International Journal on Emerging Technologies (Special Issue NCETST-2017) **8**(1): 573-575(2017)
(Published by Research Trend, Website: www.researchtrend.net*)*

ISSN No. (Print) : 0975-8364
ISSN No. (Online) : 2249-3255

Uninterrupted Power Supply to a Load using Auto-Selection between four Different Source

Tarun Kaira[1], Deepak kulyal[1], Jitendra Kumar[1], Ankit Kumar Arya[1] and S. C. Sharma[2]
[1]Scholor, Department of Electrical and Electronics Engineering,
Amrapali Institute of Technology & Sciences Haldwani, (U.K.), INDIA
[2]Assistant Professor, Department of Electrical and Electronics Engineering,
Amrapali Institute of Technology & Sciences Haldwani, (U.K.), INDIA

ABSTRACT: As we all are aware of the fact that the demand of electricity is increasing every day and India being the populated country the most commonly problem faced are frequent power cut and low energy resources.
The main objective of the work is to solve both these problem by not relying on single source and switching into renewable source of energy. This work uses four different sources to provide uninterrupted power supply and one of the sources is renewable source i.e. solar energy.
The work also provide additional advantage i.e. Automation which is done by using microcontroller (8051) family.

Keywords: Microcontroller 8051 family (PCI/AT 89C51), generator, solar panel, relay, inverter, switches, mains.

I. INTRODUCTION

In India the requirement and availability of energy for power supply is 11,14408 million units and 10,90850 million units for 2015-16 and we also know that the human activities is mostly dependent on electrical power supply. The above fact clearly shows that the supply is not meeting the demand. As a result frequent power-cut is done and interrupted power supply is provided. The alternative for this problem is to switch towards renewable energy resources.
Four different sources i.e. mains, generator, solar and inverter are used to provide uninterrupted power supply. Using the solar energy as one of the power source provides the solution for low energy resources since it is a non-renewable source of energy.
The second objective of work is to provide automation which make the work faster, reliable, efficient, and reduce human efforts. Microcontroller (PIC/AT89C51) is used to provide automation in the switching between four different sources. The automation system used for switching requires separate source to provide an output signal which will operate the four different relays connected to sources respectively.

II. METHODOLOGY

The main reason behind to selects this work is there are lot of industries and domestic appliances which work on high voltage supply and are high costly. And some electrical devices need regular or uninterrupted or continuous power supply to work well for longer life span.

Many electrical system are highly sensitive which can be affected by a minute interruption in the power supply line. In the power supply system there are many chances of interruption to take places at any times like power fail/cut off, faults etc. To avoid such types of problems these project system are best which take power supply via four different sources and alternate between them using microcontroller. The merit of this work is that they are reliable and economical.

III. BLOCK DIAGRAM

This uninterrupted power supply control system works on the principle of auto selection for switch over the load to other available source without interruption or switch off the load. This work uses 4 different sources of supply which drive the load and provide uninterrupted power supply. All the four sources are connected parallel to each other as shown in the block diagram. The sequence of power sources is mains, solar, inverter and generator respectively i.e. highest priority is given to mains and least priority to generator.

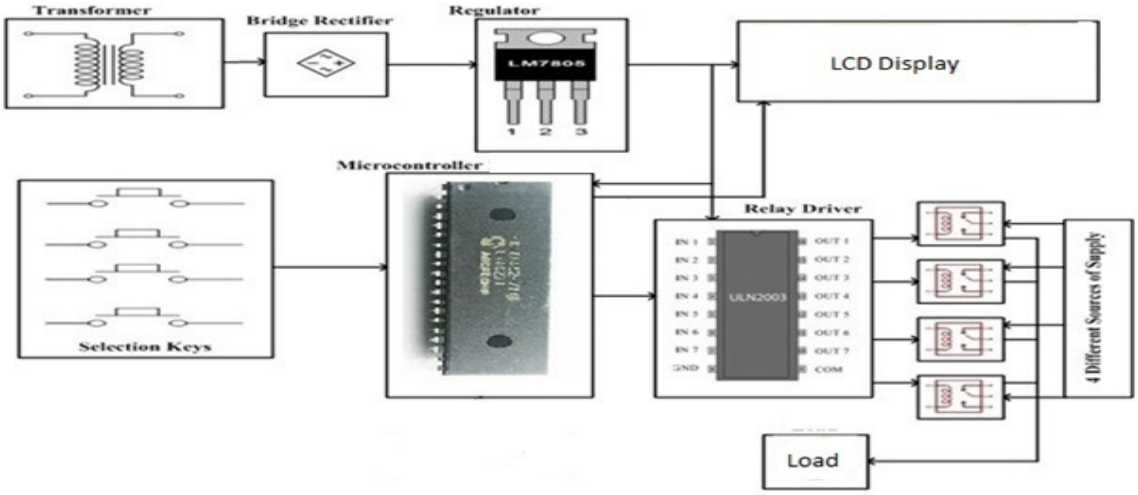

Fig. 1.

