REMOTE OPERATED LAND ROVER

By:-

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERINGN
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CERTIFICATE

This is to certify that the work entitled, "**RADIO FREQUENCY CONTROL LAND ROVER"** submitted by **Tanya Sharma (101325)** fulfillment for the award of degree of Bachelor of Technology in **COMPUTER SCIENCE AND ENGINEERING AND INFORMATION TECHNOLOGY** of Jaypee University of Information Technology has been carried out under my supervision. This work has not been submitted partially or wholly to any other University or Institute for the award of this or any other degree or diploma.

Brig.Retd S.P Ghrera
H.O.D. CSE Deptt.
(Project Supervisor)

ACKNOWLEDGMENT

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(TANYA SHARMA)

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ABSTRACT

At some point in every electronics designer's life, they need to transfer information wirelessly. While wires are a great and reliable way to connect devices together, sometimes they are not practical. Car alarms, cell phones and TVs all require some degree of wireless transmission.

To make life easier for people starting out in electronics, very simple RF modules have been designed and are widely used because of their low cost and low overhead. High range RF modules are good idea to implement in controlling things wirelessly.

CHAPTER-1

INTRODUCTION

An RF module (radio frequency module) is a (usually) small electronic device used to transmit and/or receive radio signals between two devices. In an embedded system it is often desirable to communicate with another device wirelessly. This wireless communication may be accomplished through optical communication or through Radio Frequency (RF) communication. For many applications the medium of choice is RF since it does not require line of sight. RF communications incorporate a transmitter and/or receiver.

RF modules are widely used in electronic design owing to the difficulty of designing radio circuitry. Good electronic radio design is notoriously complex because of the sensitivity of radio circuits and the accuracy of components and layouts required achieving operation on a specific frequency. In addition, reliable RF communication circuit requires careful monitoring of the manufacturing process to ensure that the sensitive is not adversely affected. Finally, radio circuits are usually subject to limits on radiated emissions, and require Conformance testing and certification by a standardization organization such as ETSI or the FCC. For these reasons, design engineers will often design a circuit for an application which requires radio communication and then "drop in" a pre-made radio module rather than attempt a discrete design, saving time and money on development.

RF modules are most often used in medium and low volume products for consumer applications such as garage door openers, wireless alarm systems, industrial remote controls, smart sensor applications, and wireless home automation systems. They are sometimes used to replace older infra red communication designs as they have the advantage of not requiring line-of-sight operation.

Several carrier frequencies are commonly used in commercially-available RF modules, including those in the industrial, scientific and medical (ISM) radio bands such as 433.92 MHz, 315 MHz, 868 MHz, 915 MHz, and 2400 MHz. These frequencies are used because of national and international regulations governing the use of radio for communication.

1.1 TYPES OF RF MODULES

1. Transmitter modules

An RF transmitter module is a small PCB sub-assembly capable of transmitting a radio wave and modulating that wave to carry data. Transmitter modules are usually implemented alongside a micro controller which will provide data to the module which can be transmitted. RF Transmitters are usually subject to Regulatory Requirements which dictate the maximum allowable Transmitter power output, Harmonics, and band edge requirements.

2. Receiver modules

An RF Receiver module receives the modulated RF signal, and demodulates it. There are two types of RF receiver modules: super heterodyne receivers and super-regenerative receivers. Super-regenerative modules are usually low cost and low power designs using a series of amplifiers to extract modulated data from a carrier wave. Super-regenerative modules are generally imprecise as their frequency of operation varies considerably with temperature and power supply voltage. Super heterodyne receivers have a performance advantage over super-regenerative; they offer increased accuracy and stability over a large voltage and temperature range. This stability comes from a fixed crystal design which in turn leads to a comparatively more expensive product.

3. Transceiver modules

An RF Transceiver module incorporates both a transmitter and receiver. The circuit is typically designed for Half-duplex operation, although full duplex modules are available, typically at a higher cost due to the added complexity.

4. System on a chip (SoC) module

An SoC module is the same as a transceiver module, but it is often made with an on-board micro controller. This micro-controller is typically used to handle radio data packetisation or managing a protocol such as an IEEE 802.15.4 compliant module. This type of module is usually used for designs that require additional processing for compliance with a protocol when the designer does not wish to incorporate this processing into the host micro-controller.

1.2 WIRELESS PROTOCOLS USED IN RF MODULES

1. ZigBee

It is a specification for a suite of high level communication protocols used to create personal area networks built from small, low-power digital radios. ZigBee is based on an IEEE 802.15 standard. Though low-powered, ZigBee devices can transmit data over long distances by passing data through intermediate devices to reach more distant ones, creating a mesh network; i.e., a network with no centralized control or high-power transmitter/receiver able to reach all of the networked devices. The decentralized nature of such wireless ad hoc networks make them suitable for applications where a central node can't be relied upon.

2. Bluetooth low energy

Bluetooth LE, or BLE, marketed as Bluetooth Smart, is a wireless personal area network technology designed and marketed by the Bluetooth Special Interest Group aimed at novel applications in the healthcare, fitness, security, and home entertainment industries.[1] Compared to "Classic" Bluetooth, BLE is intended to provide considerably reduced power consumption and cost while maintaining a similar communication range.

