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POWER LEVEL MONITORING SYSTEM FOR BATTERY BANK AT A BTS USING A GSM MODULE

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ABSTRACT

In mobile telecommunication,a Base Transceiver Station (BTS) is a piece of equipment that facilitates wireless communication between user equipment andthe network. Generally CEB power is used to power BTS and backup generator and battery banks are used as secondary power sources.But power generators are not available at every BTS site as backup power source due to commercial issues. Power issues mainly occurred when a battery bank served as an additional power source in the event of interruption the CEB power or at a breakdown of the backup generator. The power of the battery bank is automatically switched to BTS when CEB power is down. Then battery bank is gradually drained while reducing the voltage level of battery bank.The proposed system monitors the voltage level through voltmeter and transfers the measured data into personal computer by using max232 IC after converting the analog value to digital value using an ADC. Finally data is delivered to relevant site engineer via SMS by using GSM module.This power level monitoring system sends discrete voltage value of the battery bank imminently to the required authorities whereby they can quickly attend to draining of the battery. Thisstudy reflects optimum solution for the above recognized issue with most appropriate and cost effective manner.

Keywords: *Battery bank, Power level, GSM Module, Base Transceiver Station*

1.0 INTRODUCTION

BTS is an instrument that is used to interface mobiletelephone and the operating network. BTS consist with TREs(Transmitter Receiver Equipment), microwave equipment and routers.Therefore power sources are required in order to power telecom equipment in BTS. The power issue in BTS sites mainly occurredduring the interruption of CEB power and also when they have backup generatorswhich are having battery bank as additional power source. The power of the battery bank is automatically switched to BTS when CEB power is down. Then battery bank start to drain while reducing the voltage level. If the voltage level of battery bank is reduced below a certain voltage level,life time of battery bank will go down.Usually the cost of abattery bank is around Rs. 80,000. The service providers

have to spenda lot of money to replace the battery banks. With the introduction of the proposed system, power level of battery bank is continuously monitored by using a voltmeter and the voltage value of battery bank is delivered to site engineer via SMS.The main objective of the study was to develop a system to inform the relevant authorities before any kind of damage to the battery bank take place due to over draining.

2.0 EXPERIMENTAL

Battery bank of a BTS is connected to a rectifier in order to charge the batteries when CEB power is available.Power level of Battery Bank is drained according to capacity of the BTS site and the power from batteries is provided to both microwave link and BTS. The microwave link is given high priority over BTS during the operation with battery bank. Accordingly the disconnection voltages were defined as LVD1 and LVD2 (Low Voltage Disconnector). Maximum charge level of the BTS battery bank is 54 V.

Table 1: Low Voltage Disconnecting status according to voltage range of Battery Bank

Naming System	Range of voltage	Status	
LVD1	53V - 48V	Non-critical	Disconnect BTS
LVD2	48V - 42V	critical	Disconnect Microwave

If the voltage level of battery bank is below 42V it will directly affect to lifetime of battery bank.Voltage of battery bank can be easily measured through connecting probes between battery bank and rectifier[2].

In the proposed system the discrete voltage level of the battery bank is measured using this voltmeter. The observed analog value is then converted in to digital signal by using ADC module. Digital data of the voltage is transferred to personal computer through MAX 232 IC. Finally the data is send to the mobile of the site engineer via GSM mobile network with the help of a personal computer which is connected to GSM network via dongle. The system is generated the SMS at every voltage level of Battery Bank when it is gradually drained.

