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DESIGNING A MESSAGING SYSTEM FOR CHECKING MICROWAVE LINK VOLTAGE

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ABSTRACT

In a telecommunication site, there is a base transceiver station. Antennas, remote radio unit, battery bank unit and microwave links are the main components of a site. There are two voltages that should be supplied to the sites. They are battery low voltage disconnect voltage and load low voltage disconnect voltage. Normally in a site, battery low voltage disconnect voltage is 43.2 V and load low voltage disconnect voltage is 44 V. When the site gets 43.2 V, microwave link breaks down. When battery bank reaches 44 V, the microwave link is going to breakdown within several seconds. At present, a signal passes to the network operating centre only after microwave link breaks down. It is not an efficient way to maintain a site because after a microwave link breaks down, a lot of problems can occur during several sites. Therefore, an alternative is required to know about the condition of the microwave link before it breaks down. In this study, it was attempted to fabricate a design to identify the link voltage before breakdown occur.

Keywords: Microwave link, Battery bank, Base transceiver system

1. INTRODUCTION

A microwave link is a communications system that uses a beam of radio waves in the microwave frequency range to transmit video, audio or data between two locations, which can be from just a few feet or meters to several miles or kilometers apart[1].

Normally, the transmission site is functioning when the working voltage of base transceiver station is 44 V. In a site, microwave links are used to link two or more sites. To make a link with two or more sites, microwave link should be in "on" state. That voltage is 43.2 V. Therefore two voltages (44 V and 43.2 V) should be supplied to a site. These voltages are supplied through the battery bank.

The network operating centre (NOC) is the main control unit of the site[2]. When some issue is taken place at the site, alarms pass to the NOC. Then authorized person can identify the site and the problem. But for the proper functioning of these alarms, BTS should be in "on" state[3]. It means BTS should have 44 V. When this voltage is getting low, BTS comes to its "off" state. When BTS comes to off state, it cannot transmit alarms to the NOC.

If a breakdown of BTS happens at 44 V, sometimes microwave link is in "on" state. That means still site can link with other sites. The reason is Mw link breaks down at the voltage of 43.2 V. If there is a breakdown in a Mw link, engineers can identify it only after the breakdown. This creates so many problems in different forms. Through this project it is proposed a method to identify the Mw link voltage before breakdown.

2. METHODOLOGY

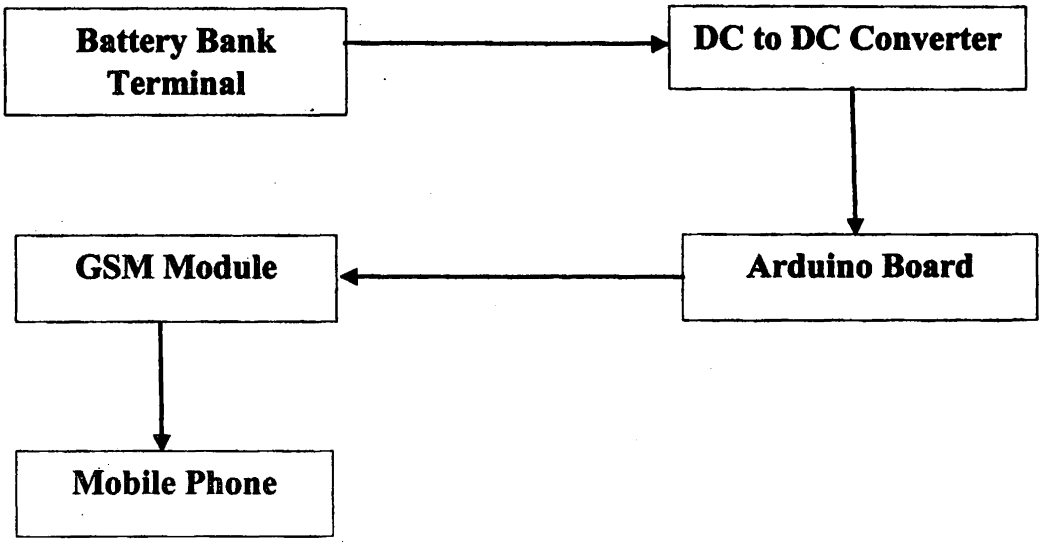

Figure 1: Block diagram of the circuit

Figure 1 shows the block diagram of the circuit. 0 V to 44 V voltages were supplied from the battery bank terminal[4]. Those voltages were taken as input to the DC to DC converter where they were converted to 0 V to 5 V. Converted voltages were supplied to the arduino board as its inputs. Arduino code was compiled using arduino software. Compiled code was written in arduino chip.The output of the arduino board was supplied to the GSM module. The messages were passed to the phone through GSM module.

