Innovative Journal for Opportunities and Development in Science & Technology,
Volume 6, Issue 3, Feb. 2026
Paper Id: – IJ2025V6I3 -13 A-F
ISSN 2582-6026

MULTI POWER SUPPLY USING 4 DIFFERENTS SOURCE FOR NO BREAK POWER SUPPLY

[1]Omarje Madhukar Rupanvar, [2]Vidya Baban Gavhane, [3]Samarth Sandip Lohokare,
[4]Harshada Ramesh Iole, [5]Akshay Kishor Udmale, [6]MS. Ushir R. P.

[1]UG Scholar, Electrical Dept. JSPM's Bhivrabai Sawant polytechnic, Wagholi
[2]UG Scholar, Electrical Dept. JSPM's Bhivrabai Sawant polytechnic, Wagholi
[3]UG Scholar, Electrical Dept. JSPM's Bhivrabai Sawant polytechnic, Wagholi
[4]UG Scholar, Electrical Dept. JSPM's Bhivrabai Sawant polytechnic, Wagholi
[5]UG Scholar, Electrical Dept. JSPM's Bhivrabai Sawant polytechnic, Wagholi
[6]Asst. Prof. Electrical Dept. JSPM's Bhivrabai Sawant polytechnic, Wagholi

ABSTRACT: In order to offer a steady and uninterrupted power supply, this research proposes a multi-power supply system that uses four distinct energy sources. The generator/inverter, battery backup, solar power, and mains supply are the sources that the system automatically chooses from. The load is immediately switched to the next available source without any power outages in the event that one source fails. This project's primary goals are to increase power availability, minimize power failure issues, and guarantee dependability. Hospitals, businesses, communication systems, and important loads where constant power is necessary can all benefit from such a system.

The electric supply is vital to human beings in the modern era. Nearly every aspect of our lives need uninterrupted power supply, including homes, hospitals, and research facilities. The rising demand for electricity and the high consumption of conventional energy sources, which are finite, need a change from traditional energy production methods to a more effective strategy that uses hybrid systems to make economical use of both conventional and non-conventional sources. The automation of switching between several sources to provide a steady supply of electricity at a cheap cost is the topic of this study. The system is more resilient to errors and power outages when it has many sources. The project carries out

KEYWORDS: Relay Driver IC, LCD.,arduino Nano.

Innovative Journal for Opportunities and Development in Science & Technology,
Volume 6, Issue 3, Feb. 2026
Paper Id: – IJ2025V6I3 -13 A-F
ISSN 2582-6026

I. INTRODUCTION

In the modern world, a steady power supply is necessary for the dependable functioning of industrial control units, medical equipment, communication systems, and electronic gadgets. Data loss, device damage, and downtime can result from power outages or fluctuations. A No-Break Power Supply system is necessary to overcome these obstacles and provide steady and uninterrupted power delivery.

The design and construction of a Multi-Power Supply System that employs four distinct power sources to continuously supply electricity to a load is the main goal of this project. The system automatically chooses the best power source that is available and smoothly and uninterruptedly transitions between them. High availability and dependability are ensured by the four power sources, which might comprise the main AC supply, solar power, battery backup, and generator or inverter supply.

By combining many power sources, the system becomes more durable overall, improves energy efficiency, and lessens reliance on a single supplier. Power outages are reduced and manual intervention is eliminated with automatic source switching. Critical applications including hospitals, data centers, telecom systems, and embedded electronics greatly benefit from such a system. An efficient way to provide continuous power operation while encouraging the usage of backup systems and renewable energy is demonstrated by the suggested multi-source no-break power supply. When any one of the four power sources—solar, mains, generator, and inverter—is not accessible, the paper is made to automatically provide a load with continuous power.

Innovative Journal for Opportunities and Development in Science & Technology,
Volume 6, Issue 3, Feb. 2026
Paper Id: – IJ2025V6I3 -13 A-F
ISSN 2582-6026

II. REVIEW OF SYSTEM DESIGN

1. ARDUINO NANO:

Arduino is an open-source electronics prototyping platform based on flexible, easy to use hardware and software. It is intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments. Arduino can sense the environment by receiving input from a variety of sensors and can affect its surroundings by controlling lights, motors, and other actuators. The microcontroller on the board is programmed using the Arduino programming language (based on Wiring) and the arduino development environment (based on Processing). Arduino projects can be stand-alone or they can communicate with software on running on a computer.

