Aero Dynamic Wind Mill with Reverse Charge Protection for Rural Power Generation Applications with Battery Voltage Analyzer Using AT89S52

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ABSTRACT

Energy is a major input for overall socio-economic development of any society. Wind energy is the fastest growing renewable energy. From centuries man has been trying to convert wind power to mechanical &, more recently, electric power. Wind technology has improved significantly over the past two decades, and wind energy has become increasingly competitive with other power generation options. Wind power has negligible fuel costs.

A key challenge for wind energy is that electricity production depends on when winds blow rather than when consumers need power. The amount of electricity generated from wind has been growing rapidly in recent years. The power in the wind can be computed by using the concepts of kinetics. The wind mill works on the principle of converting kinetic energy of the wind to mechanical energy. The power available in the wind increases rapidly with the speed hence wind energy conversion machines should be located preferable in areas where the winds are strong & persistent.

Existing system

This project is designed by using an aero dynamic wind blade arrangement which is connected to the shaft of the dc geared motor such that its output is given to the Reverse polarity preventer cum polarity corrector. Depending upon the movement of the wind blade (clock wise / anti clock wise) the polarity can be corrected automatically which is given as an input supply to the 12V DC rechargeable battery. The o/p of this lead acid battery is used to switch on the DC load.
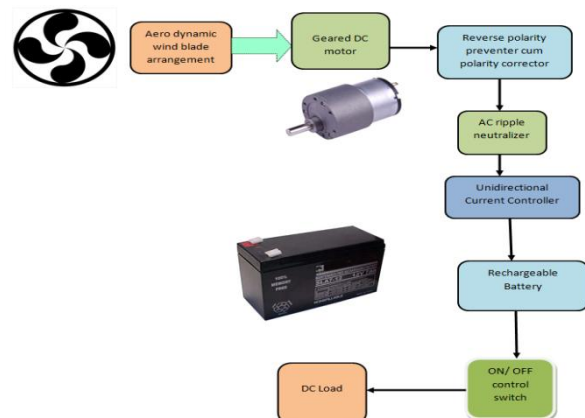

Draw back

Only DC load can be used. No display of voltage stored.

Proposed system

This project is designed by using an aero dynamic wind blade arrangement which is connected to the shaft of the dc motor such that its output is given to the Reverse polarity preventer cum polarity corrector. Use of embedded technology makes this system efficient and reliable. Micro controller (AT89S52) allows dynamic and faster control. Liquid crystal display (LCD) makes the system user-friendly to get the voltage. AT89S52 micro controller is the heart of the circuit as it controls all the functions. Depending upon the movement of the wind blade (clock wise / anti clock wise) the polarity can be corrected automatically which is given as an input supply to the 12V DC rechargeable battery. The o/p of this lead acid battery is given as input to the inverter which drives the AC loads. The battery is connected to the inverter. This inverter is used to convert the D.C to A.C. This A.C voltage is used to activate the loads. The output of wind turbine is given to 12V 1.3 Amp-Hour Lead-acid Battery. The battery is connected to the inverter which is used to convert the D.C to A.C.

Block Diagram:
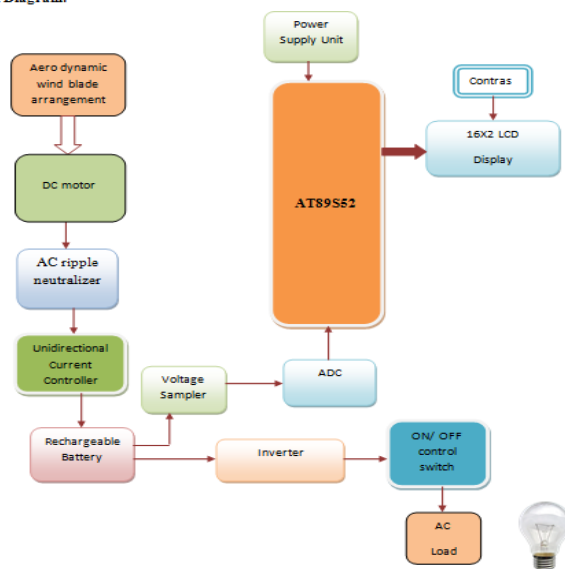
Hardware modules:

Wind turbine:

