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Smart Auto Changeover, Power Supply Monitoring, And Controlling Using Iot

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Abstract:
The basic idea for the development of this topic is to provide safety to the not only hospital but also sensitive areas like ICU's, government offices. Automatic changeover for single-phase load is an electrical control panel that can give uninterrupted power supply for single-phase load under fault conditions of any one of the phases in the system. It is capable to transfer the load from the main supply to the auxiliary supply during fault. This paper presents a prototype of automatic changeover of single-phase load. The control panel does not require any other secondary supply to operate itself.

1. INTRODUCTION

I. In now days hospital faces a big problem about power supply. This problem is overcome by this project In this project we have use some units like power monitoring unit, smart changeover unit, generator, timer unit, auto start unit, metering unit, GSM & Control unit.

II. This project is most beneficial for hospitals because of failure of supply from MSEB. This supply is again back in few mins or sometimes it takes long time to back to supply. But in case of emergency in hospital this situation is dangerous, at this instant our project is major solution of this problem.

III. A microcontroller contains one or more CPUs (processor cores) along with memory and programmable input/output peripherals. The need for a steady source of power has called for an alternative source of power especially in Nigeria where power failure is prevalent. The introduction of these alternative sources of supply brings forth the challenge of switching smoothly and timely between the mains supply and the alternative sources whenever there is a power failure.

2. BLOCK DIAGRAM

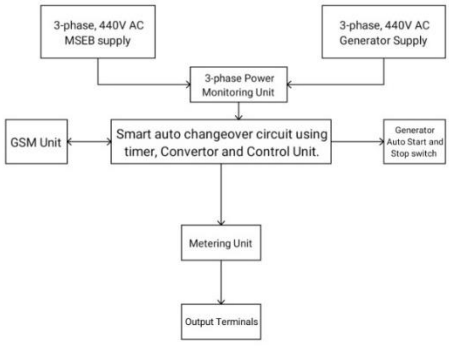

Fig 2.1 Block Diagram

This system is aims develop the Smart Auto changeover and power monitoring and controlling using IOT where this system consist of the following component Smart PID microcontroller based & inductive relay based 30 A capacity changeover unit , power monitoring unit/ display, generator auto start-stop switch unit, timer unit, Ac voltmeter, Ac Ammeter, GSM, IC ATML238, Adopter Banana socket, Backlight sheet. This project is most beneficial for hospitals because of failure of supply from MSEB. This supply is again back in few mins or sometimes it takes long time to back to supply. But in case of emergency in hospital this situation is dangerous, at this instant our project is major solution of this problem.

3. HARDWARE CIRCUIT DESIGN

3.1 Power monitoring unit

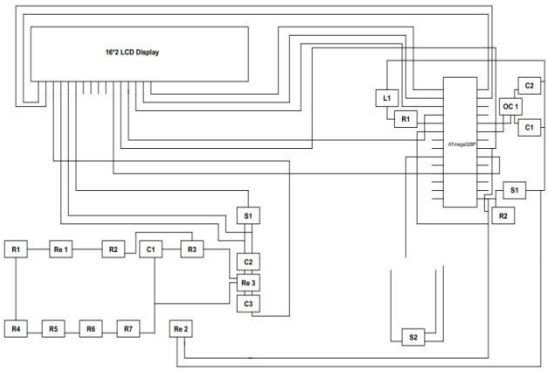

Fig 3.1 Power monitoring unit

Power metering systems measure energy consumption, control its quality, and relay this information from meter to concentrator or cloud. This helps put utilities in a position in which they can better manage the use of energy by means of load management.

The power monitor proposed assess and logs the supply voltage and current level at specific intervals of time. The system also includes a phase loss detection circuit which generates an interrupt whenever one of the phases of the system is out of balance. The system consists of a microcontroller and a power monitoring IC, which together serves the purpose of providing information about all the three phases.

3.2 Smart Auto changeover switch

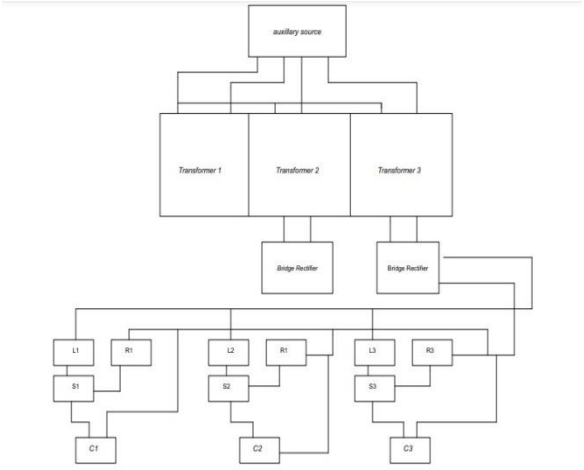

Fig 3.2 Smart auto changeover switch

Electrical transfer switch that switches the load between two sources. It works automatically when supply is failure, Then it automatically changes the source.

The project aims to design a prototype for automatic switch that transfers the load from mains to an auxiliary source, such as a generator, in an event of power failure or regular power outages. The project implements the starting of a generator as soon as the outage occurs. The circuitry comprises of relays and a control unit. Though the project remains to be a prototype, various precautions are taken to adapt to real life situations.

