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Automatic Power Supply Switching Control System between Three Different Sources

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Abstract: The main purpose of this project is to provide continuous power supply to a load, by selecting the supply from any of the four sources namely solar, inverter, mains and generator automatically in case if one the source is absent. The need of electricity is increasing day by day and the frequent power cuts of electricity are causing many problems in different areas like banks, colleges/schools, hospitals, houses and industries. Thus there is requirement for an alternate arrangement of power supply. When a source, say mains fails, the supply automatically shifts to next priority source. On failure of the mains supply the load gets supply from the next available source, say an inverter. If the inverter also fails it switches over to the next available source and so on. As it is not feasible to provide all 3 different sources of supply, one source with alternate switches are provided to get the same function. The project can be further enhanced by using other sources like wind power also and then taking into consideration for using the best possible power whose tariff remains lowest at that moment.

I. INTRODUCTION

A power supply is an electronic device that supplies electric energy to an electrical load. The primary function of a power supply is to convert one form of electrical energy to another and, as a result, power supplies are sometimes referred to as electric power converters. Some power supplies are discrete, stand-alone devices, whereas others are built into larger devices along with their loads. Examples of the latter include power supplies found in desktop computers and consumer electronics devices**.**

Every power supply must obtain the energy it supplies to its load, as well as any energy it consumes while performing that task, from an energy source. Depending on its design**, a** power supply may obtain energy from various types of energy sources, including electrical energy transmission systems, energy storage devices such as a batteries and fuel cells, electromechanical systems such as generators and alternators, solar power converters, or another power supply.

A. Objective of Study & Scope

In this project, continuous power supply to a load from by supply of power from any of the two other sources automatically in case if one the main source absent. Thus the main objective for the project is to design and construct automatic power supply system by using additional three sources along with the main supply. There are some scopes which are needed to achieve the. objective for this project: To design a relay driver circuit with all the three sources and to design a control system by using microcontroller for automatic operation of supply to the load connected with the LED indication of definite supply for overall system according to continuous supply to the load without any interruption of supply. To integrate the hardware and software for obtaining the objective of the project.
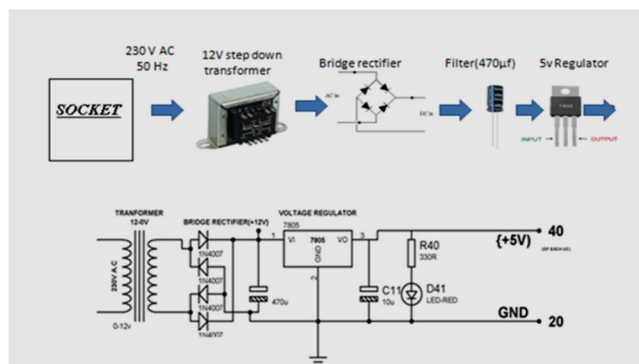
II. HARDWARE COMPONENTS