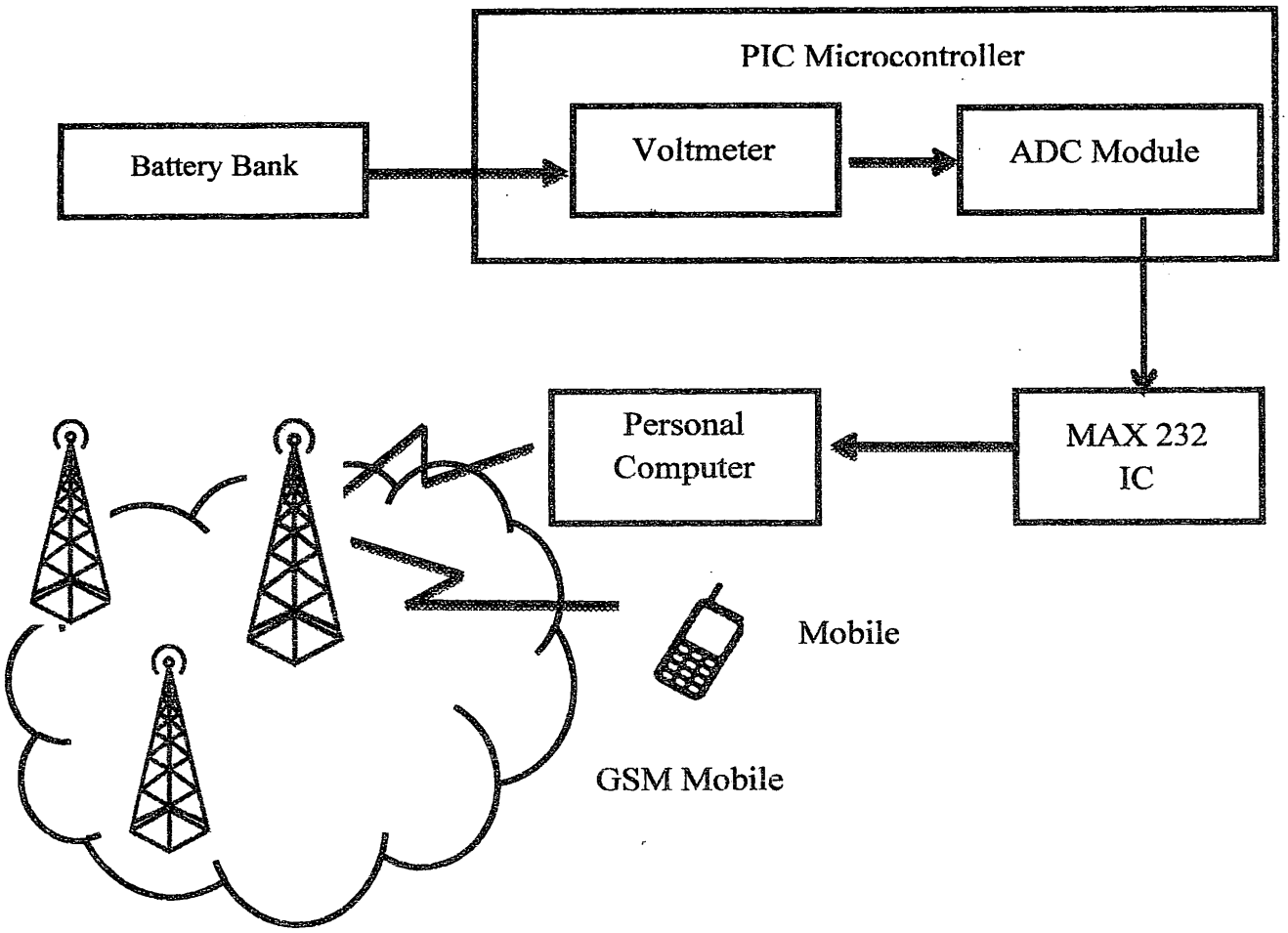

Figure 1: System Diagram of Power Level Monitoring System for Battery Bank at the BTS

3.0 RESULTS AND DISCUSSION

The major task to achieve during the development of this system was to reduce the cost since it has to be implemented to thousands of BTS sites belong to the mobile service provider. In the other hand the company was not willing to spend huge amount of money on the battery security system. Because, this product is not an income generator but onlyan expenditure for the mobile company.The other problem was the reliability.Failure of the CEB power is to be critical reason when considering about the stability of the mobile network. Throughout our country, the breakdowns of CEB power are very frequent. So that as mobile service provider they must adopt solutions to any incident that will affect to the consistency of the service.

The system was tested after completing the designing of and. Itworked successfully. Especially the voltage value was monitored by the voltmeter accurately and that value was passed to the mobile phone as quickly as possible.

4.0 CONCLUSION

By the proposed system, voltage level of battery bank is measured and measured data is transferred to site engineer via SMS. At present site engineer cannot exactly predicted how much time required to stop draining of the battery bank before it down up to critical power level after he was informed the situation by the Network Operation Centre(NOC).This solution makes the work of site engineers easier, thereby he will be able to prevent fully draining of the battery bank which will help to reducethe maintenance cost of the battery bank. When considering the all facts and the technology used, it can be assured that this system can be implemented toany area of the countrywith the guarantee that the system will work properly. To implement this system, a personal computer is required for every BTS site. As the further improvement,GSM dongle can be replaced with a GSM modem to speed up the communication.

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