3. Wi-Fi

it is a technology that allows an electronic device to exchange data or connect to the internet wirelessly using 2.4 GHz UHF and 5 GHz SHF radio waves. The name is a trademark name, and is a play on the audiophile term Hi-Fi. The Wi-Fi Alliance defines Wi-Fi as any "wireless local area network (WLAN) products that are based on the Institute of Electrical and Electronics Engineers' (IEEE) 802.11 standards".

1.3 MAIN FACTORS AFFECTING THE PERFORMANCE OF RF MODULES

As with any other radio-frequency device, the performance of an RF module will depend on a number of factors. For example, by increasing the transmitter power, a larger communication distance will be achieved. However, this will also result in a higher electrical power drain on the transmitter device, which will cause shorter operating life for battery powered devices. Also, using a higher transmit power will make the system more prone to interference with other RF devices, and may in fact possibly cause the device to become illegal depending on the jurisdiction. Correspondingly, increasing the receiver sensitivity will also increase the effective communication range, but will also potentially cause malfunction due to interference with other RF devices.

The performance of the overall system may be improved by using matched antennas at each end of the communication link, such as those described earlier.

Finally, the labeled remote distance of any particular system is normally measured in an open-air line of sight configuration without any interference, but often there will be obstacles such as walls, floors, dense construction to absorb the radio wave signals, so the effective operational distance will in most practical instances be less than specified.

CHAPTER-2

HARDWARE REQUIREMENTS

1. Atmega 8 Micro controllers ------2 pcs

2. Transceiver RF module ------ 2 unit

3. Robotic chassis

4. Robotic Wheels ----2

5. Caster wheel -----1

6. 16*2 LCD -------1

7. DC motor -------2

8. Motor Driver LM2931D ------ 1

9. PCB ----- 2

10. Buzzer

11. LED

12. Power supply

13. Battery 12 VDC chargeable

14. Keypad

15. Battery charging unit.

2.1 ATMEGA 8 MICROCONTROLLER

Features

It is a high-performance, low-power and 8-bit microcontroller with Advanced RISC Architecture:-

1. 130 Powerful Instructions – Most Single-clock Cycle Execution
2. 32 × 8 General Purpose Working Registers
3. Fully Static Operation
4. Up to 16MIPS Throughput at 16MHz
5. On-chip 2-cycle Multiplier

High Endurance Non-volatile Memory segments:-

1. 8Kbytes of In-System Self-programmable Flash program memory
2. 512Bytes EEPROM
3. 1Kbyte Internal SRAM
4. Write/Erase Cycles: 10,000 Flash/100,000 EEPROM
5. Data retention: 20 years at 85°C/100 years at 25°C(1)
6. Optional Boot Code Section with Independent Lock Bits
7. In-System Programming by On-chip Boot Program
8. True Read-While-Write Operation
9. Programming Lock for Software Security

Peripheral Features:-

1. Two 8-bit Timer/Counters with Separate Prescaler, one Compare Mode
2. One 16-bit Timer/Counter with Separate Prescaler, Compare Mode, and Capture Mode
3. Real Time Counter with Separate Oscillator
4. Three PWM Channels
5. 6-channel ADC
6. Six Channels 10-bit Accuracy
7. Byte-oriented Two-wire Serial Interface
8. Programmable Serial USART
9. Master/Slave SPI Serial Interface
10. Programmable Watchdog Timer with Separate On-chip Oscillator

11. On-chip Analog Comparator

Special Microcontroller Features:-

1. Power-on Reset and Programmable Brown-out Detection
2. Internal Calibrated RC Oscillator
3. External and Internal Interrupt Sources
4. Five Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down and Standby

I/O and Packages:-

1. 23 Programmable I/O Lines
2. 28-lead PDIP

Operating Voltages:-

1. 2.7V - 5.5V (ATmega8L)
2. 4.5V - 5.5V (ATmega8)

Speed Grades

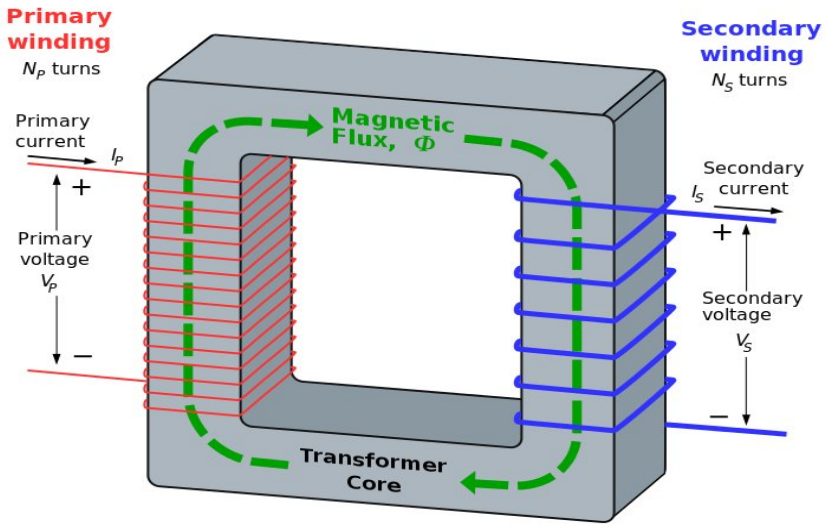
1. 0 - 8MHz (ATmega8L)

2.2 TRANSFORMER

A transformer is a device that transfers electrical energy from one circuit to another through inductively coupled conductors — the transformer's coils or "windings". Except for air-core transformers, the conductors are commonly wound around a single iron-rich core, or around separate but magnetically-coupled cores. A varying current in the first or "primary" winding creates a varying magnetic field in the core (or cores) of the transformer. This varying magnetic field induces a varying electromotive force (EMF) or "voltage" in the "secondary" winding. This effect is called mutual induction.

