

Advanced Military Spying And Bomb Disposal Robot

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ABSTRACT

This paper represents the wireless robot which performs bomb diffusing and detection operation. The bomb searching and diffusing system work with the help of experts. This robotic system works with the help of wireless technology. the bomb diffusing experts control the robotic system using IP Web Cam Application. We have used four DC motors for Arm controlling purpose. Here we have used a metal detector and chemical sensor for bomb detection purpose. With the help of this project, we save the life of bomb experts and the lives of ordinary people.

1. Introduction

Here we are going to design a robot which is capable of detecting the bomb and even marking their exact location. Here robot will be controlled wirelessly. Here RF module will be used. The main application of the RF module is to communicate wirelessly. This communication may be accomplished through radio frequency communication.

Generally, An RF module is a small size electronic device, that is used to transmit or receive a radio signal between two devices. The three main tasks in this project are as follows-

1. Detecting
2. spying
3. diffusing

Here we used a camera for spying purpose. This wireless camera basically used for live streaming and video feedback. The night vision camera is also used so that the night will get a clear image. For detecting, we are using the metal detector and chemical sensor. Spying is provided the exact location of the bomb. And for the diffusion purpose, the Arm is used. This bomb diffusing robot can handle simple tasks like cutting wires, lifting light object etc. robot takes commands from the user in the form of control signals and performs the required action.

Next important part of this project is to create the Graphical User Interface(GUI). The Graphical User Interface is a human-computer interface. It consists of icons, menus, buttons, etc. Most of the modern applications like electronic gadgets like mobile phones interact with the user through GUI.

1.1 Graphical User Interface-

GUI uses buttons, menus, message boxes, etc. Controlling can be done through GUI.

1.2 The following steps represent the steps for creating Graphical User Interface-

- Step 1- Go in the command window and type "Guide" then the guide window will pop up.
- Step 2- Then click on "Blank GUI" and then "OK".now blank

window will pop up on the screen.

Step 3-That blank window will be known as GUIDE layout editor.

Here we can design the layout of a GUI by dragging and dropping the components from left.

Step 4- File ->Preferences->Guide->matlab GUIDE preferences and tick the one box,2 and 4 boxes which will be of the (show name of the component, show file extension, add comments).

Step 5- We can resize the template which will not be changed it will be fixed. And if we want to change this property than we will go in Tools -> GUI option -> Resize behavior (choose the App option).

Step 6 - we can add a couple of components to GUI.

1. add"ares"
2. add "panel" where push buttons will be placed.
3. alignments of the buttons can also be done.
4. we can change the properties of the GUI. This can be done by double clicking of an object (or) going to view -> property inspector where property inspector will allow us to view and set the property

i)we can change GUI name
property -> name=[xyz]

ii)panel name i.e. title can also be changed, so double click on the panel -> changed the title.

iii)Then double click on push buttons to change their name string.

iv)We can also add toolbar buttons using toolbar editor like (zoom, zoom out, rotate, etc.).

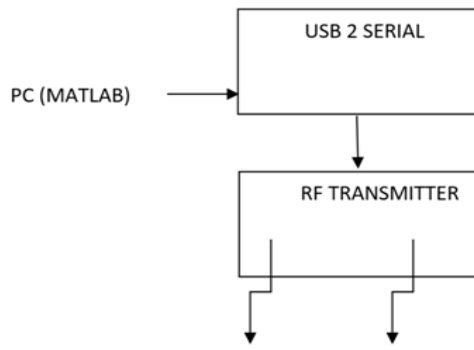
v) After the GUI is created, we can run the GUI by clicking the green button.

vi)It will generate a mat lab file which displays a GUI. click on that file and save it.

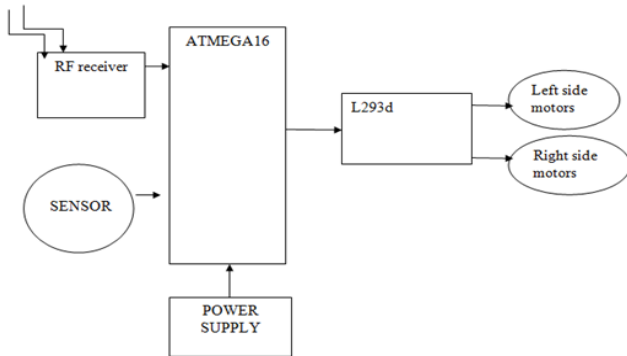
Then the program will be generated as well as we can see the GUI what we generate in the editor.

