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Multi Power Supply using Four Different Sources for Un Interrupt Power Supply

Abstract: - The most crucial necessity for all of us is power. We are all aware that power outages are frequent because of the high demand for electricity and the producing station's limited capacity. The main problem in the globe is the lack of nonrenewable continuous supply sources and the restricted amount of electricity generated at power plants. If you look about us, you'll realize that individuals have encountered several issues in their daily lives as a result of power supply interruptions. Hospitals, data centers, and some research projects are affected by this kind of power outage. This is one of the main reasons why every nation is looking at ways to provide consistent electricity with good efficiency and control. This project combines renewable and non-renewable energy sources, including solar, inverter, small diesel generator, and mains, to provide a constant power supply. Switches can be used to manually cut the power to various sources. With the aid of the Arduino Nano, the relay and relay driver IC may operate automatically to provide a constant supply to the load.

Keywords: pic micro controller, relay driver IC, LCD

1. INTRODUCTION

This project's primary goal is to use a suitable programmed microcontroller to optimize the use of electricity from mains, wind, inverter, and solar sources. controller as efficiently as possible. Lights, wind, fuel cells, and other devices are examples of emergency power systems, which are designed to supply backup power sources during emergencies or when the normal systems malfunction. Residential residences, hospitals, data centers, research labs, telecommunications equipment, and contemporary navy vessels are just a few of the many places they find application. Regular automobile batteries with a lead acid base are used in some homemade emergency power systems. There are four switches for each of the four sources. These are linked to the Arduino Nano family, which gives it input signals. When a switch is pushed, it indicates that the specific source is not present. Relay drivers are used to flip a specific relay to provide a continuous power supply after receiving output from microcontrollers [1]. Battery life is increased, system temperature is decreased, and fan noise is also decreased when the system's power consumption is decreased. The From a stock distribution design to a fine-tuned system, power consumption may be significantly reduced. The primary goal of this project is to supply a load with electricity continuously by automatically choosing a power source from any of the four available options—mains, wind, solar, and generator—in the event that none of the sources are available. Since the dawn of civilization, people have utilized wind and sun energy to propel sailboats, grind grain, and pump water from deep wells. In pre-industrial Europe, windmills were used for a variety of purposes, such as pumping irrigation or drainage, grinding grain, sawing lumber, and processing other goods including tobacco, paints and dyes, cacao, and spices. Both water-pumping windmills and tiny wind electric turbines, often known as "wind chargers," were essential to farming and the development of the American Great Plains and west before the United States constructed an electrical wire system. The industry has been refining wind turbines to harness wind

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energy and turn it into electrical power in recent decades. Because of its numerous benefits, wind turbines are a desirable energy source, particularly in regions of the world with underdeveloped transmission infrastructure. Because of its modular design and speedy installation, it is simple to balance the supply and demand for power. The project may be further improved by utilizing more power sources, such as solar electricity, and then considering the best option whose tariff is now the lowest. The most crucial necessity for all of us is power. We are all aware that power outages are frequent because of the high demand for electricity and the producing station's limited capacity. The world's largest difficulty is the restricted power output at power plants and the lack of a continuous, non-renewable supply source [2]. Because wind is a free and abundant fuel, there is less need to buy, transport, and store pricey fuels. It is adaptable; with the electricity produced, homes may use appliances for refrigeration and lighting, schools can utilize computers, and industries and TVs have access to a dependable power source. Most significantly, unlike many other types of energy generation, the generator does not emit any toxic substances throughout the electricity generation process.

Four switches are used in this configuration to provide the appropriate breakdown of that power supply source. Any switch that is pushed indicates that the specific source is not present. The microcontroller receives input signals from switches. The relay driver IC receives orders from the microcontroller and changes the appropriate relay to maintain continually. Other sources will start to operate and provide a supply if the current source is regrettably interrupted [4]. Using other sources, like as wind, to provide an uninterrupted supply of power to the load, can improve this configuration even further. Electrical power distribution systems may now operate automatically thanks to this initiative, which also enables quick and dependable system switching between power sources under certain situations like regular power line maintenance and power outages [3]. A light that is originally powered by a single mains source is used to signify it. The load receives power from the next available source, such as a solar power plant, in the event that the mains supply fails, which is activated by pushing the corresponding switch. It moves to the next accessible source if the SOLAR fails as well, and vice versa. One source with alternating switches is given to provide the same purpose since it is not practical to offer all four of the supply sources as shown in the block diagram. In this case, the idea is that if a system is designed with two or more sources, it will continuously supply power to equipment using any one source while also taking into account the best alternative power source whose tariff is always the lowest. where the user is able to switch from a distance. Additionally, it will report on the state of the sources that are now operational [4].