Table 1: List of component.

S.NO.	LIST OF COMPONENT	QUANTITY
1.	RESISTOR	11
2.	CAPACITOR	5
3.	INTEGRATED CIRCUIT	3
4.	MICROCONTROLLER(PIC16F877A)	1
5.	CRYSTAL OSCILLATOR(4MHZ)	1
6.	VOLTAGE REGULATOR	1
7.	RELAY	4
8.	TRANSFORMER	1
9.	16*2LCD	1
10.	PLAIN PCB	1

At normal condition i.e. when mains supply is present, relay connected to mains sense the output from the mains and load is driven by mains supply. All other sources which are connected in parallel are open at this time. In case mains supply is cut off, power is automatically drawn from second source i.e. solar. If solar supply is absent the microcontroller will switched to inverter supply. If inverter supply also fails, the supply will automatically shift to generator.

One of the other possible case is when power switches from one source to another source, say solar supply fails and supply shifts to inverter and at the same time if mains supply comes back then the supply will automatically switched to mains supply instead of switching to inverter because mains supply has been given the highest priority. The selection process of sources is done automatically using microcontroller.

In this system microcontroller is very essential component and always keep sensing the available sources. When any source is switched off through the selection keys then the microcontroller shifted the load to the other supply source by giving the signal to the relay driver IC then the relay driver IC switched on the appropriate load relay.

Load relays used in this work are connected in parallel with load and four sources of supplies are also connected in parallel with these load relays. These load relays consist of normally open and close contacts and are operated through the relay driver IC.

We have checked this system by connecting the lamp at output side as a load. When any interruption takes place in the power supply lamp will not blink during the shifting of sources. Otherwise there will be blinking during the shifted time of the sources i.e. there is interruption in supplying the power at output side of the work.

IV. SOME COMPONENTS

Microcontroller PIC 16F877A: In this auto power supply control system, the PIC 18F877A microcontroller is used for the auto selection of the available source. It shifted the load to the other power supply source automatically without any interruption. It is programmed in c language with help of micro c software and is powered up with 5V dc voltages. It is interfaced with LCD display and relay driver IC.

Relay Driver: In this auto power supply control system, the relay driver ULN2003 is used for driving the load relays. This relay receives the signal from microcontroller for shifting the load on another supply source. It is powered up with 5V dc and interfaced with microcontroller.

Transformer: The transformer is used for connecting this system directly to 220V AC. It steps down 220V into 12V.

Voltage Regulator: The voltage regulator is used for regulating 12V DC into 5V DC voltages for supplying the power to the LED, microcontroller and other components. IC LM 7805 voltage regulator is used for regulating voltages.

LCD Display: LCD display is used for displaying the source of supply on which the whole system is working.

FILTERS: Capacitive filters are used in this work. It removes the ripples from output of the rectifier. The DC output received from this filter is constant until the mains voltage and load is maintained constant but if either one of the quantities is vary; the DC output received at this point changes. To overcome this drawback a regulator is applied at the output stage of the filter.

RECTIFIER: In this work bridge rectifier is used due to its merits like full wave rectification and high stability. For a single half of the cycle only two diodes will be in forward bias condition.

V. CONCLUSION

This work is use to provide a continuous power to the load through any of the sources from which we are operating the device i.e. main line, generator, inverter and solar automatically in the absence of any of the source. The complete operation is based on the microcontroller. This work is a low-cost, reliable, efficient system.

The work can be further enhanced by using other sources like wind power also and then taking into consideration for using the best possible power source whose tariff remains lowest at that moment.

REFERENCE

[1]. Smt. Thilagavathi, (Nov 5,2016) “Automatic power supply controller using four different source”.
[2]. http:// consultelectronicsproject.blogspot.com.
[3]. www.wikipedia.org.in
[4]. http://powermin.nic.in/en/content /power-glance-all-india