

Design and Implementation of Advanced Power Distribution System

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Abstract: The main aim of this project is to avoid complete shutdown of power due to increase in demand and constant production. In order to avoid this to maximum extent we are going to split the consumer load into parts and give different priorities. When the demand increases when compared to the production level the load with lesser priority should get off automatically and when the demand equals the production level it should get on automatically. So by using this system we can reduce the complete shutdown of power.

Keywords: Microcontroller, zigebee, voltage regulator, relay.

I. INTRODUCTION

Electrical energy plays a crucial role in every human's life today. Today we are facing scarcity of electricity everywhere and frequent power cuts due to lack of conventional energy sources for generating electricity. In a growing country like India frequent power cuts will affect the economy of the country seriously. The main aim of this project is to avoid complete shutdown of power. In current scenario power cut is a major problem in our state and it gets so worse day by day. The main reason for this was increase in demand and constant production. In order to avoid this to maximum extent we are going split the consumer load into parts and given a priority. When the demand increase the production level the load with lesser priority should get off automatically and when the demand equals the production level it should get on automatically. So by using this system we can reduce the complete shutdown of power.

II. MAINSTATION

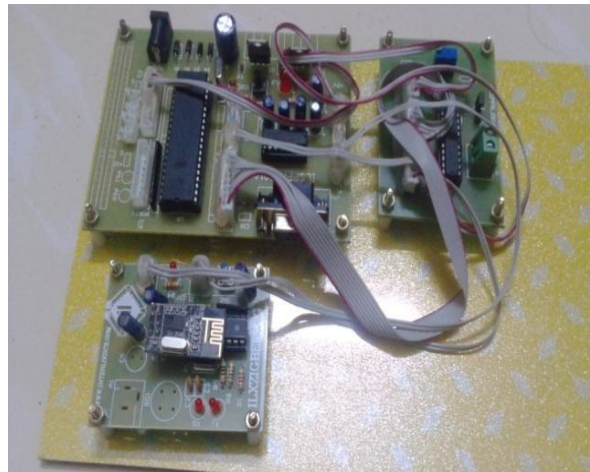


Fig 1 Mainstation

Here initially the source voltage level is measured by using the potentiometer and the value is digitized by means of the ADC. The microcontroller in the main station will transmit the voltage level to the sub-station through the zigbee protocol. The microcontroller in the sub-station will receive the data from the main-station and also measure the load voltage level in the sub-station.

These two voltages are compared and if the source voltage exceeds the load voltage means the power is distributed for all stages through controlling three relays. If the load voltage exceeds the source voltage means corresponding relays are turned off to control the power distribution. The source means power production unit output voltage will be measured and converted to digital value and send it to the microcontroller. Now the microcontroller will transmit the data through Zigbee using UART protocol.

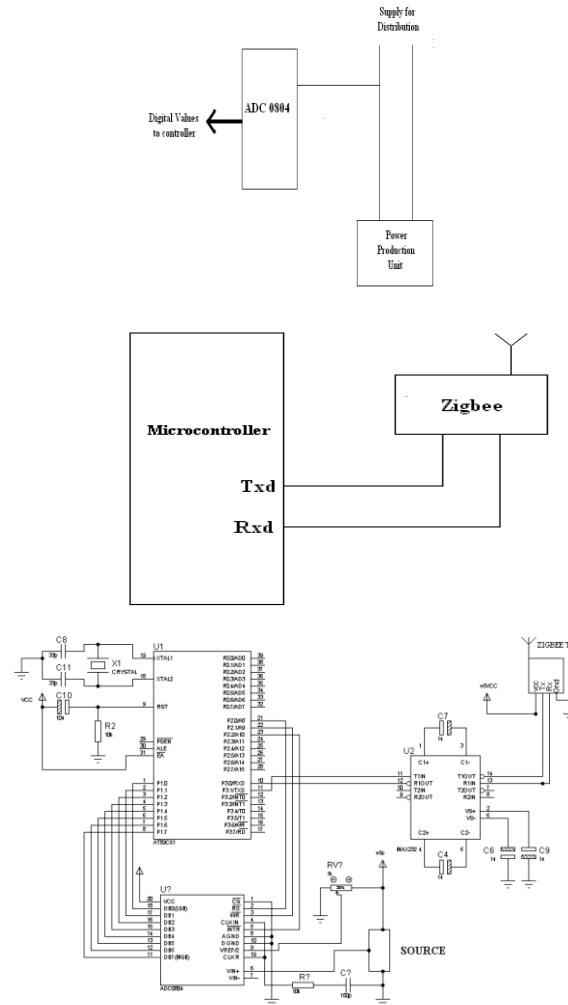


Fig. 2 circuit diagram of mainstation

III. SUBSTATION



Fig 3 Substation

Now the zigbee in the substation will receive the data and send to the microcontroller. Likewise same in the transmitter Side the receiver side load voltage was measured and send to the microcontroller. Now microcontroller will compare this two values. According to this value the relay are operated and load voltage was balanced.

