

Automatic Source Selection for Industries Using Arduino

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Abstract:

The main purpose of this project is offer to produce power supply to a load, by choosing the availability from any of the four sources specifically star, inverter, main and generator mechanically just in case if one the supply is absent. The need of electricity is increasing day by day and also the frequent power cuts of electricity square measure inflicting several issues in numerous areas like banks, colleges/schools, hospitals, homes and industries. Thus, there's demand for AN alternate arrangement of power provided. This arrangement is often designed by exploitation Arduino UNO ATMEGA 328P and relays. When a supply, say mains fails the availability mechanically shifts to next priority supply generator and then on LEDs(Light emitting diodes) can be used to show that which source is used to provide the supply.

Keywords:

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 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 wind power are used to provide uninterrupted power supply. Using 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 makes the work faster, reliable, efficient, and reduces human efforts. Arduino (UNO Atmega 328P) is used to provide automation in the switching between four different sources. The automation system used for switching requires a separate source to provide an output signal which will operate the four different relays connected to sources respectively.

The demand for electricity is increasing every day and frequent power cuts are causing many problems in various areas like industries, hospitals and houses. An alternative arrangement for power source is thus desirable. A Arduino is used. The output of the Arduino is given to the relay driver IC, which switches appropriate relay to maintain uninterrupted supply to the load. Output is observed using a lamp drawing power from the mains initially. On the failure of the mains supply the load gets supply from the next available source i.e. an inverter. If the inverter also fails, it switches over to the next available source, and so on. The current status, like which source is supplying power to the load is also displayed on an LCD. As it is not feasible to provide all 4 different sources of supply, one source with

an alternate parallel arrangement is provided to get the same function for demo purposes. However 4 different sources if available can be used.

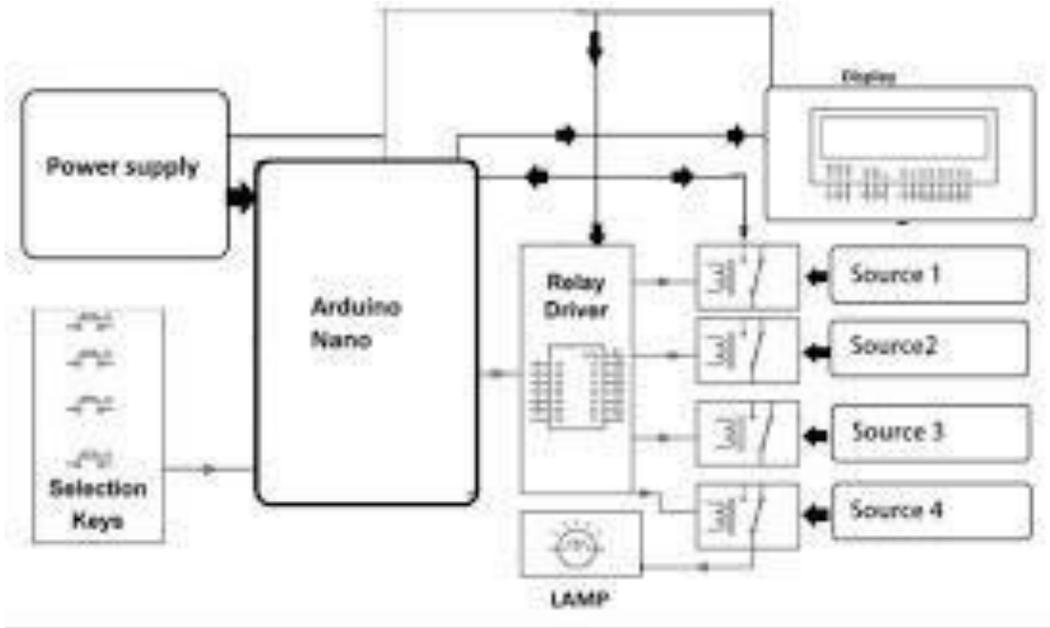
METHODOLOGY:

The main reason behind selecting 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 systems 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 place at any times like power fail/cut off, faults etc. To avoid such types of problems these project systems are best which take power supply via four different sources and alternate between them using Arduino. The merit of this work is that they are reliable and economical.