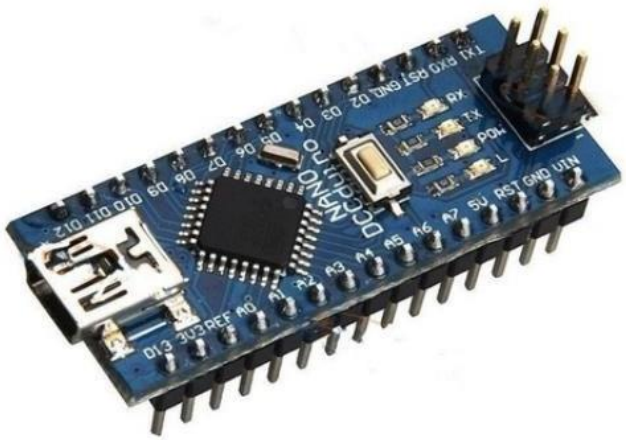

Figure 1:Arduino Nano

Arduino Nano is a surface mount breadboard embedded version with integrated USB. It is a smallest, complete, and breadboard friendly. It has everything that has electrically with more analog input pins and onboard +5V AREF jumper. Physically, it is missing power jack. The arduino Nano is automatically sense and switch to the higher potential source of power, there is no need for the power select jumper. Each of the 14 digital pins on the Nano can be used as an input or output, using pin mode, digital write, and digital read functions. They operate at 5 volts. Eachpin can provide or receive a maximum of 40 mA and has an internal pull up resistor (disconnected by default) of 20-50 kohms.[8]

In Addition, Some Pins Have Specialized Functions:-

- Serial: 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the FTDI USB-to-TTL Serial chip.
- External Interrupts: 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. See the attach Interrupt function for details.

Innovative Journal for Opportunities and Development in Science & Technology,
Volume 6, Issue 3, Feb. 2026
Paper Id: – IJ2025V6I3 -13 A-F
ISSN 2582-6026

- PWM: 3, 5, 6, 9, 10, and 11. Provide 8-bit PWM output with the analog Write function.
- SPI: 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication, which, although provided by the underlying hardware, is not currently included in the arduino language.

- LED: There is a built-in LED connected to digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW value, and then it's off. The Nano has 8 analog inputs, each of which provides 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though is it possible to change the upper end of their range using the analog reference function. Analog pins 6 and 7 cannot be used as digital pins. Additionally, some pins have specialized functionality:
- AREF : Reference voltage for the analog inputs. Used with analog Reference.

I2C. I2C communication is developed using A4 and A5 pins where A4 represents the serial data line (SDA) which carries the data and A5 represents the serial clock line (SCL) which is a clock signal, generated by the master device, used for data synchronization between the devices on an I2C bus.

2. Relay Driver IC UNL2003 :

ULN2003 is a relay driver IC consisting of a Darlington array. It is made up of seven open collector Darlington pairs with common emitter. Moreover, **ULN2003A** has a capability of handling seven different Relays simultaneously. A single Darlington pair consists of two bipolar transistors and operates in the range of 500mA to 600mA current.

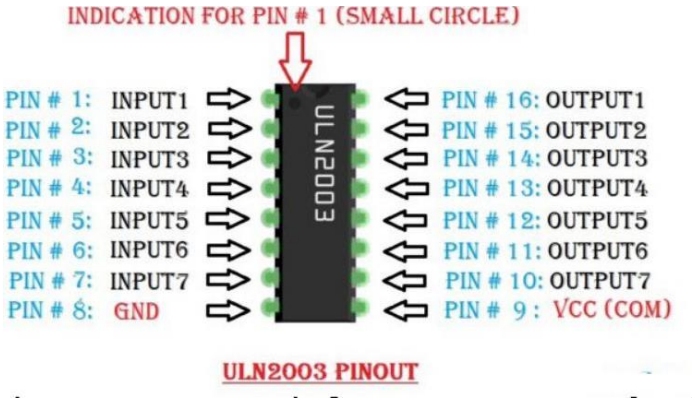

Figure 2:ULN2003 Pin out

Innovative Journal for Opportunities and Development in Science & Technology,
Volume 6, Issue 3, Feb. 2026
Paper Id: – IJ2025V6I3 -13 A-F
ISSN 2582-6026