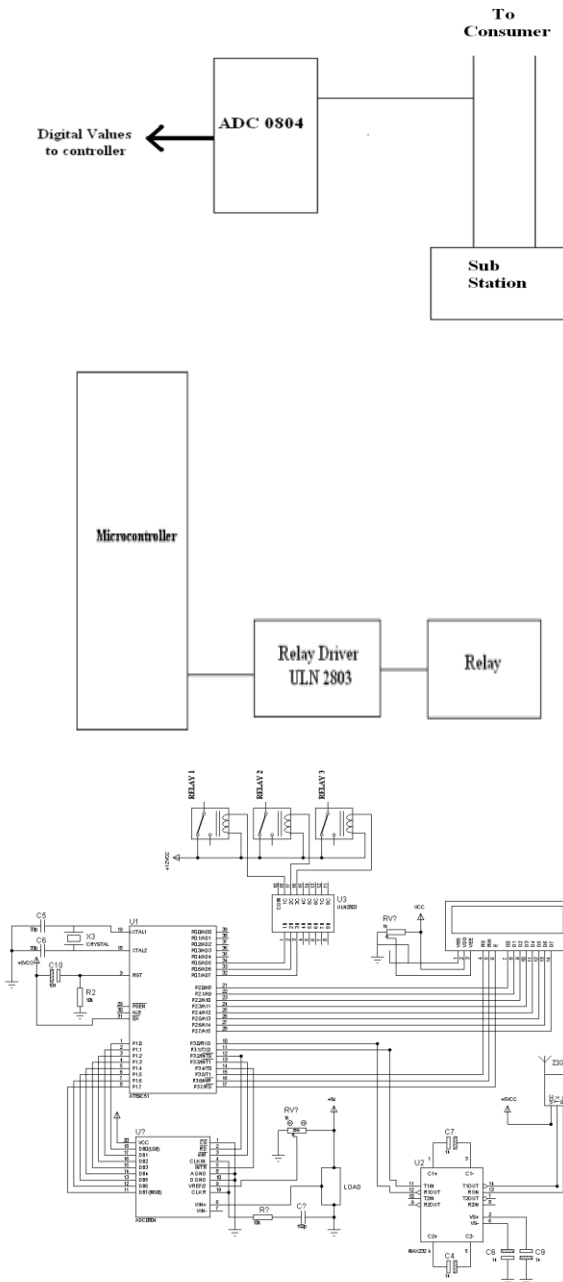


Fig. 3 circuit diagram of substation

IV. SOFTWARE AND HARDWARE REQUIREMENTS

Hardware:

- GUI - LCD 16x2
- ADC - ADC 0804
- Microcontroller - AT89c51
- Wireless Technology - Zig bee
- Tripper - Relay

Software:

- IDE Used - Keil u vision
- Programming Platform - Embedded c
- Debugger - Jet Flasher

V. HARDWARE OUTPUT

Conditions	Relay-1 (R)	Relay-2 (Y)	Relay-3 (B)
Load=Generation (about 100kw)	Y	Y	Y
Load>Generation (about 101kw)	Y	Y	N
Load>Generation (about 150kw)	Y	N	N
Load>Generation (about 190kw)	N	N	N

VI. ADVANTAGES

- We can avoid the unexpected power cut through our project.
- This will safeguard our appliances from the failure due to unexpected power cuts.

VII. APPLICATIONS

- Priority based applications can be implemented using this method.
- Power production unit management.
- Power distribution unit management.
- Private power distribution systems.

VIII. CONCLUSION

This paper presents a preliminary outline of a new research project and tentative hypotheses and observations that are to be corroborated through field research. Our main aim was to introduce a new perspective on the analysis of power-sharing agreements that highlights the variability of outcomes both within and across countries. Our preliminary research suggests that power-sharing, as a conflict resolution formula, escapes a clear-cut assessment, both in positive and negative terms. In our project has been designed and implemented well using embedded microcontroller. Here we effectively monitor the power generation and substation load usage. When the demand increase the production level the load with lesser priority should get off automatically and when the demand equals the production level it should get on automatically. The microcontroller in the sub-station will received the data from the main-station and also measured the load voltage level in the sub-station. The status of power distribution system was displayed in LCD.

REFERENCES

- [1] Yogendra Kumar¹, Biswarup Das², Jaydev Sharma³ KTH, Stockholm, "Genetic algorithm for supply restoration in distribution system with priority customers" 9th International Conference on Probabilistic Methods Applied to Power Systems, Sweden – June 11-15, 2006-05-20
- [2] K. Akoi, H. Kuwabara T. Satoh M. Kanezashi, "Outage state optimal load allocation by automatic sectionalizing switches operation in distribution systems," IEEE trans. Power delivery. 1987, vol. 2, no.4, pp. 1177-1185
- [3] K. Akoi, H. Kuwabara T. Satoh M. Kanezashi, "Voltage drop constrained restoration of supply by switch operation in distribution system," IEEE trans. Power delivery. 1988 vol. 3, no. 3, pp. 1267-1279.
- [4] C. C. liu S. J. Lee, S.S. Venkata "An expert system operational aid for restoration and loss reduction of distribution systems," IEEE trans. Power syst. 1988 vol. 3, no. 2, pp. 619-626
- [5] C. E. Lin et al., "A distribution system outage dispatch by data base method with real time revision," IEEE trans. Power Delivery, vol. 4. Jan. 1989.