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AUTO POWER SUPPLY CONTROL

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Abstract: The main goal of this project is to offer an uninterrupted power supply to a load by automatically picking a supply source from among four options: mains, generator, inverter, and solar in the event of a power outage. The need for electricity is growing by the day, and frequent power outages are generating several problems in enterprises, hospitals, and homes. As a result, a different power source arrangement is desirable. This project uses four switches to demonstrate and activate the failure of the power supply source. When either of the switches is pressed, it indicates that the source is not present. This project uses four switches to demonstrate and activate the failure of the power supply source. When either of the switches is pressed, it indicates that the source is not present. As input signals, switches are linked to the microcontroller. The microcontroller is from the 8051 family. The relay driver IC receives the microcontroller's output and switches the appropriate relay to maintain continuous power to the load. Initially, output is measured using a bulb that draws electricity from the mains. When the mains supply fails (which is triggered by pressing the relevant switch), the load is supplied by the next available source, which is an inverter. If the inverter fails as well, the system changes to the next available source, and so on. An LCD also shows the current condition, such as which source is giving power to the load. Due to the impossibility of providing all four different sources of supply, one source with an alternate parallel configuration is provided for demonstration purposes. However, four separate sources can be used if they are accessible. Other sources of energy, such as wind power, can be added to the project, and the best potential power source – the one with the lowest tariff at the time – can then be considered.

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I INTRODUCTION

The outline of the project is selection of supply from mains, generator, and inverter and solar automatically by using microcontroller concept. As it is not feasible to provide all 4 different sources of supply, one source with alternate switches are provided to get the same function. We have four switches in this project, which we regard to be four different sources of supply. When we push any of the switches, it indicates that that source is no longer connected to the microcontroller as an input signal. We're using microcontrollers from the 8051 series in this project. The microcontroller's output is sent to the ULN2803, which works as a relay driver. This can control up to 7 relays. The relays used here are 12 volt relays. If the main supply is taken off, the output can be seen using a bulb that receives uninterrupted power from another source. The power supply is made out of a 230/12V step-down transformer that reduces the voltage to 12V AC. A bridge rectifier is used to convert this to DC. A capacitive filter removes the ripples, and the voltage is then controlled to +5V using a voltage regulator 7805, which is required for the microcontroller and other components to function. The automation feature is now a must-have. It is simple to use and understand. It also saves time. This project also serves as a proof-of-concept for system automation.

Manual operations were common in the past (and still are in some places today). When the main power goes off, someone has to manually start the generator. When it comes to electrical appliance control, automation ensures greater safety. This project is a prototype for the same, which is an automatic generator switchover when the main power fails. We're creating an embedded circuit to control this in this system. The switching will be in the default phase if there are four phases. The switching is controlled by four relays. The phases will be indicated by the on/off action of the switch. Current is assumed to flow through electrical conductors from the positive to the negative pole, according to the traditional model of current flow established by Benjamin Franklin and still followed by most engineers today. In the vast majority of applications, however, the actual direction of current flow is irrelevant. As a result, the traditional model is used in the following discussion. The red (positive) path leads to the output terminal, and the blue (negative) path leads back to the lower supply terminal. The top right output remains positive in each example, whereas the lower right output remains negative. Because this is true regardless of whether the input is AC or DC, this circuit can not only produce a DC output from an AC input, but it can also provide "reverse polarity protection." In the diagrams below, current flows from the upper supply Switches when the input connected to the left corner of the

diamond is positive and the input connected to the right corner is negative, indicating the absence of that particular source which is connected to the microcontroller as input signals. We're utilising a microcontroller from the 8051 series. The microcontroller's output is sent to the ULN2003, which works as a relay driver. This can control up to seven relays.

II OBJECTIVES:

- To solve the power cut or power shortage problem.
- To design an emergency system that ensures the continuous supply of power to any specified load even during fault conditions.
- To minimize the delay in the process of shifting the supply source from the main supply to the alternative back up source to the smallest possible value.
- To reduce the power bill by setting a selecting sequence of sources which will select the lowest at first then, the higher cost and so on