2. BLOCK DIAGRAM

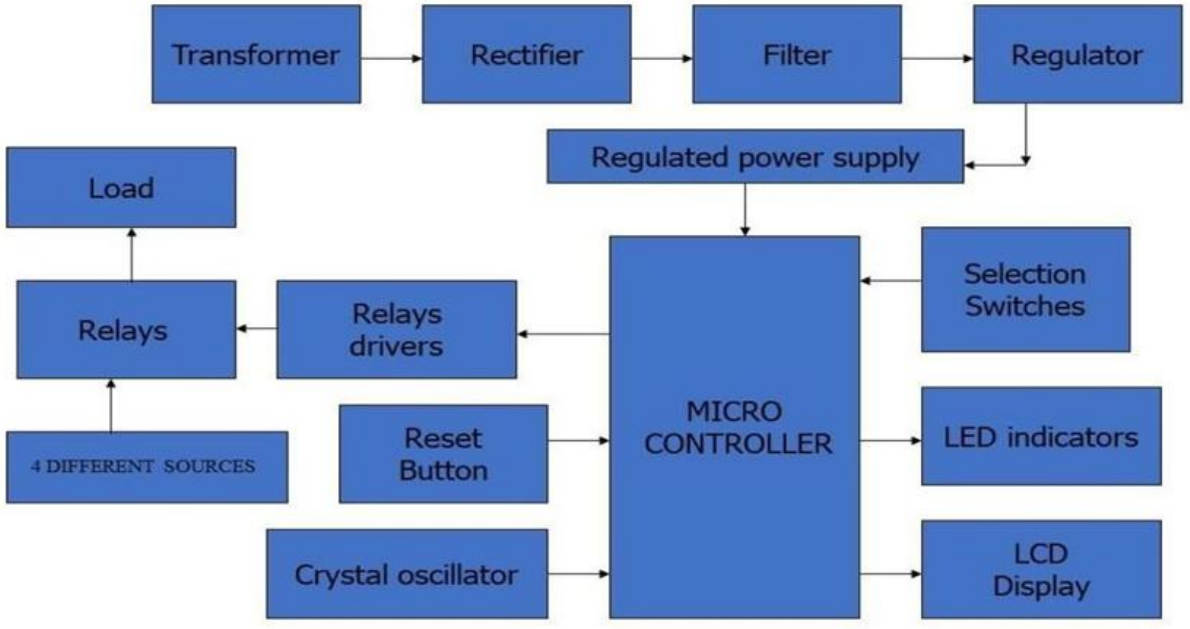

Fig 1. Block diagram

3. BLOCK DIAGRAM DESCRIPTION

3.1 RELAY MODULE:

The Arduino microcontroller's digital pin outputs operate the eight electro-magnetic relays that make up the relay module. The necessary number of capacitors for power factor correction are turned on via these relays. The contacts are only closed when the logic on any of the digital pins is high, and the layers are typically in the Normally Open (NO) state. The relay's normally open contacts shut when a pin's logic becomes high, and the matching capacitor is connected in parallel with the load.

Fig 1. Relay Module

A parallel port and bus are used to connect the relay module to the Arduino microcontroller's digital pins. The power supply provides a voltage of 12V to the relay driver. To show that the relay has been turned on and is operational, an LED is attached across each relay's terminals.

3.1.1 Specifications and Features:

1. One normally closed contact and one normally open contact
2. Channel:4channel
3. Relay Operating Voltage: 3.3V to 5V
4. Pull-down circuit for avoidance of malfunction
5. Power supply indicator and Control indicator led.
6. Input signal, signal, common Terminal and start conducting.
7. Useful for appliance control.
8. DC or AC signal, control, you can control the220V AC load.
9. There is a normally open and one normally close contact.

3.2 LCD DISPLAY

Seven data lines in total—three control lines and four data bus lines—will be needed for the LCD. The LCD will need 11 data lines in total if an 8-bit data bus is utilized (3 control lines + This serves as an illustration of the Parallel Port. This should work with the majority of parallel ports, if not all of them, because it does not utilize the bi-directional capability present on modern reports. Nevertheless, it does not demonstrate how to utilize the Status Port as an input. An LCD module with 16 characters and 2 lines connected to the parallel port. It can display 16 characters per line if it is an A16x2LCD.