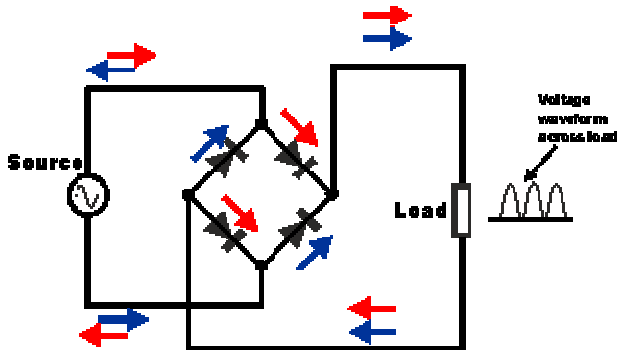
If a load is connected to the secondary circuit, electric charge will flow in the secondary winding of the transformer and transfer energy from the primary circuit to the load connected in the secondary circuit.

The secondary induced voltage *VS*, of an ideal transformer, is scaled from the primary *VP* by a factor equal to the ratio of the number of turns of wire in their respective windings: By appropriate selection of the numbers of turns, a transformer thus allows an alternating voltage to be stepped up — by making *NS* more than *NP* — or stepped down, by making it.



2.3 BRIDGE RECTIFIER

A bridge rectifier makes use of four diodes in a bridge arrangement to achieve full-wave rectification. This is a widely used configuration, both with individual diodes wired as shown and with single component bridges where the diode bridge is wired internally.



2.4 POWER SUPPLY

Power supply is a reference to a source of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit

Here in our application we need a 5v DC power supply for all electronics involved in the project. This requires step down transformer, rectifier, voltage regulator, and filter circuit for generation of 5v DC power.

2.5 REGULATOR IC (78XX)

It is a three pin IC used as a voltage regulator. It converts unregulated DC current into regulated DC current.

Normally we get fixed output by connecting the voltage regulator at the output of the filtered DC (see in above diagram). It can also be used in circuits to get a low DC voltage from a high DC voltage (for example we use 7805 to get 5V from 12V).

2.6 L293D

The L293 and L293D are quadruple high-current half-H drivers. The L293 is designed to provide bidirectional drive currents of up to 1 A at voltages from 4.5 V to 36 V. The L293D is designed to provide bidirectional drive currents of up to 600-mA at voltages from 4.5 V to 36 V. Both devices are designed to drive inductive loads such as relays, solenoids, dc and bipolar stepping motors, as well as other high-current/high-voltage loads in positive-supply applications. All inputs are TTL compatible. Each output is a complete totem-pole drive circuit, with a Darlington transistor sink and a pseudo-Darlington source. Drivers are enabled In pairs, with drivers 1 and 2 enabled by 1,2EN and drivers 3 and 4 enabled by 3,4EN. When An enable input is high, the associated drivers are enabled and their outputs are active and in Phase with their inputs. When the enable input is low, those drivers are disabled and their outputs are off and in the high-impedance state. With the proper data inputs, each pair of drivers form a full-H (or bridge) reversible drive suitable for solenoid or motor applications. On the L293, external high-speed output clamp diodes should be used for inductive transient Suppression. A VCC1 terminal, separate from VCC2, is provided for the logic inputs to Minimize device power dissipation. The L293and L293D is characterized for operation from 0°C to 70°C.

CHAPTER 3

SOFTWARE REQUIREMENTS

Software : AVR Studio 6.1

The software is written in 'C' language and compiled using Code Vision AVR 'C' compiler. The source program is converted into hex code by the compiler. Burn this hex code into ATmega8microcontroller. .

The source program is well commented and easy to understand. First include the register name defined specifically for ATmega 8 and also declare the variable. Set port A as the input and port D as the output. The program will run forever by using 'while' loop. Under 'while' loop, read port A and test the received input using 'switch' statement. The corresponding data will output at port D after testing of the received data.

