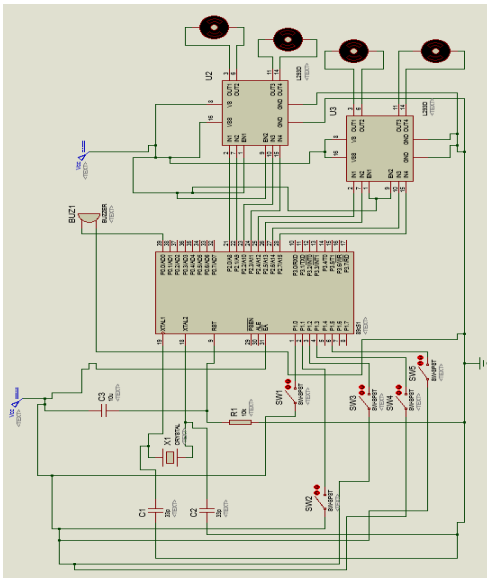


Figure 4. Receiver Circuit Diagram

**VI. CIRCUIT OPERATION**

The transmitter circuit comprise of four switches, helps the land wanderer in moving left, right, front, back and arm developments. At the point when the switch is squeezed in transmitter circuit the transmission pin will be empowered in the encoder and the information is transmitted through RF transmitter and got by the recipient.

The transmitted information from the encoder to is checked at the decoder in collector by checking the data at the substantial transmission pin. On the off chance that the best possible transmission is done, at that point the LED in the collector will shine.

The transmitted information from the encoder to is checked at the decoder in collector by checking the data at the legitimate transmission pin. On the off chance that the correct transmission is done, at that point the LED in the recipient will sparkle.

The working of the land meanderer program is written in KEIL programming form which is dumped in to the smaller scale controller 8052 by utilizing Prog ISP and L293D is utilized to run the engines and it goes about as the interfacing circuit between the engines and miniaturized scale controller it likewise shields the miniaturized scale controller from the back emf which is created by DC engines. For L293D we can associate four engines however we require just two engines and free wheel for the case development in this way, the land wanderer comprises of two engines driven by the engine driver L293D. In this we

are utilizing lithium battery which gives the 12v power supply to run the DC engines associated with the land meanderer.

Based on the input we are given the land rover can move forward, left, right and stop. The proximity sensor present in the land rover will detect the land mines while the land rover is moving without any physical contact. Here we are using inductive proximity sensor which detects in the distance of 5mm. When the landmine is detected the buzzer will ring then the vehicle will stop.

**MECHANICALSTRUCTURE**



Figure 5. Robotic Landmine Defuse

**VII. SOFTWARE REQUIREMENT**

In this project we are using the Keil software for writing the code. Keil development tools for the 8051 Microcontroller Architecture support every level of software developer. The industry-standard Keil c compilers, Macro Assemblers, Debuggers, Real-time kernels, Single-board computers and emulators support all 8051 derivatives.

The Keil 8051 Development Tools are designed to solve the complex problems facing embedded software developers.

**VIII. CONCLUSION**

Finally it can be concluded that the project wireless operated land rover that alerts on sensing bombs made an interesting experience. In this the RF transmitter and receiver can transmit the data up to 200 meters. And proximity sensor can detect the metal and the robotic arm can pick up the bomb and take it to a safe place for disposal.

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