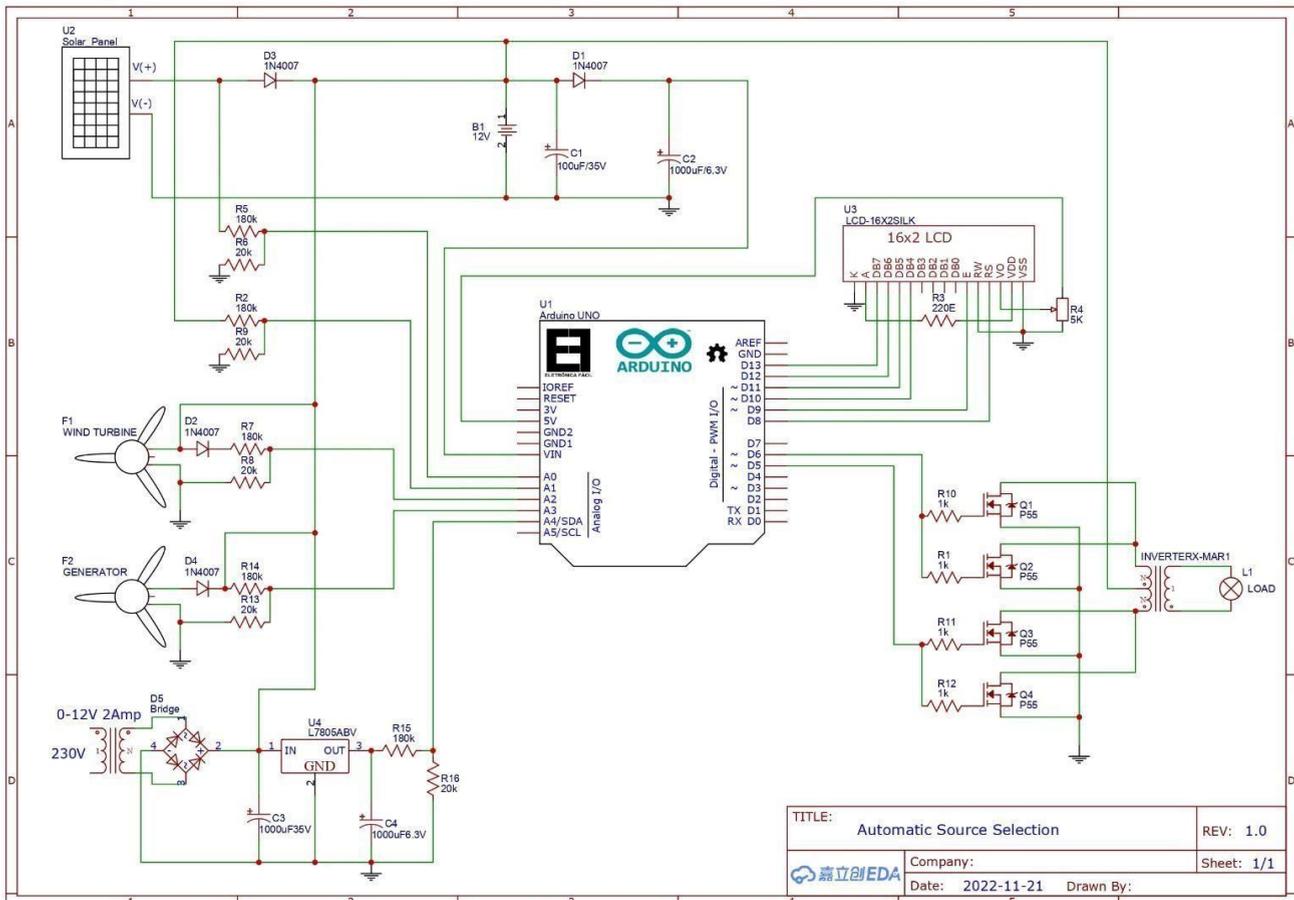
Hardware Requirements:

- Arduino.
- Relays.
- LCD.
- Lamp.
- Push Buttons.
- Transformer.
- Diodes.
- Voltage Regulator.
- Crystal.
- LEDS.
- Capacitors.

BLOCK DIAGRAM:



CIRCUIT DIAGRAM :-



Circuit Diagram Description

Auto supply switching is basically selection of supply from multiple available power sources automatically by using Arduino concept that is to check the availability of the source and switching to that available source to ensure uninterrupted power supply to load. In case of the electrical appliance control using automation causes more safety.