A. Solar Panel
B. Inverter Module
C. Transformer
D. Bridge Rectifier
E. Voltage Regulator
F. Relays
G. LCD
H. Arduino

Block Diagram Of The Circuit
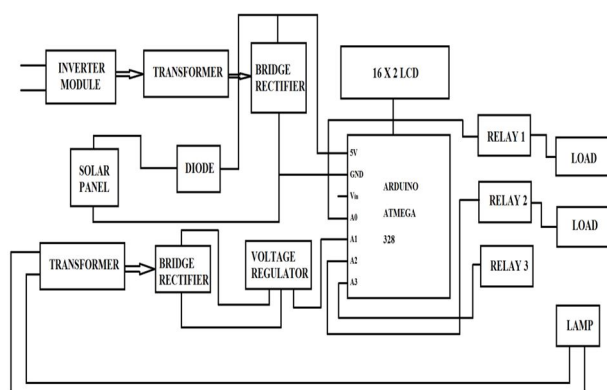

A. *Power Supply*

B. *Solar Panel*

Solar panel refers to a panel designed to absorb the sun's rays as a source of energy for generating electricity or heating. A photovoltaic (PV) module is a packaged; connect assembly of typically 6×10 photovoltaic solar cells. Photovoltaic modules constitute the photovoltaic array of a photovoltaic system that generates and supplies solar electricity in commercial and residential applications. Each module is rated by its DC output power under standard test conditions (STC), and typically ranges from 100 to 365 watts. The efficiency of a module determines the area of a module given the same rated output – an 8% efficient 230 watt module will have twice the area of a 16% efficient 230 watt module. There are a few commercially available solar modules that exceed 22% efficiency and reportedly also exceeding 24%. A single solar module can produce only a limited amount of power; most installations contain multiple modules. The most common application of solar panels is solar water heating systems. The price of solar power has continued to fall so that in many countries it is cheaper than ordinary fossil fuel electricity from the grid.

C. *Inverter Module*

1) High power IGBTs are obtained by connectingtens of dies in parallel in a power module. Opened IGBT module; different semiconductor dies are connected via wire bonds while external connectors are connected to lead-frame structures. A power module or power electronic module provides the physical containment for several power components, usually power semiconductor devices. These power semiconductors are typically soldered or sintered on a power electronic substrate that carries the power semiconductors, provides electrical and thermal contact and electrical insulation where needed.
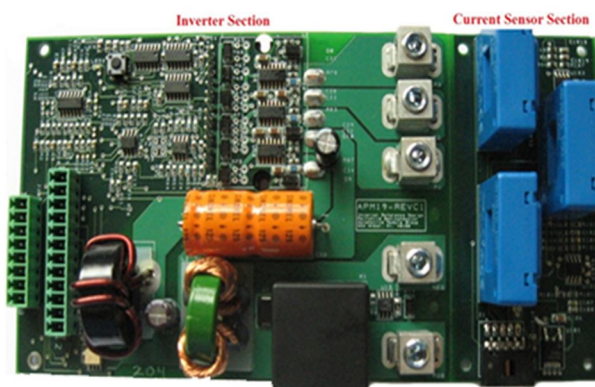
D. Relay

1) It is an electromagnetic switch.
2) Used to control electrical devices.
3) Copper core magnetic flux plays major role.
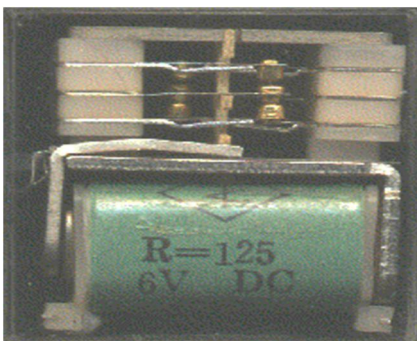
E. Microcontroller Arduino

1) An Arduino board consists of an Atmel 8-bit microcontroller with complementary components to facilitate programming and incorporation into other circuits. Official Arduino have used the mega AVR series of chips, specifically the ATmega8, ATmega168, ATmega328, ATmega1280, and ATmega2560. Most boards include a 5 volt linear regulator and a 16 MHz crystal oscillator or ceramic resonator in some variants.
2) In this project we are using ATmega328.
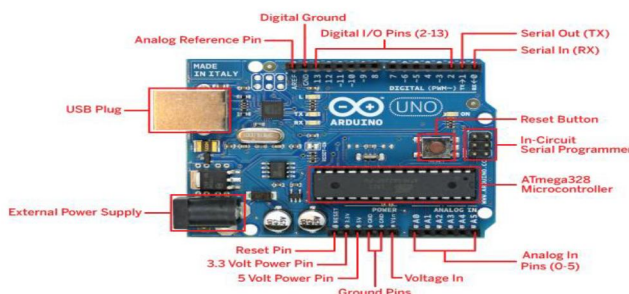
III.   HARDWARE COMPONENTS USED AND THEIR SPECIFICATIONS