Installing Prerequisites

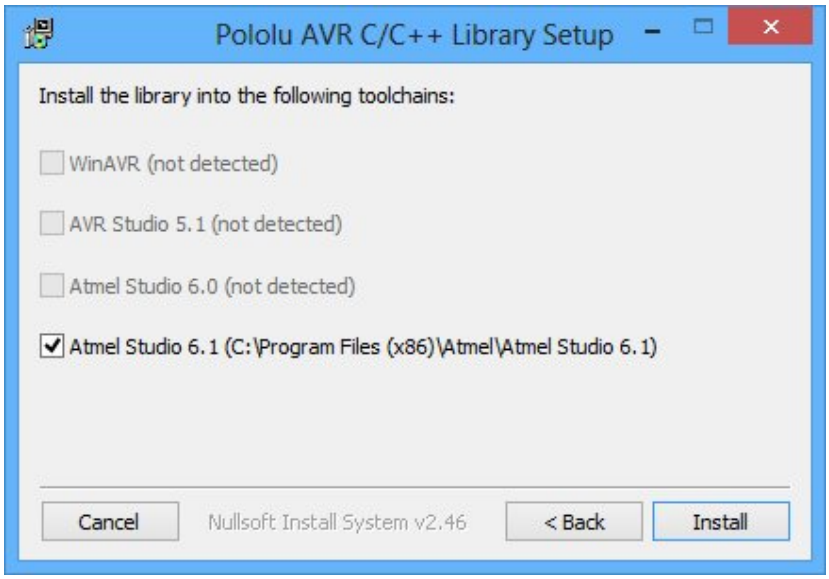
As a first step for programming AVRs in Windows, we recommend downloading and installing Atmel Studio 6.1, an integrated development environment (IDE) from Atmel. You can use this direct download link for Atmel Studio 6.1 update 2.0 (~650 MB exe) or find it on Atmel's website.

After Atmel Studio 6.1 is installed and working, download and install the Pololu AVR Development Bundle (~11MB exe). The Pololu AVR Development Bundle contains these components:

- The Pololu AVR C/C++ Library, which provides functions for interacting with the hardware on your Orangutan or 3pi robot.
- Pololu USB AVR Programmer drivers and software.
- Orangutan SVP drivers.

When you run the Pololu AVR Development Bundle installer, it will ask you which components to install. If you are not sure which ones you will need, it is OK to install them all.

The installer for the Pololu AVR C/C++ Library will ask you which AVR toolchains you want the library to be installed into:



The Atmel Studio 6.1 checkbox is grayed out, then the installer was unable to find Atmel Studio 6.1 and you should try reinstalling or repairing it. You should leave the Atmel Studio 6.1 box checked so that the library can install its files into Atmel Studio 6.1.

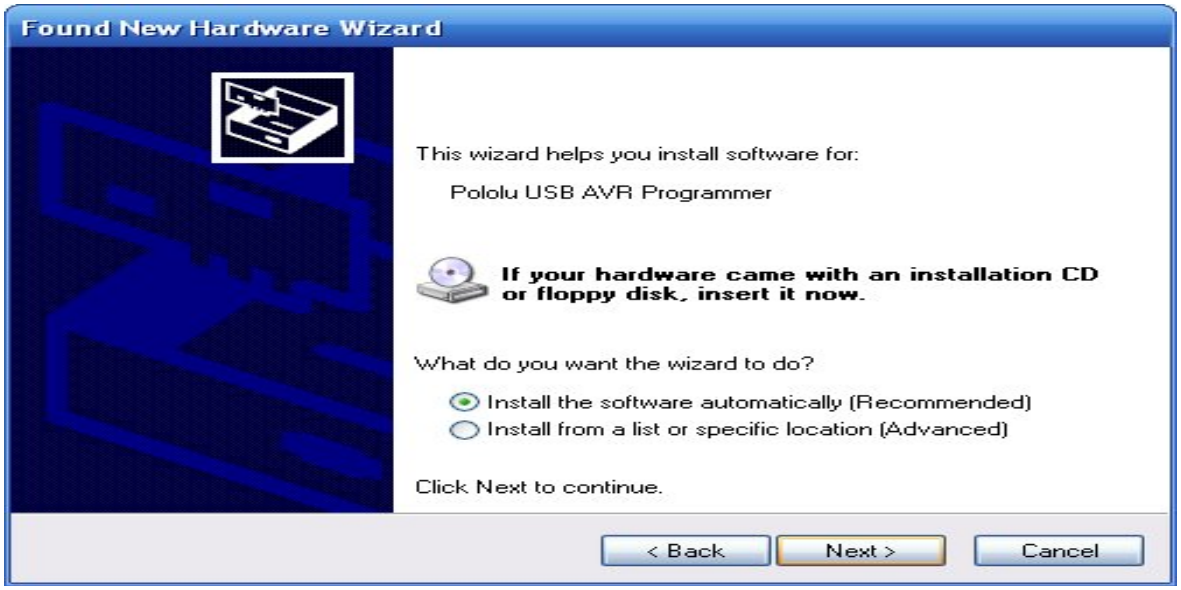
During the installation, Windows will ask you if you want to install the drivers. Click "Install" (Windows 7, 8, and Vista) or "Continue Anyway" (Windows XP) and you will also need to install our CP2102 drivers.

If you use **Windows Vista, Windows 7, or Windows 8**, your computer should automatically install the necessary drivers when you connect a programmer.
If you use **Windows XP**, you will need to follow these steps whenever you plug in a new programmer:

Connect the programmer to your computer's USB port. The programmer is actually three devices in one so your XP computer will detect all three of those new devices and display the "Found New Hardware Wizard" three times. Each time the "Found New Hardware Wizard" pops up, follow steps 2–5.