Wind turbine is used to absorb the wind from atmosphere and using the kinetic energy from wind to generate the electrical power. Battery with Charge controller: Here 12v battery can be used to store the power from wind turbine and solar panel. Both can produce above ranges then it can be controlled by using Charge controller circuit. Here a NPN transistor should be used to provide the safety purpose for drive the power from renewable energy to battery supply and maintain to don't send the power from battery to renewable energy sources such as solar panel and wind turbine.
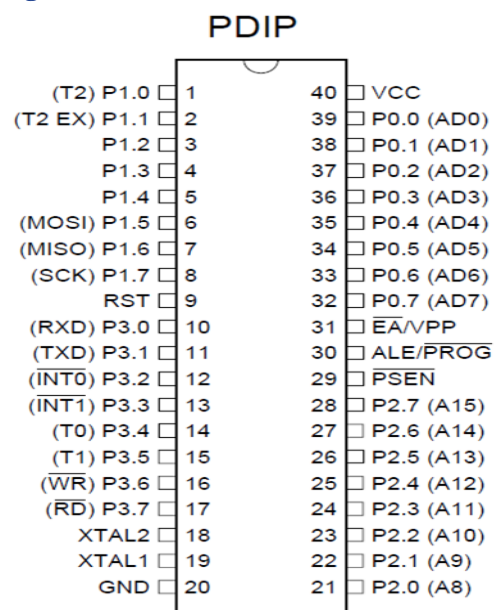
Inverter:

It can be used to convert the 12v to 230v supply for providing the power to the home appliances form solar and wind. Step up transformer can be used to increase the power from 12v–230v power supply.

AT89S52

Widely used in embedded systems products are Microprocessors and microcontrollers. Microcontroller is a programmable device. It has a fixed amount of RAM, ROM, I/O ports and a timer. It acts as CPU for particular application. Cost and space are critical in the stream of embedded system. 8052 is a eight-bit processor, meaning that the CPU can work on only 8 bits of data at a time. Data larger than 8 bits has to be broken into eight-bit pieces to be processed by the CPU. 8052 is available in different memory types such as UV-EPROM, Flash and NV-RAM.
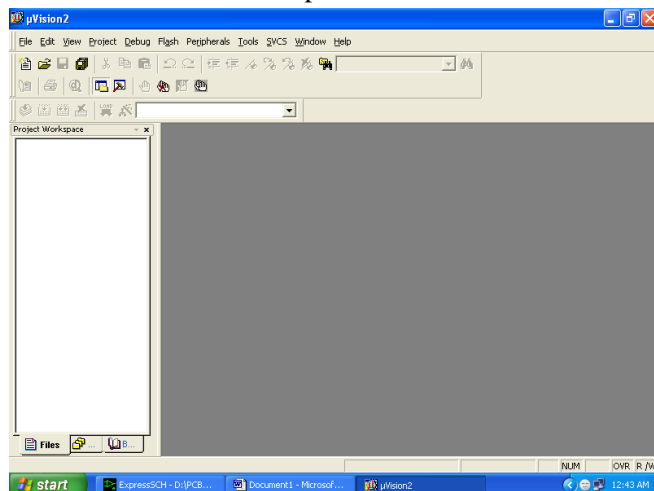
Pin diagram:

Schematic diagram
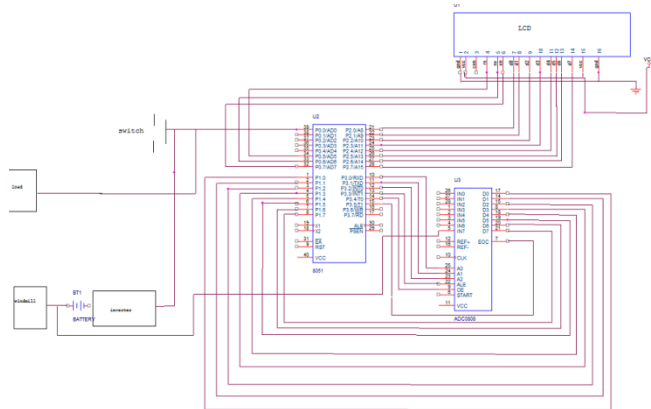
Software tools

Embedded C code is compiled in the Keil uvision tool

Proload is a software which accepts only hex files. Once the machine code is converted into hex code, that hex code has to be dumped into the microcontroller placed in the programmer kit and this is done by the Proload.

APPLICATIONS

1. Energy cost can be reduced
2. Increase the power generation
3. Energy Monitoring
4. Know the cost of energy usage

CONCLUSION

Windmills have been used for centuries for various purposes. Today, they are primarily used to generate power and they do so quite efficiently when compared with other renewable resources such as solar. The energy is completely clean and has little effects of the environment. Depending on the overall size the rotor will directly affect the power output capabilities of the system. The larger the rotor is the higher the output power. The downside to a windmill is that they cannot always generate 100% power. The wind hitting the rotor is constantly changing and with it so does the power output of the windmill. Windmills can also be noisy because of the rotation from the rotors, because of this they are not good to be placed near homes. Another downside, is since wind is not always constant these systems need to be backed up with other renewable sources in case of the absence of wind. However, windmills are still a very vital and important part of the move towards complete renewable energy and we may start to see a substantial increase in their use around the world.

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