Auto supply switching is a prototype for the same which is auto change to other source when main supply fails without human interaction in this system we are designing an embedded circuit to control and ensure auto supply switching. In case all 4 phases are available, then the switching will be in the default phase. Four relays are there to control the switching. 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.

In this project we are having 4 switches which we consider as 4 different source of supply. When we press any of the switches it shows the absence of that particular source which is connected to Arduino as input signals. Here we are using 8051 family Arduino. The output of Arduino is given to the ULN2803 this acts as a relay driver. The current phase working is displayed on LCD also.

This project uses an arrangement of 4 different sources of supply which are channelized to a load so as to have an uninterrupted operation of the load. As it is not practicable to get 4 sources of supply such as mains supply, generator supply, inverter supply and solar supply, we used one source and a set of relays. We have taken first source with mains supply and assumed as if being fed from 4 different sources by connecting all the 4 incoming sources in parallel. The ac source to the lamp is connected to four relays by making

the entire normally open contacts parallel and all the common contacts in parallel. 4 push button switches are used which represent failure of corresponding supply respectively and are interfaced to the controller. Initially we have given high input signal to the Arduino, so as a result the controller generates a low output to activate the first relay driver which will result in the relay being energized and the lamp glows.

While the push button for mains is pressed that represents failure of mains supply as a result the supply is provided from the next source and the Arduino receive high input and generates low output to activate the second relay driver which will result in the second relay being energized and the lamp glows. When we press the generator button, it indicates the generator fails to operate and the supply comes from the next source and the next source will supply high input to the controller and which will provide low signal to the third relay and the lamp switches ON and when we press the third push button the supply will choose next source now the fourth source will provide input to the Arduino and controller activates the fourth relay and the load will get the supply and the lamp continues to glow.

When all the relays are off leaving no supply to the lamp, the lamp is switched off. One 16 x 2 lines LCD is used to display the condition of the supply sources and the load on real time basis.

Working of Auto Power Supply Control System from 4 Different Sources Using PIC

Arduino:

When the supply from all the sources (Solar, Wind, Mains and Generator) are ready, the load will be driven by the solar power supply. If solar get failed, the supply automatically shifts to wind. To proceed further, if the wind get failed, the supply is provided from generator and so on. Priority is assigned to each power source in the order of Solar, Wind, Generator and Mains. In case the solar power fails, the supply should automatically shift to wind but if wind also fails at the moment then the supply will automatically shift to the next priority source. The above figure explains the working and construction of the Auto power supply from four different sources. As shown in the diagram the four sources are Solar, Wind, Mains and Generator, four relays are used to provide protection at each respective output. This output can be used to drive any load such as a lamp or motor. LEDs are used to display the source of supply. Other case is when the power switches from one source to another source, say wind fails and supply shifts to generator, if the solar come back then the supply will automatically reach back to solar power instead of switching to mains. At the output of Arduino, each output port is connected to positive dc voltage. Relays are used in contact with the output port to provide switching at the output.

The project uses an arrangement where 4 different sources of supply are provided to a load so as to have an uninterrupted operation of the load. The source of 12v supply is used from four different sources. The ac source to the fan is connected to relay 1 to relay 2 to relay 3 and relay 4 by making the entire "NO" (normally open) contacts parallel and all the common contacts in parallel.

Arduino:



RELAY

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches.

Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits, the link is magnetic and m

Result:

This work is used 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 inverters also and then taking into consideration using the best possible power source whose tariff remains lowest at that moment.

Application and Advantages:

This system could be used in places where we have different sources of supply such as solar, main and wind.

This system could be used in industries for supplying the uninterruptable power supply to the industrial machines.

This system could be used in educational institutes and hospitals for supplying the uninterruptable power supply to the hospital or educational equipment.

This system is more compact and reliable as compared to the electrical ATS panels.

This system is less costly as compared to the other power control systems

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REFERENCES:

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

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

[3] Aye Myat Thu, Kyaw Soe Lwin, International 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] Mr. Shahaji Dudhate, Mr. Amol Attargekar, Mr. Dhanaji Desai, Prof. Mrs. Aditi Patil (2016), " Power supply control from different sources", Department Of Electronics And Telecommunication, Dr. D.