Surveillance Robo using RF Module

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ABSTRACT

This Research paper will describe the project done to design and build a small Surveillance robo,where a robot will present the real time video and detect the metal with the help of metal detector. Researches were done in the beginning of the project to get more information about robotics in general and to think about the design, hardware components, and the software technique which will control the robot. The design was inspired from the car design where 2 wheels are used in the robot. The Robot is controlled using AT89S52 microcontroller which is considered the brain of the robot. This robot contains RF Module, wireless camera, Metal detector, 3 DC motors, and Buzzer is used in the robot's body to detect the metal. Two DC series motors are used to control the rear wheels and one DC series motor is used for the rotation of camera. The microcontroller controls the speed of the motors with the help of Motor driver L293D. The software part of the project is the program code written in the micro-controller to control the direction of robot and rotation of camera.

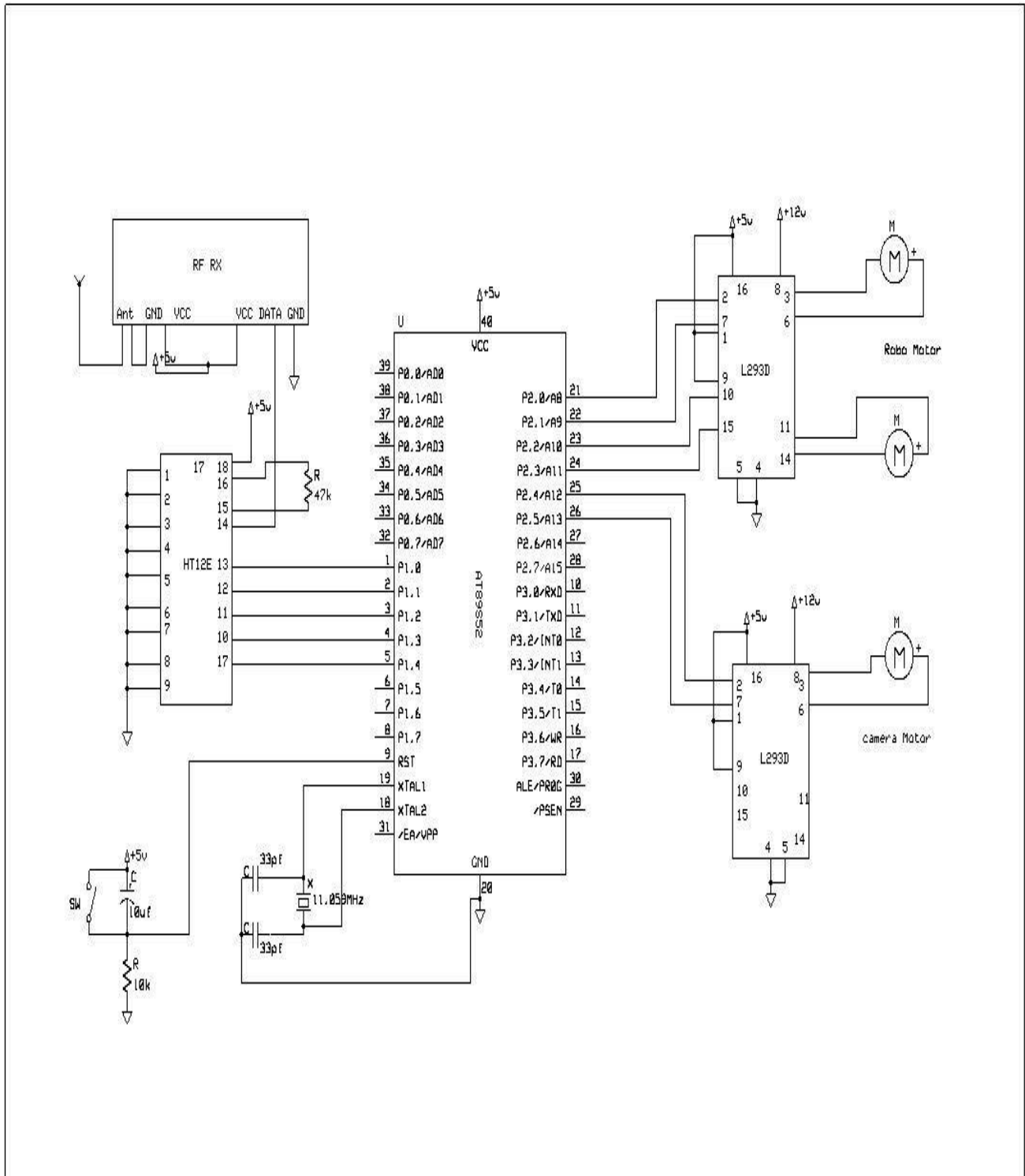*Keywords:Power supply, Metal detector, RF Module, Motor.*

