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AUTOMATIC SWITCHING SYSTEM FOR GENERATOR AND BATTERY BANK

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ABSTRACT

The Bastation Transceiver Station (BTS) [1, 2] and the related machines at Rideegama station of Sri Lanka Telecom have no power supply by the grid.Therefore a generator (Generator model is DenyoDA-6000SS) is used to power up the station. However, the generator cannot run 24 hours continuously. It needs to switch to battery bank and after two hours switch back to the generator for an electronic microcontroller based Automatic Switching system was developed for the purpose. Additionally, a monitoring system was included for Generator alarms and switching mechanism of the designed system.. But for power problem "Solar power" is good alternative solution for the existing system. The average solar irradiance to the Kurunagala region is 5.69kWh/m^2. This value is much hire when comparing with European countries. This solar power concept is popular due to the green energy concept. The initial coast of solar is high. But with profit it is not negotiable.

Keywords:*Switching, Bastation Transceiver Station (BTS), microcontroller*

1.0 INTRODUCTION

Sri Lanka Telecom Plc, OPMC Kurunegala serves thirty two BTS towers and the Redigama BTS is situated on a mountaintop. To reach the tower jungle areas have to be passed.

The Rideegama BTS power generator can onlyworkfor four hours continuously with its present conditions. After four hour running time it shuts down for two hours for cooling process. During this time station is running with 48V battery bank placed in the site. The switching process and is done manually a hired labor our. The Rideegama generator and Battery bank face technical faults daily because of labor our lack of knowledge about mechanical and electrical works. Therefore a system thatswitched automatically, monitor the switching process and alarms of the generator need to be developed.The developed switching panel and the alarm monitoring system willreduce the technical problems that occurthrough miss use the generator and battery bank.

2.0 EXPERIMENTAL

The switching System was developed as two units. One unit for controlling and the other one as a sensor to generate alarms and general readings. The main controller uses AVR Atmega32 microcontroller[3]. The sensor is based on Opto-coupler devices. It is to protect the main system from additional currents. The designed systems block diagram is shown bellow.

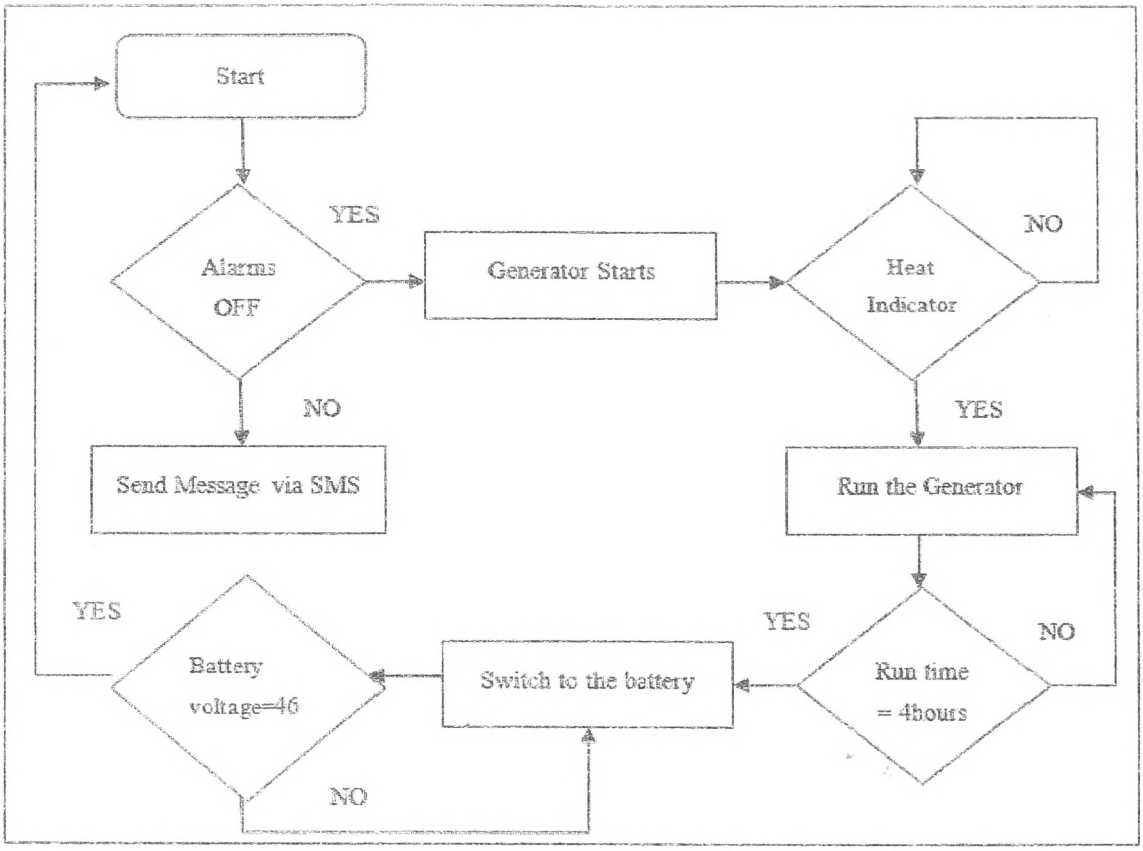

Figure 1: Functional block diagram of the designed switching system

The designed system circuit design includes two units as showed in figure 2 and 3respetively.