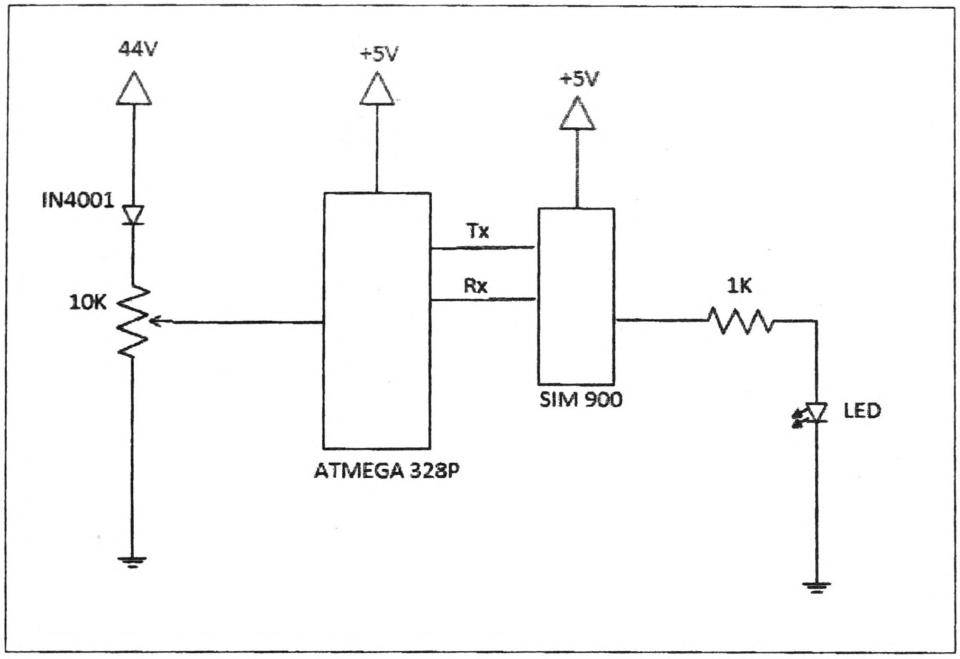

Figure 2: Circuit Diagram of the system

Figure 2 is the circuit diagram of the system. The circuit consists of a IN4001 diode, a 10K resistor, a 1K resistor, a ATMEGA 328P arduino board, a SIM 900 GSM module and a light emitting diode.

3. RESULTS AND DISCUSSION

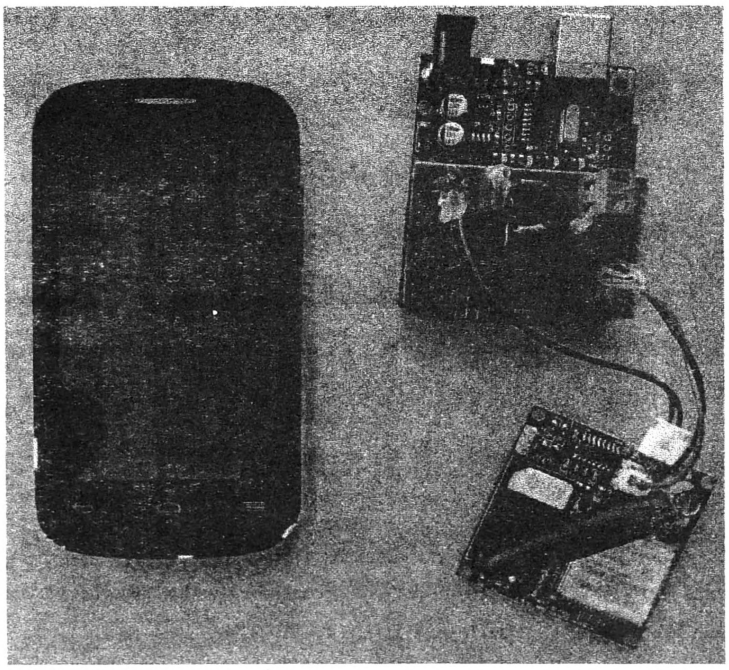

Figure 3: Picture of the completed circuit

When the BTS voltage is getting below 44 V, several messages are passed from the system. When the voltage becomes 43.9 V, "BLVD voltage is 43.9V" message passes to the phone. After getting 43.5V, "43.5V microwave link can breakdown" message passes to the phone. When become 43.2V, "43.2V Microwave link is disconnected" message is pass to the phone. From those messages engineers can identify the voltage before breaks down the microwave link. Then they can take suitable decision for that. This devise has several advantages they are[4],

- Easy to use
- Lower initial cost
- Time saving

4. CONCLUSION

The purpose of this project was to design a simple messaging system for Mw link voltages. This project was successfully completed with the proper designing and implementing the arduino simulation. The final outcome of this project was a reliable, cost effective real time messaging system which can be used for industrial purposes. Moreover this simple system doesn't require inconvenient wires because the system communicate through wireless connection. Also, this is a low cost design and hence affordable to any institution.

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