I.INTRODUCTION

Robot is defined as a electro- mechanical design that is capable of performing human tasks or behaving in a human-like manner. It's about building systems and putting together motors, solenoids, and wires, among other important components. A spy robot is a robotic vehicle using RF technology for remote operation attached with wireless camera for monitoring purpose. Therobot along with camera wirelessly transmits real time video.
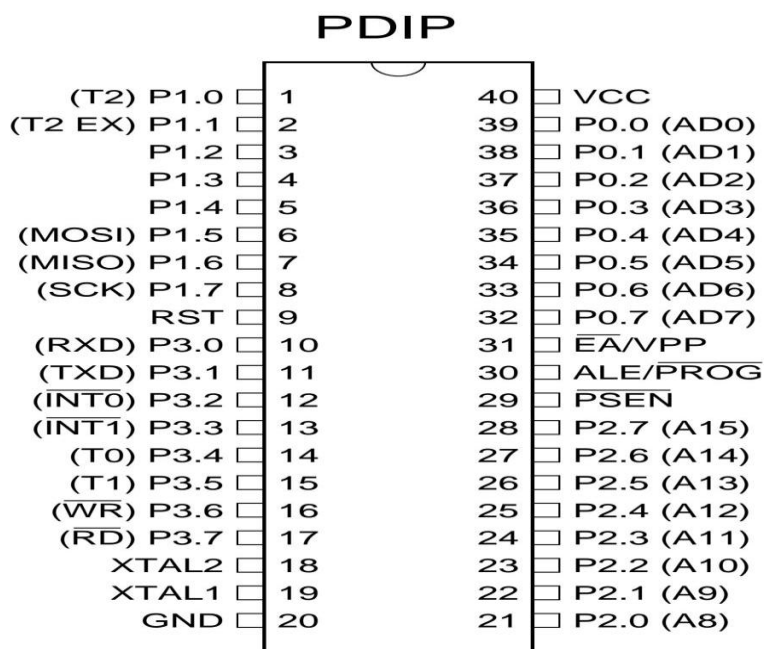
II. OBJECTIVE

1. It provides audio and visual indications.
2. Detect the metals.
3. It provides wireless transmission of real time video.
4. It reduces human efforts.

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III.CIRCUIT DIAGRAM

Components Used:-

A. Microcontroller:

A microcontroller is a single chip that contains the processor (the CPU), non-volatile memory for the program (ROM or flash), volatile memory for input and output (RAM), a clock and an I/O control unit. It is a powerful device, which is capable of executing various tasks and interfacing with other hardware devices. The controller used in this project is AT89S52.The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory.

B. Power Supply Circuit:

A power supply is an electronic device that supplies electrical energy to an electrical load.Here microcontroller, sensor and audio circuit operates with DC 5V, motor driver circuit operates with DC12Vsupply and this supply is provided by 12V step down transformer with rectifiers (to charge battery of 12V) andrequired to convert in to DC 5V by regulator. The 12V DC toconvert in to 5V by LM7805 regulator formicrocontroller. The LED is used for indication purpose, as show the level of liquid by ON/OFF and resistor is usedin series for current limiting purpose.