2. Block Diagram-

2.1 Transmitter-



2.2 Receiver-



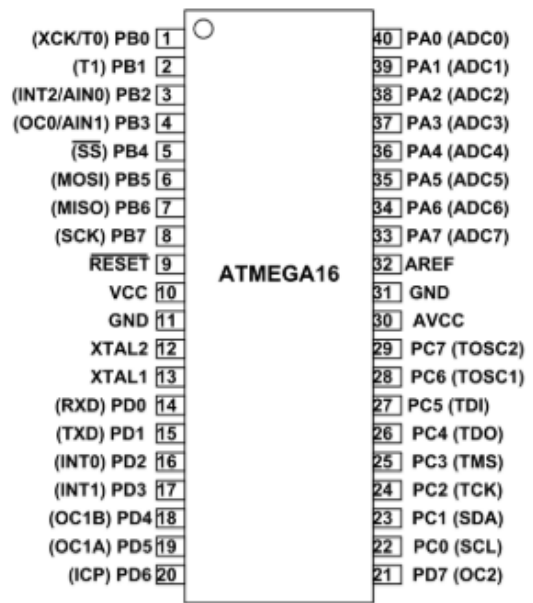
Here in the block diagram as we can see the user gives instruction to the robot by using the DC (MATLAB) that instruction is further given to the USB to Serial block will convert the instruction in the form of control signal than that signal will be given to the RF Transmitter and that signal will be passed to the RF Receiver. RF Receiver and proximity sensor output will be given to the controller ATMEGA 16 and the power supply will also be given to the controller.

An output signal of the controller will be given to the motor driver IC L293D, that one motor driver IC will control the two DC motors.

3. Hardware Used -

- 4.1 ATMEGA 16 Controller
- 4.2 Metal Sensor
- 4.3 RF Transciever
- 4.4 DC motor
- 4.5 L293D motor driver IC
- 4.6 LCD
- 4.7 Power supply
- 4.8 IP WebCam
- 4.9 Battery
- 4.10 Robot Assembly

4.1ATMEGA 16 Controller-



Controlling of DC motor using Atmega16 is easy. Atmega 16 is an 8-bit high-performance microcontroller. It is a 40 pin microcontroller. It has low power. Operating voltage range of Atmega 16 is 1.8 to 5.5V. The program memory type used in Atmega 16 is flash and it has 16 Kb of program memory size.

4.2 Metal sensor-

A metal detector is an electronic instrument which is used to detect the presence of metal nearby.

Metal detector circuit consists of LC circuit, proximity sensor, LED and Buzzer.

4.3 RF transceiver-

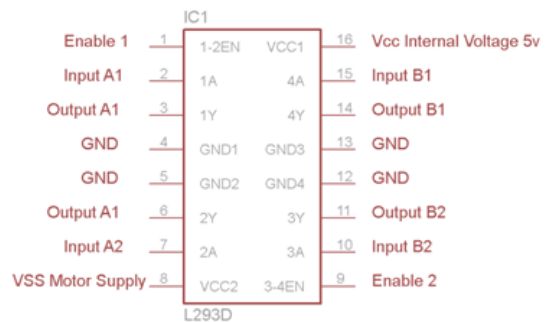
This is an FSK transceiver module, which is design using the Chipcon IC(CC2500). It is a true single-chip transceiver. It is based on 3 wire digital serial interface and an entire Phase Lock Loop.

4.4. DC Motor-

DC motor of 150 rpm @12V is used. The voltage of DC motor is in between 6 to 12 V. It is a low-cost motor having a single shaft. We have use Dc motor because servo motor does not rotate freely like dc motor.

4.5 L293D -

L293D is a motor driver IC, it allows DC motor to drive on either direction, one motor driver IC can operate two DC motors. It is a 16 pin IC.