Fig 3: LCD display

There are two lines like that. Each character is shown in a 5x7 pixel matrix on this LCD. Command and Data are the two registers on this LCD. An electrical display module with many uses is the LCD (Liquid Crystal Display) screen. A 16x2 LCD display is a relatively simple module that is frequently seen in many different circuits and devices. Compared to seven segments and other multi-segment LEDs, these modules are recommended. These include the following: LCDs are affordable, easily programmed, and have no restrictions on showing unique and even customized content. animations, characters (unlike in seven portions), and so forth. The LCD's command instructions are stored in the command register. An LCD receives a command when it is instructed to perform a certain operation, such as initializing, cleaning its screen, positioning the cursor, managing the display, etc. The information that will be shown on the LCD is stored in the data register. The ASCII value of the character that will be shown on the LCD is the data.

3.3 PIC 16F877A:

Given that it features several internal peripherals and a 40 pin DIP layout, it is simple to understand why the 16F877A is one of the most widely used PIC microcontrollers. Its lack of an internal clock source, in contrast to the majority of other more recent PICs, is its main drawback. With 368 bytes of RAM and 8k words of programmable memory (big enough for sensor and control projects), the 16F877A is a powerful microcontroller that can perform a wide range of activities.

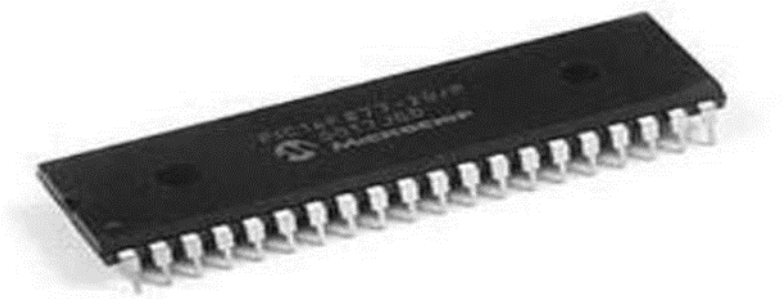

Fig 4: Pic microcontroller

3.4 Transistor as a Relay Driver: The load relays in this auto power supply management system are driven by a relay driver, which is a transistor. The microprocessor sends a signal to this relay to switch the load to a different supply source. It has a microcontroller interface and is powered by 5V DC.

3.5 Transformer: This system is directly connected to 220VAC via a transformer. 220V is stepped down to 12V.

3.6 Voltage Regulator: In order to provide power to the LED, microcontroller, and other components, the voltage regulator converts 12V DC voltages into 5V DC voltages. Voltages are regulated by the IC LM 7805 voltage regulator.

3.7 FILTERS: In this work, capacitive filters are employed. It eliminates the rectifier's output ripples. Until the mains voltage and load are kept constant, the DC output obtained from this filter remains constant; however, if one of these variables varies, the DC output obtained at this point varies. A regulator is used at the output stage of the device to get around this limitation. filter.

3.8 RECTIFIER: Bridge rectifiers are utilized in this job because of their advantages, which include complete wave rectification and great stability. Only two diodes will be in the forward bias state for one half of the cycle.

4. WORKING:

Wind power, one of the most promising renewable energy sources nowadays, need for more transmission capacity and better ways to maintain system resilience. Innovations in wind systems technology led to the development of a new generation of variable speed wind turbines, which provide several advantages over their fixed speed counterparts. A new stator field-oriented control method optimizes wind production by controlling the current in the closed loop and regulating the rotor speed of DFIG. Any time we press a switch, it shows that the particular supply—connected to the microcontroller as entry alerts—is not there. Here, we're utilizing 8051 family microcontrollers [5]. We have demonstrated the optimal power curve and the features of the wind turbine. The active and reactive power of the generator are controlled by stator currents, which deactivate them. A mathematical model of DFIG is developed using a PID controller and a current control loop. The results of the Simulink simulation show how effective the strategy is for optimizing the extraction of wind power. Renewable energy sources are increasingly appealing for power generation due to their clean nature and free availability. This system uses renewable energy sources in conjunction with the ATMEGA16 system CPU, which is more advanced than the 8051 microcontroller in many respects [6].

An integrated circuit is being designed to control this system. In the event that there are four stages, the switching will take place during the default phase. There are four relays that control the switching. The operation of the on/off switch will reveal the stages. Benjamin Franklin established the conventional model of current flow, which is still widely used by engineers today, and it states that current flows through electrical conductors from the positive to the negative pole. According to research, free electrons will nearly always flow toward the positive pole of a conductor [8].
In order to maintain a constant load supply, the microcontroller sends its output to the relay driver IC, which then adjusts the relay. In order to facilitate operation of the system from different places, we incorporated GSM technology into our proposed system. Modern GSM technology can get information from a variety of sources, including the status of a switch's on/off state [9].
Given the higher cost compared to more conventional energy sources,

It is not a good idea to do away with traditional sources entirely. Not only must we make use of both power sources, but we must also give serious thought to which sources to prioritize. Since power consumption will only go up, the endeavor is based on the idea that we need a reliable power source [10].