When the "Found New Hardware Wizard" is displayed, select "No, not this time" and click "Next".

5. On the second screen of the "Found New Hardware Wizard", select "Install the software automatically" and click "Next".



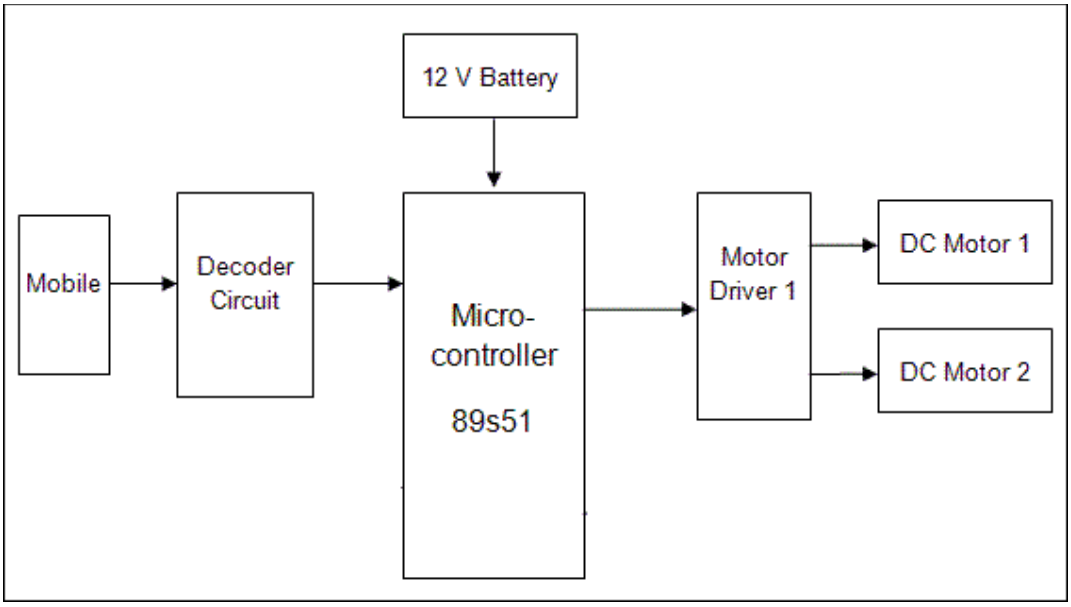
7. When you have finished the "Found New Hardware Wizard", click "Finish". After that, another wizard will pop up. You will see a total of three wizards when plugging in the programmer. Follow steps 4-7 for each wizard.


Found New Hardware Wizard
Completing the Found New Hardware Wizard
The wizard has finished installing the software for:
Pololu USB AVR Programmer
Click Finish to close the wizard.
< Back
Finish
Cancel

CHAPTER 4

CONSTRUCTION

4.1 BLOCK DIAGRAM



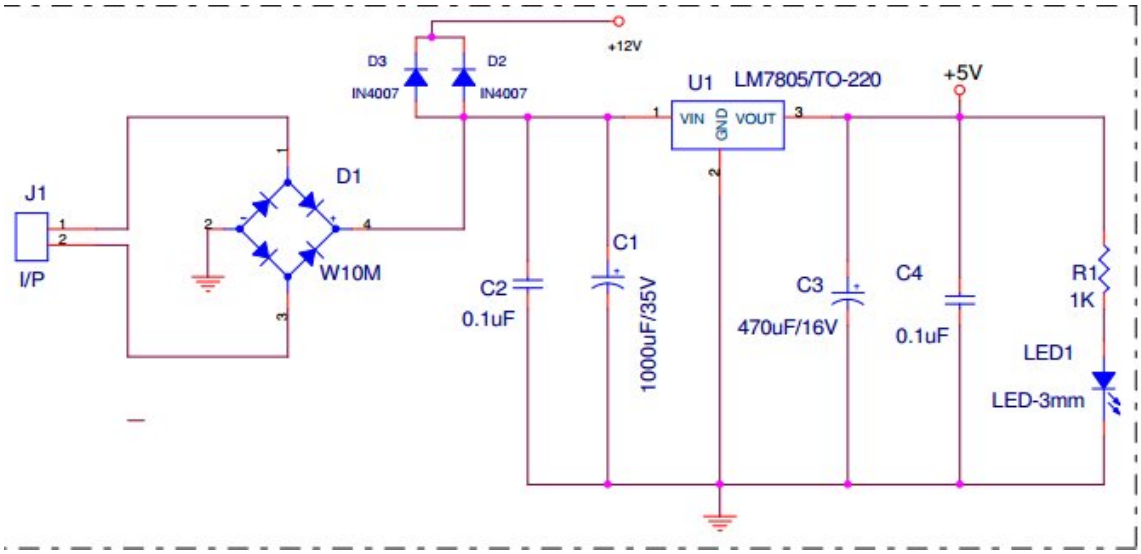
MOBILE- This is very first and the most important part of the system because due to this only the entire system is activated and works. It will receive the signals from another remote and gives them as input to DTMF decoder.

DTMF decoder: - The function of this block is self understood. It will take DTMF input given by cell phone decode it and gives 4-bit digital output to micro controller. It also generates an interrupt every time when it gives digital output.