COMPONENTS USED	SPECIFICATIONS
Solar Panel	6V/7A

| Inverter Module	DC 12V
Backup Battery	12V/7A
Transformer	230V,50HZ AC Supply Step down T/F, 12V/1A
Transistor	BC547
Bridge Rectifier	4 Diode (IN4004)
Voltage Regulator	
Relay	12V/10A Uni-Directional (Silicon-0.7V Cut-in Voltage)
LCD	16*2 Display,
Arduino Kit	ATMEGA 328

IV. RESULTS

When mains are ON, the supply 230V AC is stepdown to 12V AC using Transformer. Then the 12V AC supply is given to the bridge rectifier to converter AC to DC Source. Then supply is given to the load i.e: lamp. It indicates the glow of lamp as shown in the figure below.

There are three relays, each relay is given to the mains, solar and inverter respectively. When the main i.e: master relay is On, then the other two relays are tripped
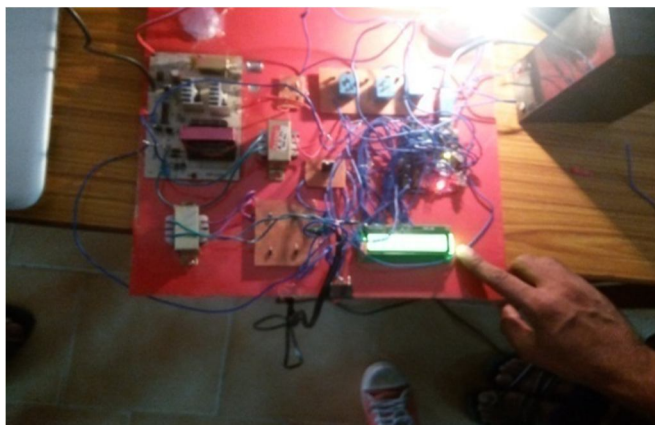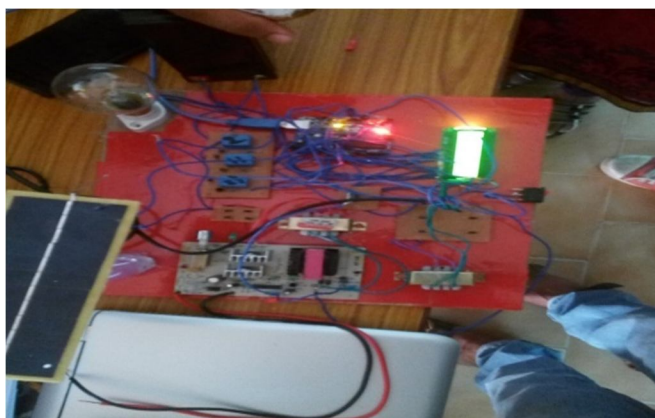
when MAINS are in ON condition
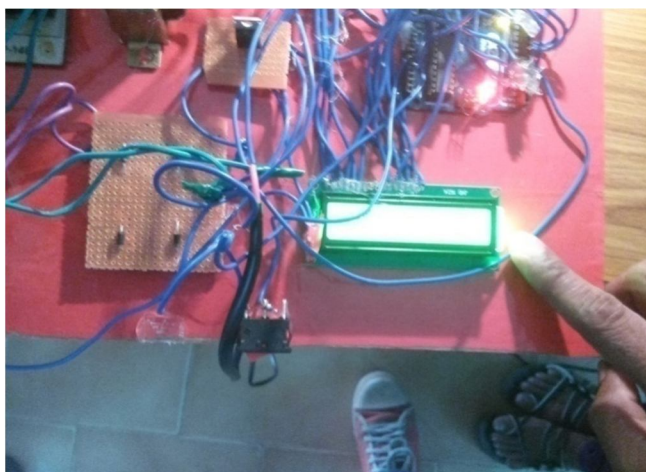
Shows the shifting of Supply
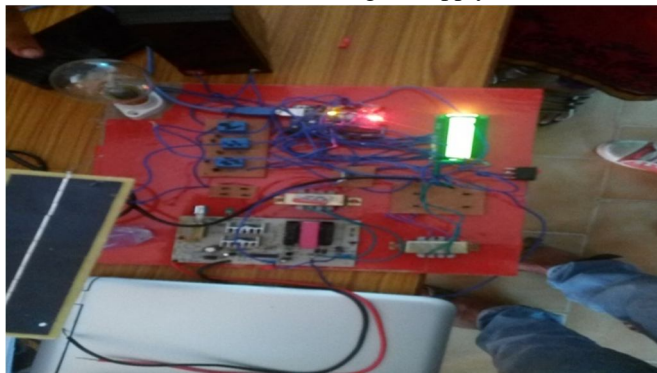
When INVERTER is ON