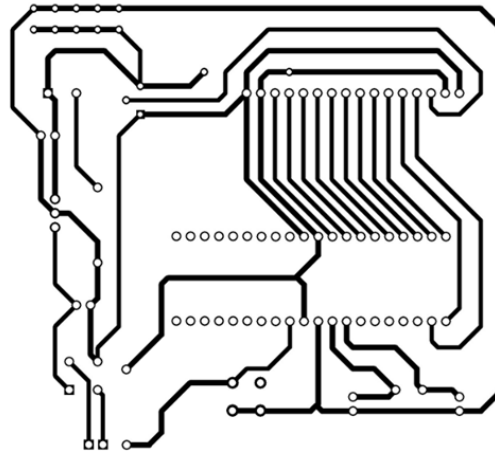


4.6 Power supply -

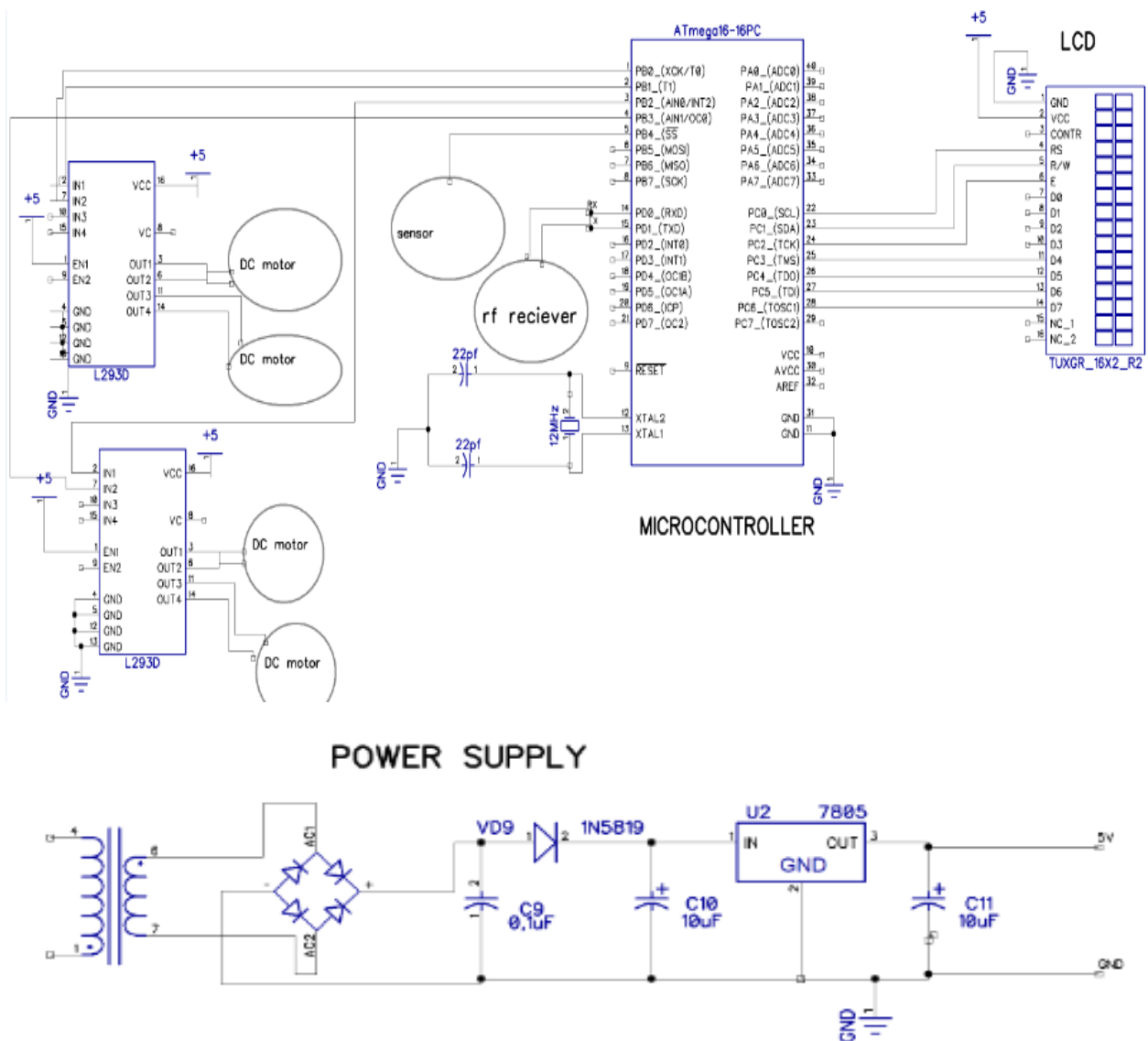
The transformer is the first block in the power supply. The transformer will convert the ac signal to step down or step up into an AC form. Hence the transformer is also known as AC to AC converter. An output of the transformer is given to the

rectifier. rectifier convert a signal to the pulsating DC means ripples will be present to the output of the rectifier is given to the filter. and filter will remove the ripple and convert it in the pure form.

PCB Layout-



Circuit Diagram-



4. Advantages

1. Live to stream
2. Bomb-detecting and diffusing operation.
3. Spying.

5. Conclusion

The advanced Bomb Disposal Robot has been designed in such a way that it is capable of detecting and diffusing the bomb and even marking their exact location. It performs three different tasks like detecting, spying, diffusing.

References

1. <https://ieeexplore.ieee.org/document/4350500>
2. <https://ieeexplore.ieee.org/document/8275193>
3. <https://ieeexplore.ieee.org/document/7856510>
4. <https://ieeexplore.ieee.org/document/7976932>
5. <https://ieeexplore.ieee.org/document/8261366>