C.Decoder HT12D:

HT12D IC comes from HolTek Company. HT12D is a decoder integrated circuit that belongs to 212 series of decoders. This series of decoders are mainly used for remote control system applications, like burglar alarm, car door controller, security system etc. It is mainly provided to interface RF and infrared circuits. They are paired with 212 series of encoders. The chosen pair of encoder/decoder should have same number of addresses and

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data format. In simple terms, HT12D converts the serial input into parallel outputs. It decodes the serial addresses and data received by, say, an RF receiver, into parallel data and sends them to output data pins. The serial input data is compared with the local addresses three times continuously. The input data code is decoded when no error or unmatched codes are found. A valid transmission in indicated by a high signal at VT pin. HT12D is capable of decoding 12 bits, of which 8 are address bits and 4 are data bits. The data on 4 bit latch type output pins remain unchanged until new is received.

D. Encoder HT12E
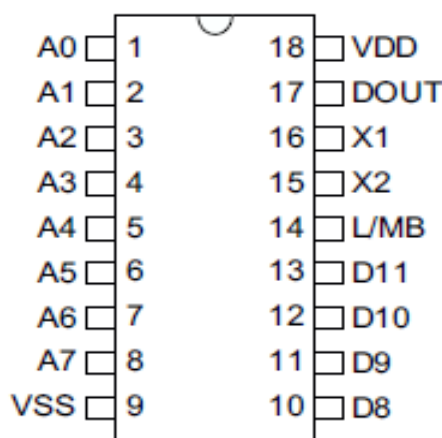
HT12E is an encoder integrated circuit of 212 series of encoders. They are paired with 212 series of decoders for use in remote control system applications. It is mainly used in interfacing RF and infrared circuits. The chosen pair of encoder/decoder should have same number of addresses and data format. Simply put, HT12E converts the parallel inputs into serial output. It encodes the 12 bit parallel data into serial for transmission through an RF transmitter. These 12 bits are divided into 8 address bits and 4 data bits. HT12E has a transmission enable pin which is active low. When a trigger signal is received on TE pin, the programmed addresses/data are transmitted together with the header bits via an RF or an infrared transmission medium. HT12E begins a 4-word transmission cycle upon receipt of a transmission enable. This cycle is repeated as long as TE is kept low. As soon as TE returns to high, the encoder output completes its final cycle and then stops.

E. Motor Driver(L293D):
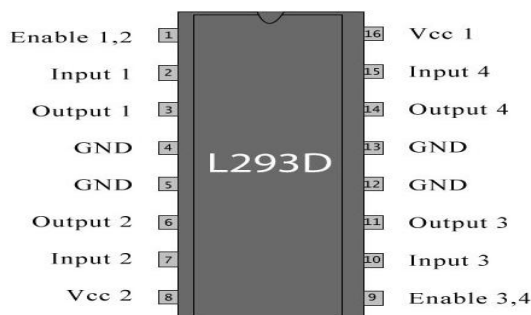
Microcontroller has very low current output it cannot drive current consuming sources, suchlike motor hence motor driver circuit requires. We can implement this circuit using transistor or related driver IC.Notification LED can directly drive with current limiting resistor through microcontroller. Motors can be connectedwith motor driver IC output it can be submersible pump or basic movements motor.

F. DC Motor:
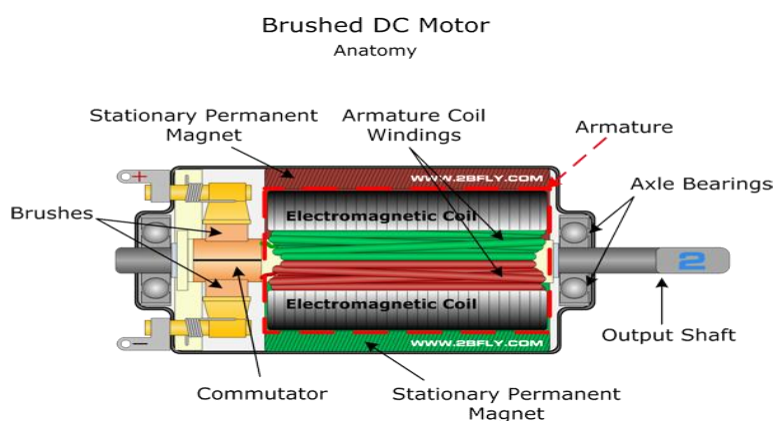
It is an electric motor that converts electrical energy into mechanical energy and it is called a DC Motorbecause it works on direct current. 12V DC power supply is required for the DC Motor for its operation. In thisproject DC Motor is used to operate wheels of the vehicle.