5. SCHEMATIC DIAGRAM

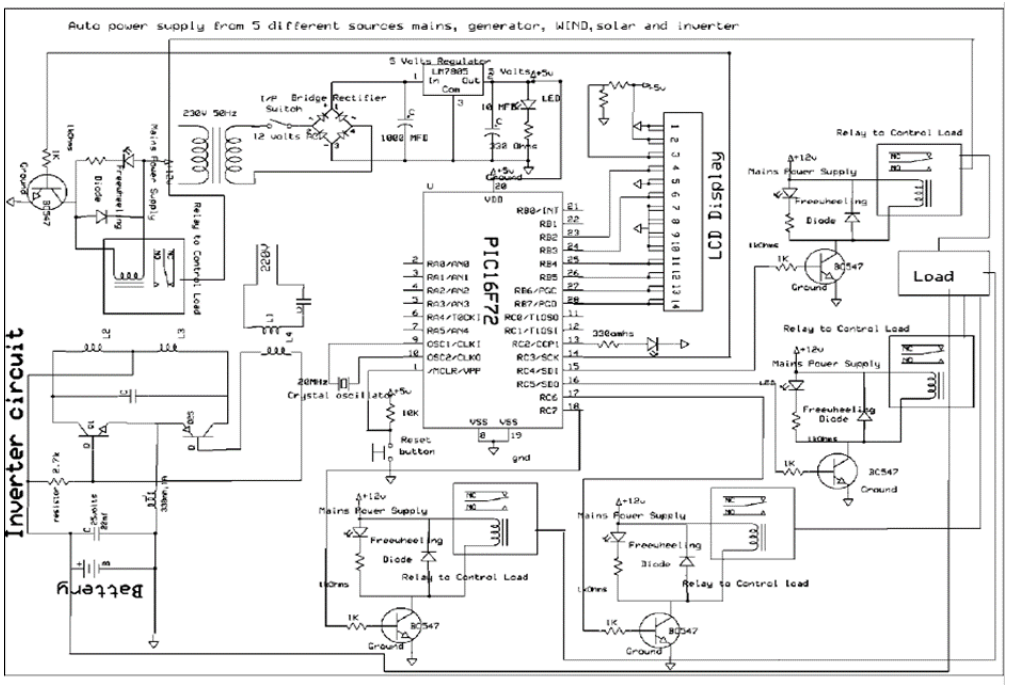

Fig 5: Schematic Diagram

Schematic Diagram of Four Potential Sources for Vehicle Power Power Source, Backup Power Source, The following schematic design shows the interface part of each component with the micro controller and relay, and it also shows the four sources of auto power supply: mains, generator, wind, and solar. The 9th and 10th pins of the microcontroller are linked to the crystal oscillator, and the microcontroller is also connected to the regulated power supply and the leds by resistors. The automation of switching between four separate sources is provided by a microcontroller (PIC/AT89C51). Separate sources are needed by the automation system for switching in order to provide an output signal that can activate the four relays that are linked to the sources [7].

6. ADVANTAGES

- When the power goes out, this project will automatically switch the UPS system on, and vice versa when the power goes on.
- Unlike nuclear electricity and fossil fuels, it does not harm the environment.
- A wind turbine can also harness this renewable energy source.
- Keeping energy usage down.
- Energy from the sun, wind, and other freely accessible sources
- Rechargable battery storage of energy.
- Lighting, fans, and other electrical demands may be controlled with the use of stored energy.
- Power savings will increase with the help of this initiative. What this means is that we can cut down on electricity waste.

7. DISADVANTAGES

- The usage of silver, a relatively expensive metal, for interconnecting these cells in the panel means that the overall manufacturing process is still rather expensive.
- The storage of power generally by solar cell panels is a practical concern associated with their use.
- During the day, storage batteries collect the electricity from the solar cell panels and store it. This stored energy is only available as direct current. Wind and hydroelectric power also provide direct current electricity.
- However, alternating current is required for the operation of our equipment. Because of the necessity to convert DC to AC before powering any item, the cost of solar panels and other renewable energy sources goes up.

8. APPLICATIONS

- Industrial areas.
- Household purpose.
- Shopping malls.