III BLOCK DIAGRAM

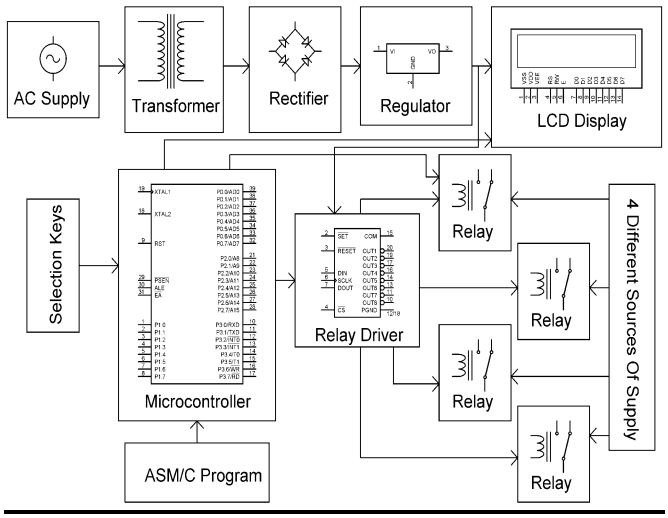


Fig. 1. Block Diagram

This project employs a system of four independent sources of supply that are channelled to a load in order to ensure the load's continuous operation. We used one source and a set of relays because it was not practical to get four sources of supply, such as solar, inverter, main, and generator. We took the initial source with solar power and connected all four incoming sources in parallel to make it appear as though it were fed from four independent sources. By making all of the typically open contacts parallel and all of the common contacts parallel, the lamp's ac source is connected to four relays. The controller is interfaced to four push button switches, each of which represents a failure of the appropriate supply. We initially gave the microcontroller a high input signal, so the controller provides a low output to engage the first relay driver, resulting in the relay being energised and the bulb glowing. When the solar push button is pressed, the supply is switched to the next source, and the microcontroller receives a high input and generates a low output to engage the second relay driver, causing the second relay to be energised and the light to glow. When we press the inverter button, the supply is switched to the next source, which will supply high input to the controller and a low signal to the third relay, causing the lamp to turn on. When we press the third push button, the supply is switched to the next source, which will supply high input to the controller and a low signal to the third relay, causing the lamp to turn on. The lamp is turned off when all of the relays are turned off, leaving no power to the lamp. The condition of the supply sources and the load are displayed on a real-time basis on a single 16x2 line LCD.

IV FLOWCHART

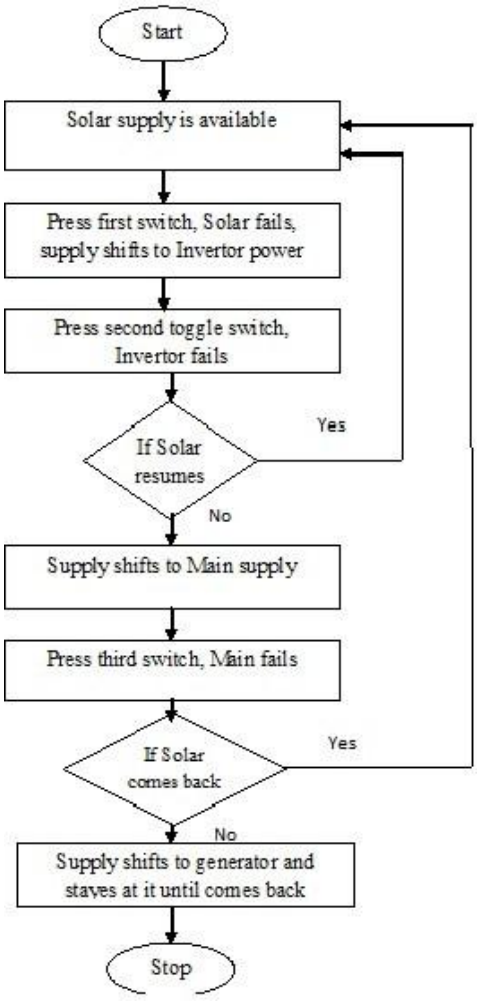
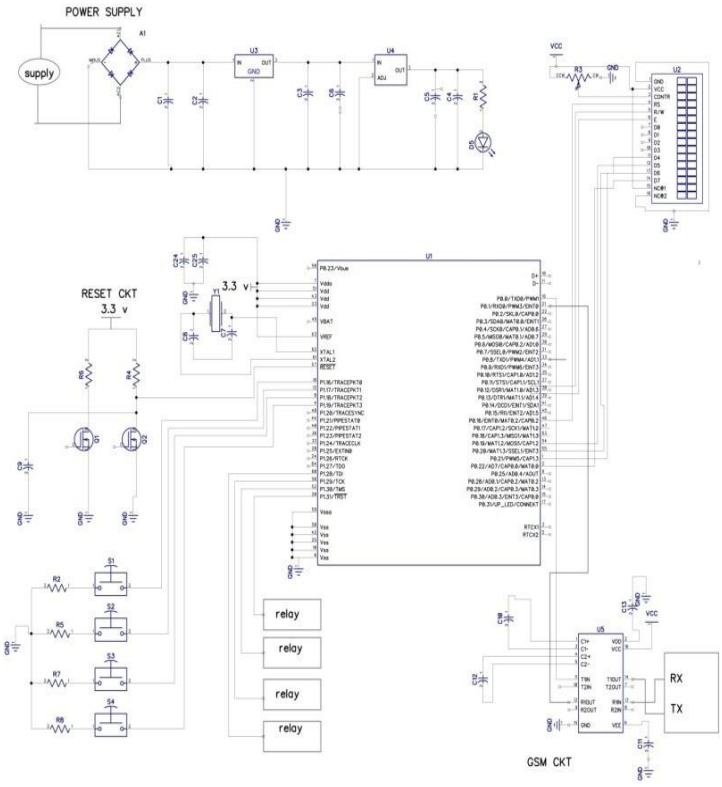


Fig.2 Flowchart

V CIRCUIT DESIGN AND HARDWARE DESIGN:-

This project employs a system of four independent sources of supply that are channelled to a load in order to ensure the load's continuous operation. We chose one source and a set of relays because getting four sources of supply, such as solar, inverter, main, and generator, was not feasible. We took the initial source with solar power and connected all four incoming sources in

parallel to make it appear as though it were fed from four independent sources. By making all of the typically open contacts parallel and all of the common contacts parallel, the lamp's ac source is connected to four relays. Four push button switches are used which represent failure of corresponding supply respectively and are interfaced to the controller.



VI CONCLUSION

This project's "Power supply from four different sources: Solar, Inverter, Main, and Generator" has been detailed in length in the "Power supply from four different sources: Solar, Inverter, Main, and Generator" section. It has been developed by merging Colleges/Schools, etc. The significance of this project rests in its numerous advantages and wide range of applications, such as Industries, Hospitals, Banks, and so on. It was created by combining the features of all of the hardware components used. Every module's presence has been carefully considered and arranged, resulting in the best possible operation of the unit.

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