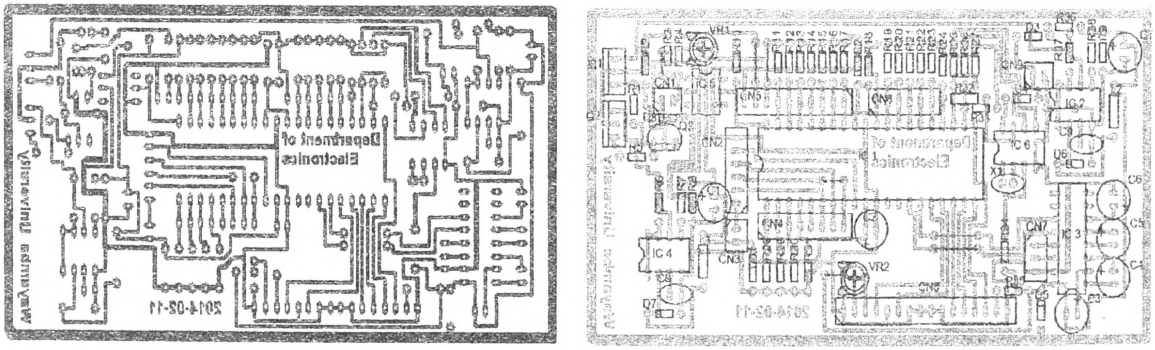

Figure 2: Developed Control panel circuit diagram of the system

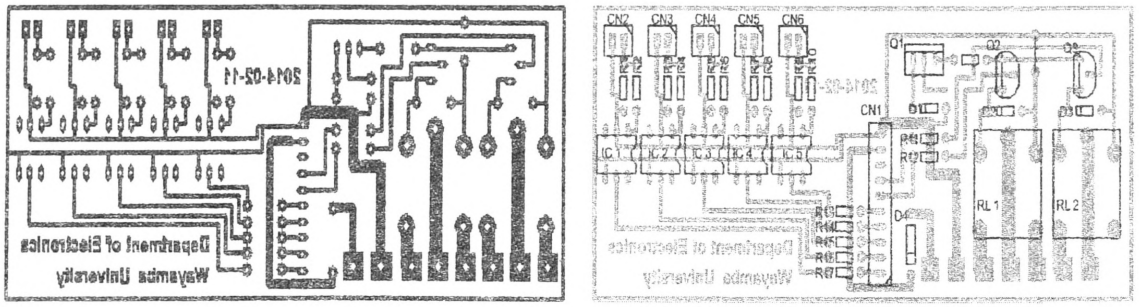

Figure 3: Developed sensor panel circuit diagram of the system

3.0 RESULTS AND DISCUSSION

The major result of this project is Automatic Switching Process without human effort. Generator works for four hours and then it switches to the battery bank placed in Rideegama Sri Lanka Telecom BTS. Site is working till battery power gets reduced to 46V. Then its sending message to start the generator and site is going to work from generator power. Other resulting are authorized officer received daily switching details such as generator on tome and off time and whether any alarm was indicates in the generator system sent a message to the authorized officer.

The objective of the project was to control switching between the generator and the battery bank. This solution was developed for the current system. But for a site running only with fuel (diesel) this is not a matured solution. Figure 4 and 5 shows the developed circuit diagrams with real components.

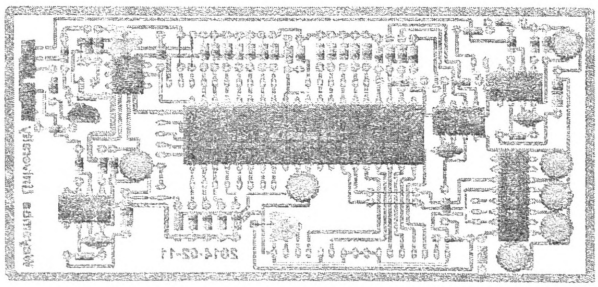

Figure 4: The Circuit diagram of Control panel

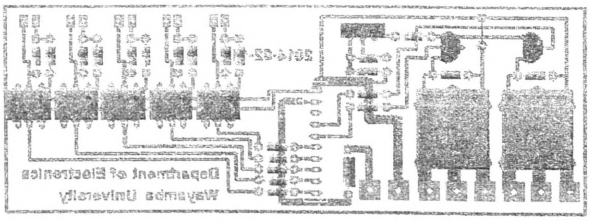

Figure 5: The circuit diagram of sensor panel

4.0.CONCLUSION

In this project final output is electronic microcontroller based advance automatic switching system for the generator and battery bank. With this solution existing systems can run accurately and system down time can be minimized. Alsosolar power is good alternative solution for the existing system to

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REFERENCES

[1]. Data Communication Fundamentals by the Thilak De Silva

[2]. Basic Concept of Telecommunication by the Thilak de Silava

[3]. www.atmel.com/images/doc2549.pdf