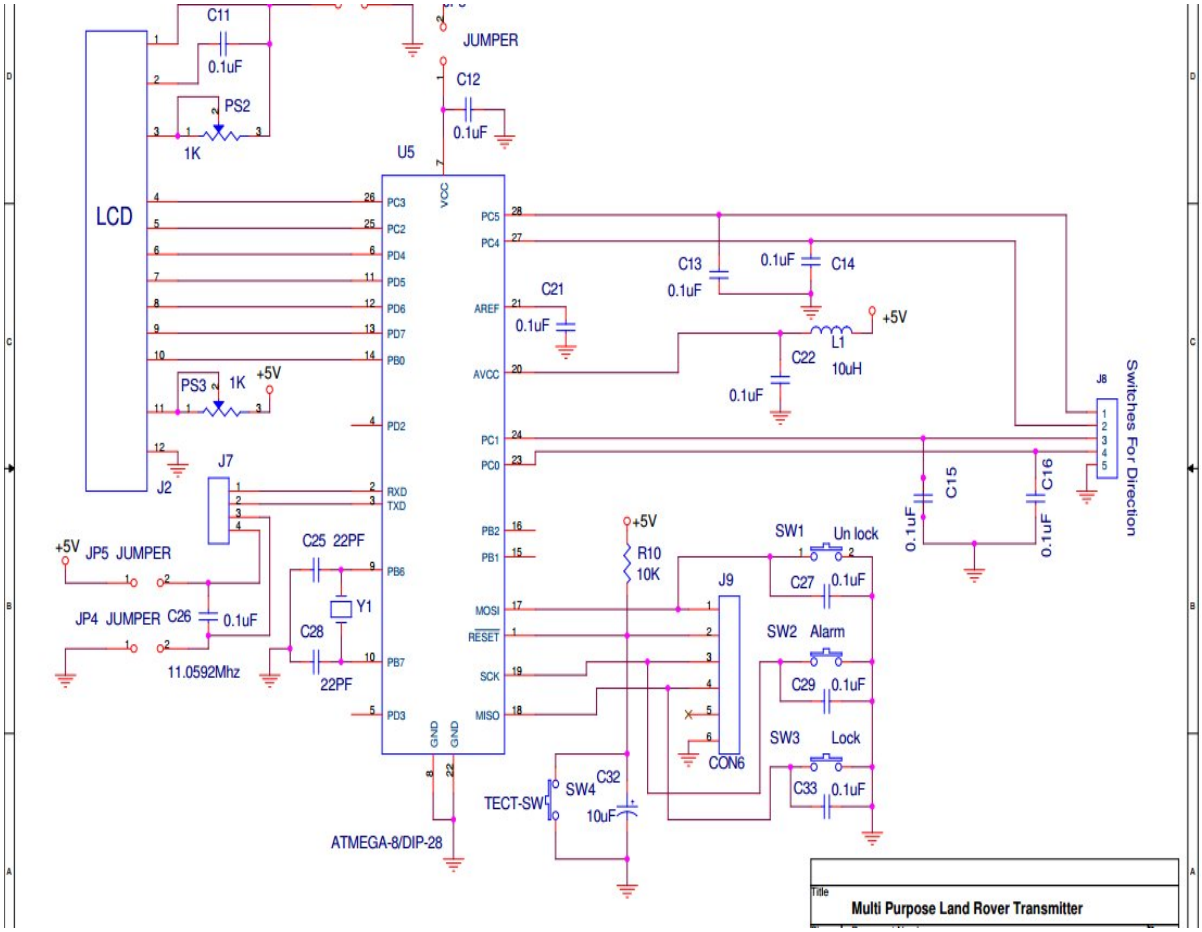
Micro-controller: - You can call this block as the heart of entire system because it actually performs all the controlling actions. Depending upon the code given by DTMF decoder it will move the rover forward, backward, left or right by rotating both DC motors.

DC Motor driver: - It receives actuating signals from micro controller in terms of high / low logic, amplifies (current) it and rotates 2 DC motors in both directions.

