Auto Power Supply Control System From Four Different Sources Using Solar, Mains, Generator, Invertor To Ensure No Break Power

G.B. Murade[1], Mr.Sharma Yash Pankaj[2], Mr.Karkhele Abhay Chandrakant[3], Mr. Harihar Kiran Rajendrakumar[4]

[1, 2, 3, 4] Dr. Vithalrao Vikhe Patil College Of Engineering, Ahmednagar,Maharashtra

Abstract- *The main objective of this paper is to provide continuous power supply to a load by selecting one of four sources, namely The main purpose of this project is to provide continuous power supply solar, inverter, main and generator automatically in case if one the source is absent. We know that due to large demand of electricity and due to limit capacity of power plant at generating stations, power cut off is common for all of us. Due to limited amount of power generating at power station and due to shortage of nonrenewable continuous supply source it beings a biggest challenge in whole world. Due to discontinuity of power supply, many problems have been faced by people in their everyday work.When a supply, such as mains, fails, the availability automatically shifts to the next priority supply generator, and LEDs can be used to show which source is used to provide the supply. The continuous supply to load can be given by automatic operation of relay, relay driver IC, with the help of microcontroller.*

Keywords- Inverter, Lcd, Relay Driver Ic, Microcontroller,Filter

I. INTRODUCTION

e are all aware of the importance of electricity and a continuous power supply. The need for automatic operation is an important requirement of electric power distribution systems. The rapid and reliable transfer of the system from one power source to another during certain system events is crucial to achieving the reliability goals for such systems and the facility serves. This project aims to automatically supply continuous power to loads via one of four power sources: solar, mains, generator, and inverter when any of them is unavailable. Four switches are used for four respective sources. We used one source and a set of relays to provide an input signal to it. As shown in the block diagram, our mains power supply, 230 volts AC, is converted to 12 volts AC by a transformer. After that, the rectifier converts the AC power to DC, and the voltage regulator generate a fixed 5V DC, that is given to the micro controller, that operates the relay with the help of the relay 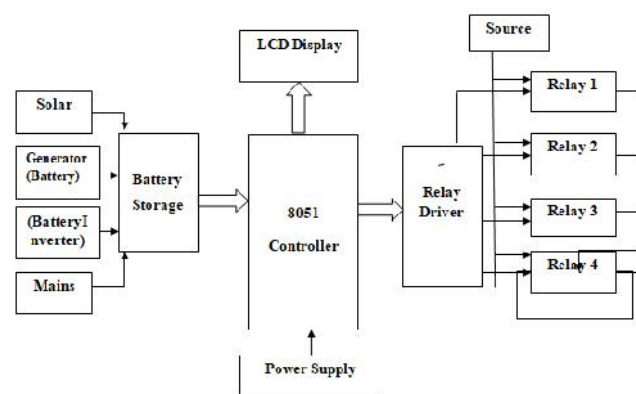driver IC, and the load can be operated, resulting in an uninterrupted power supply. In this project, we can use four switches to demonstrate the absence of a particular source when any of the switches is pressed. In order to provide input signals to the microcontroller, switches are connected to it. The microcontroller's output is sent to relay driver IC, which switches the appropriate relay to maintain uninterrupted power supply to the load in the event of a power supply failure. The microcontroller's output Is sent to relay driver IC, which switches the appropriate relay to maintain the load powered up. Initially, the output shall be observed using a lamp powered by a mains. On failure of mains supply the load get supply from the next available source say as solar. If the solar also fails, the inverter and usually generator switch to the next available source and so on. An LCD also shows the average status of which source supplies the load. As it is not feasible to provide all four different sources of supply, one source with alternate switches is provided to get the same function.

II. BLOCK DIAGRAM

III. DEVELOPMENT AND PROCESS

This system is completely developed in the following stages:

- Problem definition stage
- Block diagram design
- Circuit and component implementation
- Creating software algorithms

- Microcontroller code
- Code compilation
- Running and testing

Problem definition stage

This is the very first stage to develop any project. It actually defines the aims of the project and concept.

Designing the block diagram

At this point, we have divided system into individual modules. These modules [block diagram] will help in understanding the concept and operation of the integrated system. It also simplifies the entire debugging and testing process.

Implementing circuit and components

This is the actual circuit implementation of each block. At this stage, we have designed each block separately and then integrated them into the overall working process.

Developing algorithm for software

To get the logical flow of the software, the development of algorithm is having a prominent role. So we analysed the entire system and organised the algorithm in such a way anyone can understand how the software works.

Code for microcontroller

After developing the algorithm and flowchart, we translated them in to the C language for the micro controller so that it could understand the instructions and run them as needed.

Compiling the code

The code is implemented on the computer for which we have used pre-installed on PC. The software used simulates the operation of a microcontroller in real time without the need to burn the software into the actual IC. The software was converted into machine language after several compiling errors were deleted.

Testing and running

After loading the software into the microcontroller, we tested our project for capabilities this time. Any errors found were successfully removed. This is the final stage of our project's development.

IV. METHODOLOGY

The main aim of this project is to provide an uninterrupted power supply to a load by automatically selecting a supply from any of four sources (mains, generator, inverter, and solar) in the absence of any of the sources. The demand for electricity is increasing every day, and frequent power cuts are causing various problems in industries, hospitals, and homes. An alternate power source arrangement is required.

This project uses four switches to demonstrate the failure of that power supply. When any of the switches is pressed it shows the absence of that particular source, switches are connected to controller as input signals.

V. DESIGN OF POWER SUPPLY

Power supply is the first and the most important part of our project. For our project we require +5v regulated power supply with maximum current rating 500 MA.

Following basic building blocks are required to generate power supply.
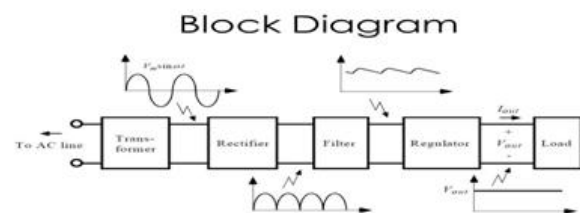
Block diagram of Design of Power Supply

VI. SYSTEM REQUIREMENT

1. In case of solar source failure detection, disconnect the loads from the solar
2. Start consuming power from the wind energy unit.
3. In case of wind source failure then transfer to greed supply.
4. If the greed source is suddenly interrupted, send a signal to the generator's starting relay and connect a parallel load to a battery [charged by a renewable source].
5. If the generator output voltage is stable and reach the required value, then connect the loads to the generator.

6. If any one source is back and stable, disconnect the loads from the generator then connect them back to that source.

7. Stop the generator unit.

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VIII. CONCLUSION

The demand of energy worldwide grows rapidly, because energy generation is low but energy consumption is on a high rate. Electricity companies cannot satisfy the demand and must use nonconventional energy system. Use of renewable energy along with the non-conventional sources not only increases the reliability of the system but also allows higher power demands to be fed. Prioritizing the various available sources makes the selection and utilization economic. The priorities may be decided according to the availability of source, usage cost, its effects on the operation of other equipment (noise due to generators, smokes etc). The selection algorithm can be coded into a microcontroller which will automatically shift between different sources using relays through the relay driver. The project involves four different sources with different parameters to allow microcontroller to judge the selection of best available source to use.

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