When MAINS are ON

In the case of breakdown supply from the 'Mains', solar or inverter acts as the backup supply to the load. Backup supply that is battery which will charge using Solar panel or by using mains during normal operation. Thus DC supply is given to the load without interruption in power supply by switching the relay signal from slave relay to the master relay.

Thus we can provides a continuous power supply to the load by means of any of the sources from those are operating the load, (i.e., inverter, solar and generator automatically in the absence of any of the source).

V. OBSERVATIONAL RESULTS

Supply	ON/OFF	LCD Display
Mains	ON	Mains ON
Mains	OFF	-
Inverter/Solar	ON	UPS ON
Inverter/Solar	OFF	-

VI. CONCLUSION

The necessity of proposed guaranteed power supply system creation for responsible consumers is proved. In this case under responsible consumers is considered the electrical installations, which define the robustness and continuity of different technological processes. During researches, the structure and methodology of key parameters choosing of proposed guaranteed power supply system of responsible consumers with use of emergency power supply sources and uninterruptable power supply is developed. The emergency power supply functions on the base of the alternative and renewed energy sources, such as wind generator, solar power station, hybrid wind-diesel power installation or power micro turbine, which works on the following oil gas. Each of these sources

allows avoiding occurrence of emergencies and infringement of technological process continuity. The main stages of choosing structure, main parameters and content of proposed guaranteed power supply system are presented.

VII.   FUTURE SCOPE

The Future Scope of the project is the addition of the supply for extra availability of the project and the convenience of the working operation would become easier if there is an extra source to the project. The higher specification of the components used would be a better idea for the durability of the project and project lies for the longer period. The main scope of this paper is to provide a continuous power supply to the output load through any of the source in the absence of any of the source. The   paper can be further enhanced by using GSM, other sources like wind power and also then taking into consideration for using the best possible power whose cost remains lowest at that moment. The   significance of this paper lies in its various advantages and wide places of applications where this project can be used efficiently.

REFERENCES

[1]   Gagari Deb and Arijit Bardhan Roy, International Journal of Computer and Electrical Engineering, Vol.4, No.1, February 2012.

[2]   Predrag Pejovi´C, Johann W. Kolar, Electronics Journal Special Issue on: Education in Electronics, Vol. 17, No. 2, January 2014

[3]   Aye Myat Thu, Kyaw Soe Lwin, Interntional Journal of Scientific Engineering and technology Research, International Journal of Scientific Engineering and Technology Research Volume.03, IssueNo.08, May-2014.

[4]   Mr. Bhrijesh N. Patel, Mr. Mrugesh M. Prajapati, International Journal of Scientific and Research Publications, www.ijsrp.org, Volume 4, Issue 6, June 2014.

[5]   Gagari Deb, Ramananda Paul and Sudip Das, International Journal of Computer and Electrical Engineering, Vol.4, No.2, April 2012.

[6]   Parantap Nandi, Department of Electrical Engineering, Institution: IIE (Kalyani), WBUT. Nadia, WB: 741235. International Journal of Multidisciplinary Research and Development 2015.

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