A single Darlington pair consists of two bipolar transistors and it operates on the current range of 500mA to 600mA. ULN200X is a well-known series of IC's. ULN2003 is also the part of this series. ULN2003 operates on 5V and TTL (Transistor Transistor Logic) and CMOS (Complementary Metal Oxide Semi-Conductor). Its pin configuration is designed so that the input pins are at the left side of the IC where as the output pins of it are on right side in front of the corresponding input pin. This IC has a very wide range of applications. They are commonly used as relay drivers in order to drive different kinds of loads. ULN2003A can also be used to drive different motors. Some of the other applications OF *ULN2003* include logic buffers, lamp drivers, line drivers, LED display, motor driver circuits etc.It ismade up of seven open collector Darlington pairs having common emitter which shows ULN2003 has a capability of handling seven different relays at a time.

3. LCD DISPLAY:

The LCD will require a total of 7 data lines (3 control lines plus the 4 lines for the data bus). If an 8-bit data bus is used the LCD will require a total of 11 data lines (3 control lines plus This is an example for the Parallel Port.

Figure 3: LCD Display

Innovative Journal for Opportunities and Development in Science & Technology,
Volume 6, Issue 3, Feb. 2026
Paper Id: – IJ2025V6I3 -13 A-F
ISSN 2582-6026

There are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.

The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

III. PROPOSED SYSTEM

By automatically alternating between solar, inverter, generator, and mains supplies according to a predetermined priority—mains being the greatest priority—the system guarantees continuous power. Through a relay driver IC, a microcontroller regulates relay switching while continually monitoring all sources. The load is immediately and uninterruptedly moved to the next available source when a source fails or is explicitly turned off. A lamp load is used to validate a no-break power supply by staying ON without blinking throughout source changes.

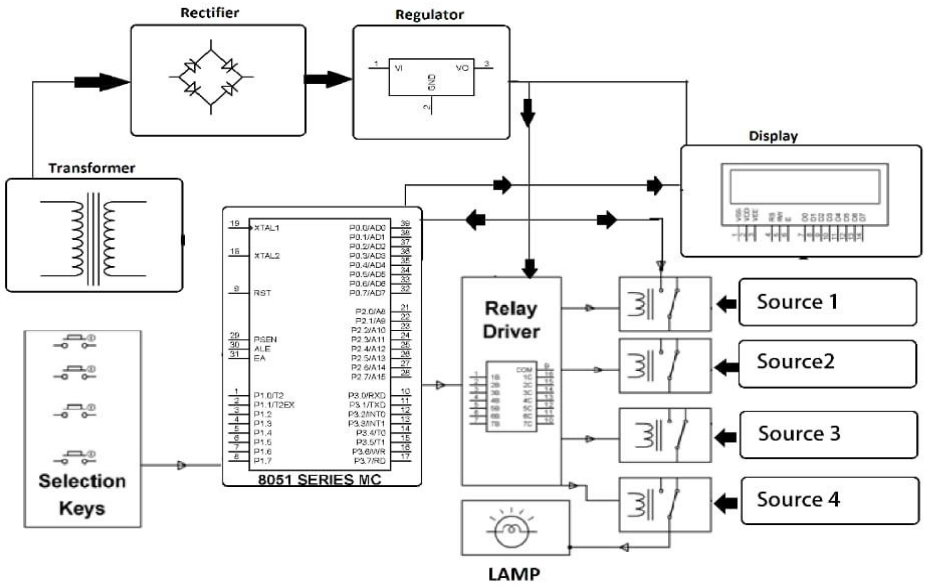

Figure 4: Block Diagram

Innovative Journal for Opportunities and Development in Science & Technology,
Volume 6, Issue 3, Feb. 2026
Paper Id: – IJ2025V6I3 -13 A-F
ISSN 2582-6026

The supply will automatically switch to the generator if the inverter supply fails as well. Another scenario is when power shifts from one source to another. For example, if the solar supply fails, the supply switches to an inverter; however, if the mains supply reappears, the supply will automatically switch back to the mains supply since the mains supply has been given the highest priority. A microcontroller is used to automatically choose the sources. The microcontroller is a crucial part of this system and continuously senses the sources that are accessible. The microcontroller transferred the load to the other supply source by sending a signal when any source was turned off using the selection keys.

These load relays are also linked in parallel with supplies. These load relays are controlled by the relay driver IC and have typically open and closed contacts. By attaching the bulb to the output side as a load, we were able to verify this system. When the power supply is interrupted, the light will not flicker while the sources are being switched. If not, there will be blinking throughout the sources' shifted time, meaning that the power supply at the work's output side will be interrupted.