G.RF Module:
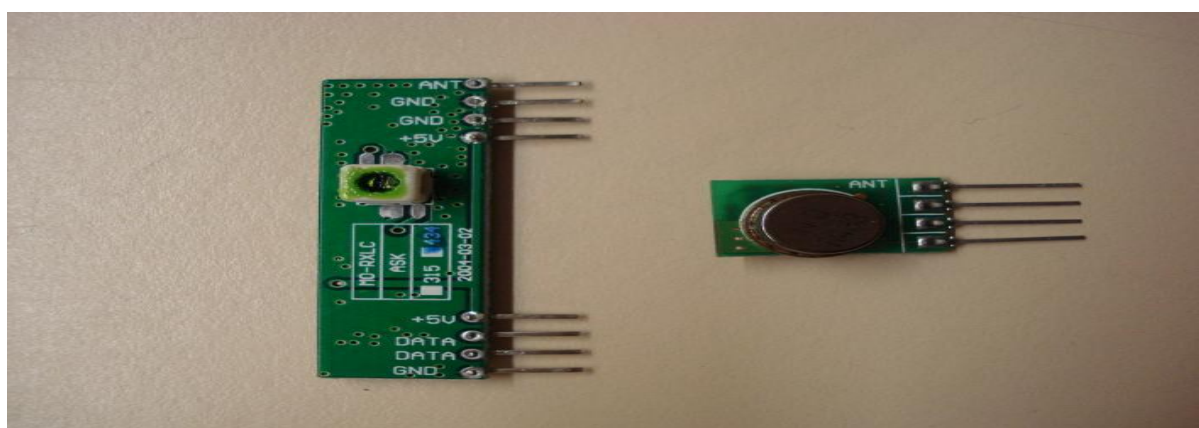
The RF module operates at Radio Frequency. The corresponding frequency range varies between 30kHz& 300 GHz. In this RF system, the digital data is represented as variations in the amplitude of carrierwave.This robot is a Fire Fighting Robot and it is controlled by Remote controller. For this purpose we are usingmicrocontroller and it is interfaced to RF Module. The RF Module is used to receive commands send by userremotely through remote control.

H.Metal Detector:

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┌────────┐      ┌─────────┐      ┌─────────┐      ┌─────────┐
│  COIL  │ ───▶ │   RF    │ ───▶ │   RF    │ ───▶ │  PIEZO  │
│        │      │ SECTION │      │   AMP   │      │  ALARM  │
└────────┘      └─────────┘      └─────────┘      └─────────┘
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Metal detectors work on the principle of transmitting a magnetic field and analysing a return signal from the target and environment. The transmitted magnetic field varies in time, usually at rates of fairly high-pitched audio signals. The magnetic transmitter is in the form of a transmit coil with a varying electric current fl owing through it produced by transmit electronics. The receiver is in the form of a receive coil connected to receive and signal processing electronics. The transmit coil and receive coil are sometimes the same coil. The coils are within a coil housing which is usually simply called "the coil," and all the electronics are within the electronics housing attached to the coil via an electric cable and commonly called the "control box". This changing transmitted magnetic field causes electric currents to flow in metal targets. These electric currents are called eddy currents, which in turn generate a weak magnetic field, but their generated magnetic field is different from the transmitted magnetic field in shape and strength. It is the altered shape of this regenerated magnetic field that metal detectors use to detect metal targets.

IV.ADVANTAGES

1. Easy to operate.
2. Long distance as we use RF
3. Saves soldier life if use in military purpose

V. APPLICATIONS

1. Military purpose.
2.For just spying the military area.
3.Even in excavation area where human cannot enter.

VI.CONCLUSION

The wireless spy robot has been designed in such a way that it can full fill the needs of the rescue, detection and searching for human beings at hazardous area. It has many applications and only tends to spy around the spy robot in this system. In this research, wireless remote control system [RF Module].The microcontrollers which control the whole system by sending data from one to another. The simulation and operation of control system can support in one corner of fully functional hardware construction. This control system needs many considerations of motor specifications and torques for further research works. In this research, the user can control the spy robot with wireless remote

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