There are certain realistic assumptions that are made while designing the prototype. These are:

i. To Turn ON a generator we only need to switch ON a kick-starter (an electric motor that starts a generator).
ii. A reserved battery powers the kick-starter as well the switching circuitry once the outage occurs.
iii. The generator needs to be switched ON only if the power outage occurs for more than 2 seconds.
iv. Actuator needed to switch off the Generator will carry out its function once it is triggered by mains supply.

3.3 GSM Unit

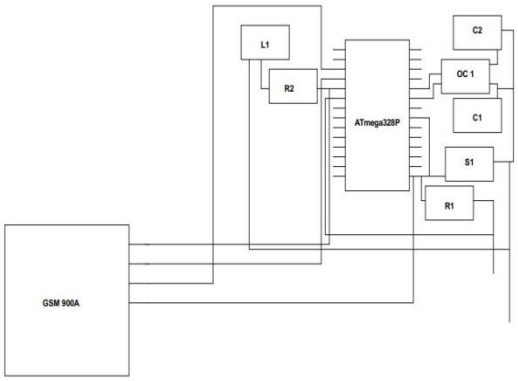

Fig 3.3 GSM unit

GSM mobile communication network system is currently the most extensive coverage, highest reliability, and maximum capacity, confidentiality and strong public wireless digital transmission system. GSM transmits data among vehicle units and the monitoring center. The performance of GSM plays a very important role in positioning systems. Real-time UML state machine is intuitive, platform-independent. LSPN is capable of theoretical analysis. Preliminary exploration with examples using real-time UML state machine and LSPN is presented to study the work mode of GSM communication module and analyze the performance of mobile communication network.

4. MODEL SECTION:-

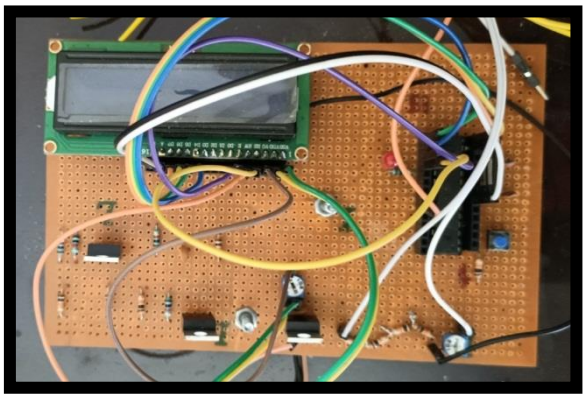

Fig 4.1 power monitoring circuit

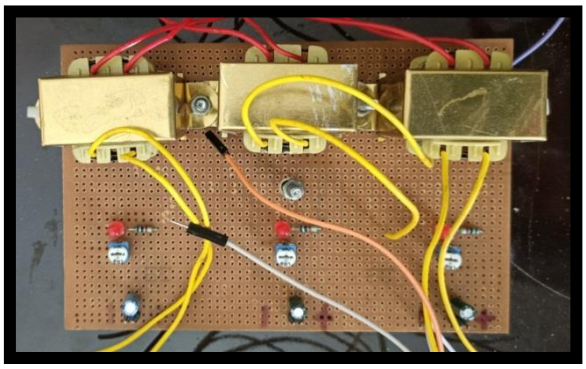

Fig 4.2 Smart auto changeover Circuit

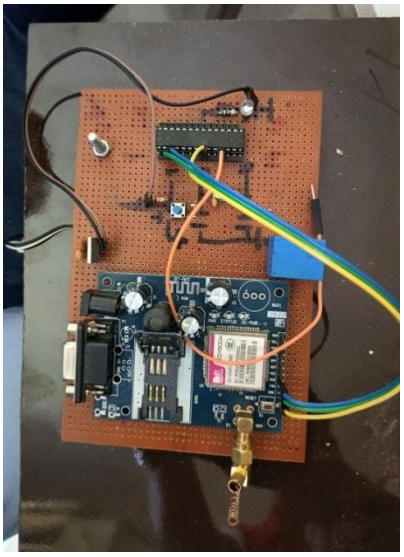

Fig 4.3 GSM circuit

Fig 4.4 Result 1

Fig 4.5 Result 2

5. ADVANTAGES

1. Necessary for uninterrupted electrical supply

If your company requires constant electricity to maintain critical services, then an automatic switch is your best option, especially if your services represent the financial interests or general safety of other parties.

2. Ideal for efficiently switching to generator power

Beyond the necessity of maintaining constant electrical supply, an automatic switch offer the most efficient way to change from utility feed to generator feed. Instead of locating manual switches after the lights go out, businesses can let the changeover happen automatically, the only scenario that wholly exempts a building from the noticeable effects of a power outage, allowing the business to carry on as before.

3. Ideal for less accessible generators

If you own a small business where the generator is located in an easy to access utility room, operating a manual switch might not be inconvenient. But for facilities whose generators are located in upper areas that require ladders, catwalks, and special keys to access, having to access manual models in the midst of an outage is inconvenient, and potentially dangerous.

6. FUTURE SCOPE

In future we extend input energy sources like green energy or renewable energy also we can use invertors additional energy input to the project model.

In future the we can advanced monitoring system is used like cloud and recent technology developing also we can add this to replace GSM Module.

7. CONCLUSION

In this project we are providing a solution for biggest problem faces by hospitals in because in our project providing in faction of seconds switching. In recent days all generators is auto started but switching time is very important, in our project we reduces maximum time of switching means in our project switching time is 0.02 sec. the problem is reduced by 60% in recent condition.

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