4.2 CIRCUIT DIAGRAM

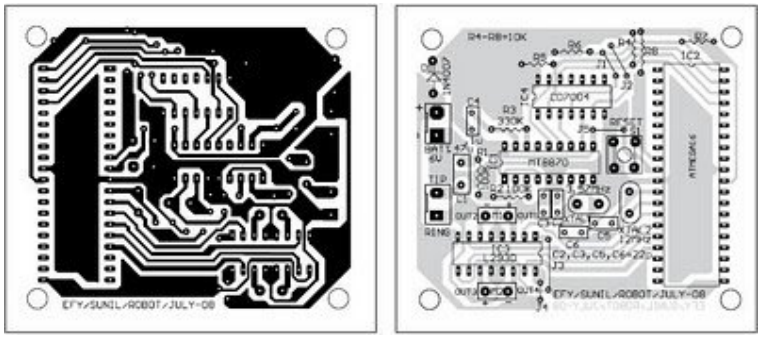


POWER SUPPLY



4.3 WORKING OF THE CIRCUIT

The important components of this rover are a DTMF decoder, microcontroller and motor driver. An MT8870 series DTMF decoder is used here. All types of the MT8870 series use digital counting techniques to detect and decode all the 16 DTMF tone pairs into a 4-bit code output. The built-in dial tone rejection circuit eliminates the need for pre-filtering. When the input signal given at pin 2 (IN-) in single-ended input configuration is recognized to be effective, the correct 4-bit decode signal of the DTMF tone is transferred to Q1 (pin 11) through Q4 (pin 14) outputs. Table II shows the DTMF data output table of MT8870. Q1 through Q4 outputs of the DTMF decoder (IC1) are connected to port pins PA0 through PA3 of ATmega16 microcontroller (IC2) after inversion by N1 through N4, respectively. The ATmega16 is a low-power, 8-bit, CMOS microcontroller based on the AVR enhanced RISC architecture. It provides the following features: 16 kB of in-system programmable Flash program memory with read-while-write capabilities, 512 bytes of EEPROM, 1kB SRAM, 32 general-purpose input/output (I/O) lines and 32 general-purpose working registers. All the 32 registers re directly connected to the arithmetic logic unit, allowing two independent registers to be accessed in one single instruction executed in one clock cycle. The resulting architecture is more code-efficient. Outputs from port pins PD0 through PD3 and PD7 of the microcontroller are fed to inputs IN1 through IN4 and enable pins (EN1 and EN2) of motor driver L293D, respectively, to drive two geared DC motors. Switch S1 is used for manual reset. The microcontroller output is not sufficient to drive the DC motors, so current drivers are required for motor rotation. The L293D is a quad, high-current, half-H driver designed to provide bidirectional drive currents of up to 600 mA at voltages from 4.5V to 36V. It makes it easier to drive the DC motors. The L293D consists of four drivers. Pin IN1 through IN4 and OUT1 through OUT4 are input and output pins, respectively, of driver 1 through driver 4. Drivers 1 and 2, and drivers 3 and 4 are enabled by enable pin 1 (EN1) and pin 9 (EN2), respectively. When enable input EN1 (pin 1) is high, drivers 1 and 2 are enabled and the outputs corresponding to their inputs are active. Similarly, enable input EN2 (pin 9) enables drivers 3 and 4.



PCB LAYOUT

In order to control the robot, you need to make a call to the cell phone attached to the robot (through head phone) from any phone, which sends DTMF tunes on pressing the numeric buttons. The REMOTE in the robot is kept in 'auto answer' mode. (If the remote does not have the auto answering facility, receive the call by 'OK' key on the rover-connected mobile and then made it in hands-free mode.) So after a ring, the remote accepts the call. Now you may press any button on your mobile to perform actions as listed in Table. The DTMF tones thus produced are received by the remote in the robot. These tones are fed to the circuit by the headset of the remote. The MT8870 decodes the received tone and sends the equivalent binary number to the microcontroller. According to the program in the microcontroller, the robot starts moving. When you press key '2' (binary equivalent 00000010).

	1209 Hz	1336 Hz	1477 Hz	1633 Hz
697 Hz	1	2	3	A
770 Hz	4	5	6	B
852 Hz	7	8	9	C
941 Hz	*	0	#	D

Dtmf dual frequency keypad

DTMF data output table

Low Group (Hz)	High Group (Hz)	Digit	OE	D3	D2	D1	D0
697	1209	1	H	L	L	L	H
697	1336	2	H	L	L	H	L
697	1477	3	H	L	L	H	H
770	1209	4	H	L	H	L	L
770	1336	5	H	L	H	L	H
770	1477	6	H	L	H	H	L
852	1209	7	H	L	H	H	H
852	1336	8	H	H	L	L	L
852	1477	9	H	H	L	L	H
941	1336	0	H	H	L	H	L
941	1209	*	H	H	L	H	H
941	1477	#	H	H	H	L	L
697	1633	A	H	H	H	L	H
770	1633	B	H	H	H	H	L
852	1633	C	H	H	H	H	H
941	1633	D	H	L	L	L	L
—	—	ANY	L	Z	Z	Z	Z

4.4 WORKING OF THE CAR

Project is having two units one is remote unit with LCD and other is Land Rover both are based on Micro-controller. It is operated by remote wireless through Radio Frequency. The range of RF module is more than 30 meters so car can be operated more than 30 meters away from remote. Land Rover is also having a battery (rechargeable) with it. Keypad in remote used to operate Land Rover in all direction including lock button with pressing lock button Land Rover will not work.

There are five keys in remote unit

1. Key 1 for forward Movement
2. Key 2 for Backward Movement
3. Key 3 for Left Movement
4. Key 4 for Right Movement
5. Key 5 for Locking Land Rover

There are LED in remote unit which blink when communication with land rover is there otherwise it will not blink for notification purpose.

Actions Performed Corresponding to the Keys Pressed

Number pressed by user	Output of HT9170 DTMF decoder	Input to the microcontroller	Output from microcontroller	Action performed
2	0×02 00000010	0×FD 11111101	0×89 10001001	Forward motion
4	0×04 00000100	0XFB 11111011	0×85 10000101	Left turn Right motor forwarded Left motor backwarded
6	0×06 00000110	0XF9 11111001	0×8A 10001010	Right turn Right motor backwarded Left motor forwarded
8	0×08 00001000	0XF7 11110111	0×86 10000110	Backward motion
5	0×05 00000101	0XFA 11111010	0×00 00000000	Stop

4.5 PROBLEM FACED

During soldering, many of the connection become short circuited so we de-solder the connection and did soldering again.
A leg of the crystal oscillator was broken during mounting. So it has to be replaced.
- LED get damaged when we switched ON the supply so we replace it by the new one.