CIRCUIT DIAGRAM:

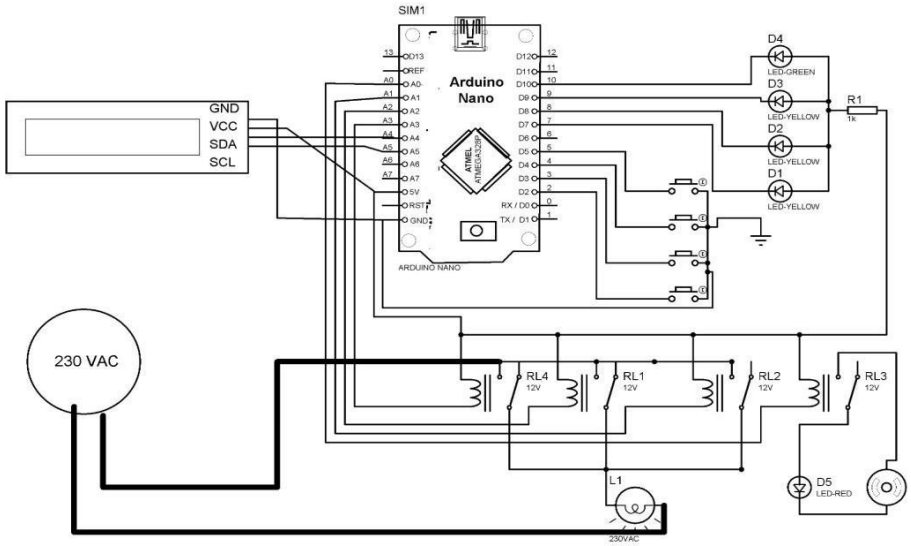

Figure 5:Circuit Diagram

WORKING:

The Arduino Nano, relay board, switches, LED, and LCD display are all part of our system.The primary component of the system is the Arduino Nano. Every module and switch interfaces with the Arduino Nano, which processes signals based on the structure of the program and sends them to the relay board. Four switches are used in this project to illustrate each power supply's failure. The switches are attached to the microcontroller as input signals, and pressing any of them indicates that the specific source is not present. The relay receives the Arduino Nano's output and changes the

appropriate relay to keep the load's supply constant. A light that first draws electricity from the mains will be used to examine the output.

source, like as an inverter. It moves on to the next available source, and so on, if the inverter fails as well. An LCD also shows the present situation, including which source is supplying the load. One source with alternate switches is supplied to provide the same purpose since it is not practical to provide all four separate sources of supply. For the LCD display, we utilize an I2C module.The i2c LCD module contains four pins: vcc, gnd, sda, and scl. It has a four-pin interface to the Arduino Nano. By utilizing the i2c module, the number of connections to the Arduino Nano is reduced, which also simplifies the LCD display's display. The lamp is turned off when all of the relays are off, preventing the lamp from receiving any power. An LCD with 16 x 2 lines is used to show

IV. CONCLUSION

This paper explains the "Power supply from four different sources: Solar, Inverter, Main, and Generator" with all of its characteristics and specifics. Auto-switching will promote production, and it will speed up operations to ensure uninterrupted operation. This project's numerous benefits and wide range of applications, including industries, hospitals, banks, etc., are what make it significant. It was created by combining schools, colleges, and other institutions. It has been created by combining the features of every hardware component that was utilized. Each module's presence has been carefully considered and positioned, which helps the unit function as best it can.Every thesis also discusses several kinds of switching mechanisms.

REFERENCES

[1] Belsky, A. A., Skamyin, A. N., &Iakovleva, E. V. Configuration of a standalone hybrid wind-diesel photoelectric unit for guaranteed power supply for mineral resource industry facilities. International Journal of Applied Engineering Research, 1(11), (2016), 233-238.

[2] Ahmed, M., Amin, U., Aftab, S. and Ahmed, Z. Integration of Renewable Energy Resources http://dx.doi.org/10.4236/epe.2015.71002

[3]. Hans-Peter ,Glauser, “Power Supply Arrangement”, Omron Corporation, Kyoto (JP) ,Patent: US 7,450,406 B2. (2008), http://patents.com/us- 7450406.html

[4]M. H. Rashid, Power Electronics: Circuits, Devices, and Applications, 4th Edition, Pearson Education, 2014.