Solar Assisted Electric Auto Rickshaw

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Abstract: Now a day’s many cities are facing different pollution crises. Vehicles are one of the major components contributing to the pollution in urban areas. This project (SOLAR AUTO RICKSHAW) is helpful to overcome this problem. Different types of renewable resources can be used to prevent pollution like wind, solar energy, hydro etc. By using different components such as PIC microcontroller, RF transmitter and receiver, 3 axis accelerometer, solar panel and keys for switching we have designed a new auto rickshaw based on solar energy.

Keywords: Solar panel, RF (receiver/transmitter), 3 axis accelerometer, PIC microcontroller, DC motor.

I. INTRODUCTION

Auto rickshaws are three-wheeled vehicles that are extensively used in many Asian countries as taxis of people and goods. Conventional auto rickshaw work on petrol and diesel which is a non-renewable energy resource. Considering today’s consumption rate soon the day will come when we will have to face energy crisis. So considering all the above problems we have designed a solar based electric auto rickshaw which is a renewable natural source and will help reduce pollution to a great extent which is a major problem faced in today’s world.

This project is consisting of 3 wheeled vehicle which can be controlled or operated by three methods:

By sending RF commands for Forward, Backward, Right and Left motion. Gesture commands: Suppose a driver is a handicap and not having hands to operate the auto rickshaw, in that case he can operate the vehicle by his head movements. Last and the normal method is just through the keys provided on a control panel.

II. COMPONENT DESCRIPTION

A. RF TRANSMITTER AND RECEIVER

The RF transmitter and receiver operates at 433 MHz of frequency in remote control once key is pressed data is send in packet format. At receiver side the decoder IC will recognize which packet has noise and which packet is clean to take and ignore the remaining packet till new packets are received. Range of transmitter is 100m when operated at 12 V. IF it is operated with 5V then range will be 50-60m. And range will also depend on receiver sensitivity.

RF TRANSMITTER FEATURES

Frequency Range: 433.92 MHz  
Supply Voltage: 3-12V  
Output power: 4-16dbm

RF RECEIVER FEATURES

Receiver frequency: 433.92MHz  
Typical sensitivity: -105dbm  
Supply current: 3.5mA  
IF frequency: 1MHz

B. THREE AXIS ACCELEROMETER

Accelerometer sensor can measure static or dynamic acceleration in all three axis. Accelerometer sensor measures level of acceleration where it mounted this enable us to
measure acceleration/ deceleration of object like car or robot, or tilt of a platform with respected to earth axis, vibration produced by machines. Sensors provides 0G output which detect linear free fall. Sesitivity can be adjusted in two ranges. Acceleeration is a vector force which has direction and measured in m/s. Earth produces gravitational acceleration on all objects on earth.

FEATURE:

Simple to use
+5 V operation at 1mA current
High sensitivity (800mV/g @ 1.5g)
Analog output for each axis

C. SOLAR PANEL

Solar panels can be used as component of large photovoltaic system to generate and supply electricity in commercial and residential application. Each module is rated by its DC output power under standard test conditions (STC), and typically ranges from 100 to 320 watts. Solar modules use light energy (photons) from the sun to generate electricity through the photovoltaic effect.

D. PIC MICROCONTROLLER

In this paper we are using PIC controller 18F452 to implement protocol converter. PIC controller has inbuilt 32 Kbytes of flash program memory. It has SRAM 1536 bytes and EEPROM 256 bytes data memory. PIC controller has 10 bit A/D converter (8 input channels).

It has programmable brownout reset and low voltage detect.

E. DC MOTOR

A DC motor consists of an stator, an armature, a rotor and a commutator with brushes. Opposite polarity between the two magnetic field inside the motor cause it to turn DC motor are the simplest type of motor.

BLOCK DIAGRAM

![Figure 1](image1.png)

![Figure 2](image2.png)

WORKING

In this system PIC controller is used. Selected PIC controller has inbuilt 32 Kbytes of flash program memory. Dc motor driver is used to drive the two Dc motors. The relay driver is used to control the relay Movement of head lamp is controlled by the relay. The battery charge control unit charges the auto rickshaw which receives the solar energy. The auto rickshaw can be controlled by RF transmitter and receiver .another way in which the auto rickshaw can be controlled is by 3 axis accelerometer .in this even the handicapped person can control the rickshaw by his head gestures. The last is the conventional method in which the keys on the control panel are used to drive the rickshaw to the desired destination.
III. CONCLUSION

This study proposed the design of a low cost solar auto rickshaw because of renewable energy resource. This can reduce the pollution to great extend. It is also convenient to be used by handicapped person.

REFERENCES