4.6 TROUBLESHOOT

Care should be taken while soldering. There should be no shorting of joints.
Proper power supply should maintain. Project should be handled with care since IC is delicate
- Component change and check again circuit

CHAPTER 5

CODE

```
#include<reg51.h>
#include<stdio.h>
void main(void)
  {
     unsigned int k,h;
           while(1)
                {
                     k=~P1;
                     h=k & 0x0F;
                      switch(h)
                           {
                                case 0x02:
                                 {
                                      P2=0x89;//Forward
                                case 0x02:
                                 {
                                      P2=0x89;//Forward
                                      break;
}
```

```
 case 0x08:
            {
                P2=0x86;//Backward
                break;
            }
case 0x04:
            {
                P2=0x85;//Left turn
                break;
            }
case 0x06:
            {
                P2=0x8A;//Right turn
                 break;
             }
case 0x05:
            {
```

```
                    P2=0x00;//stop
                    break;
                }
            }
        }
    }
```

5.1 OUTPUT OF THE PROJECT:-

CHAPTER 6

SCOPE OF THE PROJECT

6.1 APPLICATIONS

Scientific:

Remote control vehicles have various Scientific uses including hazardous environments, working in the deep ocean , and space exploration. The majority of the probes to the other planets in our solar system have been remote control vehicles, although some of the more recent ones were partially autonomous. The sophistication of these devices has fueled greater debate on the need for manned space flight and exploration. The Voyager I spacecraft is the first craft of any kind to leave the solar system. The Martian explorers Spirit and Opportunity have provided continuous data about the surface of Mars since January 3, 2004

.

Military and Law Enforcement:

Military usage of remotely controlled military vehicles dates back to the first half of 20th century. Soviet Red Army used remotely controlled Teletanks during 1930s in the Winter War and early stage of World War II. There were also remotely controlled cutters and experimental remotely controlled planes in the Red Army

Search and Rescue:

UAVs will likely play an increased role in search and rescue in the United States. This was demonstrated by the successful use of UAVs during the 2008 hurricanes that struck Louisiana and Texas.

Recreation and Hobby:

See Radio-controlled model. Small scale remote control vehicles have long been popular among hobbyists. These remote controlled vehicles span a wide range in terms of price and sophistication. There are many types of radio controlled vehicles. These include on-road cars, off-road trucks, boats, airplanes, and even helicopters. The 'robots' now popular in television shows such as Robot Wars, are a recent extension of this hobby (these vehicles do not meet the classical definition of a robot; they are remotely controlled by a human). Radio-controlled submarine also exist.

6.2 ADVANTAGES

1. Wireless control
2. Surveillance System.
3. Vehicle Navigation with use of 3G technology.
4. Takes in use of the mobile technology which is almost available everywhere.

5. This wireless device has no boundation of range and can be controlled as far as network of cell phone.

6.3 FUTURE IMPROVEMENTS

1. IR Sensors:

IR sensors can be used to automatically detect & avoid obstacles if the robot goes beyond line of sight. This avoids damage to the vehicle if we are maneuvering it from a distant place.

2. Password Protection:

Project can be modified in order to password protect the robot so that it can be operated only if correct password is entered. Either cell phone should be password protected or necessary modification should be made in the assembly language code. This introduces conditioned access &increases security to a great extent.

3. Alarm Phone Dialer:

By replacing DTMF Decoder IC CM8870 by a DTMF Transceiver IC' CM8880 , DTMF tones can be generated from the robot. So, a project called! Alarm Phone Dialer! Can be built which will generate necessary alarms for something that is desired to be monitored (usually by triggering a relay). For example, a high water alarm, low temperature alarm, opening of back window, garage door, etc. When the system is activated it will call a number of programmed numbers to let the user know the alarm has been activated. This would be great to get alerts of alarm conditions from home when user is at work.

4. Adding a Camera:

If the current project is interfaced with a camera (e.g. a Webcam) robot can be driven beyond line-of-sight & range becomes practically unlimited as GSM networks have a very large range.

CHAPTER-7

CONCLUSION

Conventionally, wireless-controlled robots use RF circuits, which have the drawbacks of limited working range, limited frequency range and limited control. In our project with the use of a REMOTE for robotic control can overcome these limitations. It provides the advantages of robust control, working range as large as the coverage area of the service provider, no interference with other controllers and up FIVE controls. Although the appearance and capabilities of robots vary vastly, all robots share the features of a mechanical, movable structure under some form of control. The control of robot involves three distinct phases: reception, processing and action. Generally, the preceptors are sensors mounted on the robot, processing is done by the on-board microcontroller or processor, and the task (action) is performed using motors or with some other actuators. So the motive is that to increase the range of remote controlled products. For this REMOTE operated control is best because we can globalize our project & no limitation of range.

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