9. RESULT

It is the goal of the "AUTO POWER SUPPLY FROM 4 DIFFERENT SOURCES MAINS, GENERATOR, WIND AND SOLAR" project to automatically switch the UPS system based on the power supply from any of four sources: the mains, wind, generator, and solar.

10. CONCLUSIONS

It incorporates the capabilities of all the hardware components that were utilized. Each component has been thoughtfully considered and positioned to ensure optimal performance of the device. Second, the project has been carried out effectively with the use of cutting-edge integrated circuits made possible by expanding technology. The project has so been planned and executed without a hitch.

10.1 Future Scope

The use of alternative power sources, such as wind power, and evaluation of the optimal alternative power source with the lowest tariff at any given moment might further improve this particular configuration. Incorporating GSM and GPS into the idea would allow users to track their whereabouts and communicate with authorities via SMS.

REFERENCES:

[1] Suresh Sunil Gavandi, Vivek WamanraoTigote, Sampada Sudhakar Kadam, Ms. Ashwini Mhatre, "Multi Power Supply Using 4 Different Sources for No Break Power Supply" International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET) | e-ISSN: 2319-8753, p-ISSN: 2320-6710Vol 9, Issue 4, April 2020|| | Impact Factor: 7.089|

[2] G.G Akotkar, Vinayak Chavan, Hemant Kolate, Mehul Patil, Pushkar Patil, Vishal Kumbhare," MULTI-POWER SUPPLY USING 4 DIFFERENT SOURCES FOR NO BREAK POWER SUPPLY CYCLE" International Research Journal of Modernization in Engineering Technology and Science (Peer-Reviewed, Open Access, Fully Refereed International Journal) e-ISSN: 2582-5208 Vol:04/Issue:07/July-2022 Impact Factor- 6.752.

[3] Ashish Shastrakar, Abhishek Bhoyte, Sandhya Dhone, JayaMasram, "Multi-Power Supply Control By Usins Four Different Sources To Avoid Supply Interruption" IOSR Journal of Engineering (IOSRJEN) www.iosrjen.org ISSN (e): 2250-3021, ISSN (p): 2278-8719 Special Issue || Dec. 2019 || PP 16-18 International Conference on Management Practices, Innovations & Research 2019.

[4] Mr.MaheshGhadage, Ms.ShivaniBhogade, Ms.Shital Gholap," REVIEW OF GSM BASED MULTISOURCE POWER SUPPLY WITH NO BREAK TECHNIQUE" Vol-3 Issue-2 2017 IJARIIE-ISSN(O)-2395-4396

[5] Suraj.P.Turankar, Ganesh.V.Thengane, Vaibhav.A.Khangar, Divya.A.Bawane, " Multi Power Supply Using 4 Different Sources for No Break Power Supply" International Journal of Advanced Research in Computer and Communication Engineering ISO 3297:2007 Certified Impact Factor 8.102 Peer-reviewed / Refereed journal ISSN (O) 2278-1021, ISSN (P) 2319-5940 Vol. 12, Issue 5, May 2023

[6] Ashish Shastrakar, Abhishek Bhoyte, Sandhya Dhone, Jaya Masram, "UNINTERRUPTED POWER SUPPY CONTROL BY USING FOUR DIFFERENT SOURCE WITH IOT" © 2020 JETIR May 2020, Vol 7, Issue 5 (ISSN-2349-5162)

[7] TarunKaira, Deepak kulyal, Jitendra Kumar, Ankit Kumar Arya and S. C. Sharma, "Uninterrupted Power Supply to a Load using Auto-Selection between four Different Source" International Journal on Emerging Technologies (1): 573- 575(2017) ISSN No. (Print) : 0975-8364 ISSN No. (Online) : 2249-3255

[8] Porandla Srinivas, G Mahesh, Vinay Dubbaka, Thummoju Sharath Chandra, P Shoba," Auto power supply from four different sources monitoring and control over IOT" MuktShabd Journal ISSN NO : 2347-3150.

[9] Mr.ShahajiDudhate, Mr.AmolAttargekar, Mr.Dhanaji Desai," Power Supply Control from Different Sources" International Journal of Scientific & Engineering Research, Volume 7, Issue 1, January-2016 ISSN 2229-5518.

[10] Adarsh Kumar Pandey, Alka Mishra, Avinash Kumar Dubey, Drishti Chandrakar," A Survey on Uninterrupted Power Supply Using Four Different Sources" International Journal of Advanced in Management, Technology and Engineering Sciences ISSN NO : 2249-7455.