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# Transmission Line Fault Detection Using Android Application Via Bluetooth

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*Received: 14 December 2013 Accepted: 2 January 2014 Published: 15 January 2014*

## Abstract

Technological advancement and its incorporation is playing significant in human life. In present days, the demand on the electric power for the household, commercial and industrial loads is increasing. Also, the management of electric power distribution system is becoming more complex. Bluetooth based fault detection is a newly developing concept in the power system fault detection. This is a part of smart grid. The system is designed to detect the transmission line fault for the user to easily recognize the current condition of the distribution line. The ultimate objective is to monitor the distribution line status continuously and hence to guard the fault of distribution line due to the constraints such as overvoltage, under voltage, SLG, DLG faults. If any of these does occurs then a user can easily detect the fault.

***Index terms***— microcontroller, transformer, ICE, bluetooth module, bridge rectifier, android application.

i. INTRODUCTION rotection system's main function is to clear faults from the power system at high speed to ensure safety, minimize equipment damage and maintain power system stability [2]. Protection of power systems requires an understanding of system faults, their detection, and safe isolation of the faulted device. By taking an inventory of all the essential electrical loads and doing a basic electrical load evaluation [2], an idea regarding how much power our system needs to produce has been obtained. We are also aware about the power fluctuation situations also that means what voltage minimum / maximum we are getting from the A.C supply mains. In doing this project we would be using concepts of microcontrollers, Bluetooth Module and Android Application.

ii. FAULT TYPES AND PROTECTION a) Single-Line-to-Ground Fault A short circuit between one line and ground, very often caused by physical contact, for example due to lightning or other commomeans. The single line to ground fault can occur in any of the three phases [1]. However, it is sufficient to analyze only one of the cases. circuit between lines, caused by ionization of air, or when lines come into physical contact [1], for example due to a broken insulator. For a Line-to-line fault, the currents will be high, because the fault current is only limited by the inherent (natural) series impedance of the power system up to the point of faulty (refer Ohms law). Two lines come into contact with the ground (and each other), also commonly due to stormy weather or some other means [1].

Low voltage is a relative term, the definition varying by context. Different definitions are used in transmission and distribution line, and in the electronics industry. Electrical safety codes define "low voltage" circuits that are exempt from the protection required at higher voltages. These definitions vary by country and specific code. Lower voltage is defined as incoming line voltage at the point of use which is smaller than the Public Service Commission's mandated legal limits; and/or smaller than the voltage ratings of the connected equipment. Lower voltage is considered a safety hazard by all industry standards and can cause premature failure of connected equipment. Devices could be damaged by lower line voltage.

## 1 e) Over Voltage

Overvoltage is defined as incoming line voltage at the point of use which is greater than the Public Service Commission's mandated legal limits; and/or greater than the voltage ratings of the connected equipment.

Overvoltage is considered a safety hazard by all industry standards, and can cause premature failure of connected equipment. Overvoltage has been a widely known industry problem for many years, but it is not generally understood by many who have to deal with it. Power companies have been unable to control it adequately. Overvoltage occurs most often during severe cold winter weather for the following reasons: Step up transformer increases the magnitude of voltage while step down transformer decreasethe magnitude of voltage. Depending on the ratio of the number ofturns in the primary & secondary winding a transformer is characterized as step up or step down. For this project purpose, considering 1? voltage to be around 220 V, 3 step down power transformer of rating 220/12 has been used to represent a realistic representation of the 3? system. In figure **??**, the basic arrangement of the implemented project can be found.

16MHz. It has 16K bytes of flash and 512bytes EEPROM. Operating voltage 2.7v -5.5v, in active mode it consumes only 1.1mA & in sleep mode it consumes less than 1uA current which made it a perfect choice for his project [3]. Transmission Line Fault Detection Using Android Application Via Bluetooth source to DC voltage. Firstly, the AC input from mains is stepped down to a lower value of voltage. This AC supply is then passed through a rectifier circuit to remove the negative cycle of AC waveform. The resulting signal is then filtered to get the DC output. The major part of the circuit is connected to the secondary coil of the transformer which is comprised by diodes and capacitor. While the diodes act as a rectifiers, capacitor filters out the DC component from the circuit. Heart of the project is the microcontroller ATMEGA 16. In general the normal distribution phase voltage is 220 V, in this project we used a step down transformer 220/12 V for converting the phase voltage from 220 V to 12 V. Then, a bridge rectifier has been used for converting the 12 V ac to 12 V dc; after that, applied voltage divider converts the 12 V to 5 V because the microcontroller works at maximum 5 V. By this process the three distribution phase is connected into three microcontroller pins. At cases, when the distribution side is in load shedding protection of transformer must be ensured, which is why the microcontroller power is given from an external power source (5 V battery) backup and also the Bluetooth module power is given from external power source(4V battery). Bluetooth module communicates with atmeg16 through UART. RXD of Bluetooth module is connected with TXD of atmega16 and TXD of Bluetooth module is connected to RXD of atmega16.

# 2 b) Receiving side

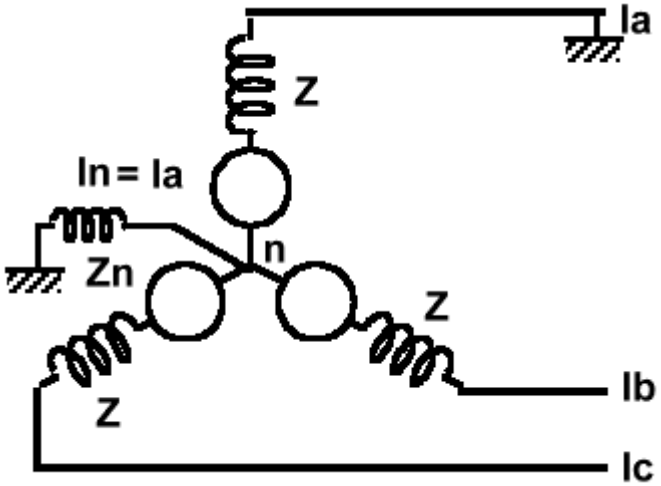
In receiver Side an Android Phone is connected with Transmitting side via Bluetooth Module CI Android Apps [6]. At first we connect the android phone with HC-The communication protocol is UART and baud rate is apps shows the data which is send by transmitting side. 9600 [4].

In view of the descriptions above, the implemented hardware can be found in figure 10. As viewed from figure 10, the system was found to be balanced three phase system. In figure 11, the corresponding representation appears in the LCD display with the phase voltages in all the phases to be around 219 V. The view from Android Phone is also shown in figure 12.

Figure 12 : Android Phone output in the distribution system results the Bluetooth modules to send instant messages automatically to the nearest user. Bluetooth based microcontroller Fault detection system will serve as a reliable, easy and cost effective solution for monitoring and controlling the electric distribution system. [1] [2]


**1**

Figure 1: Figure 1 :




**2**

Figure 2: Figure 2 :

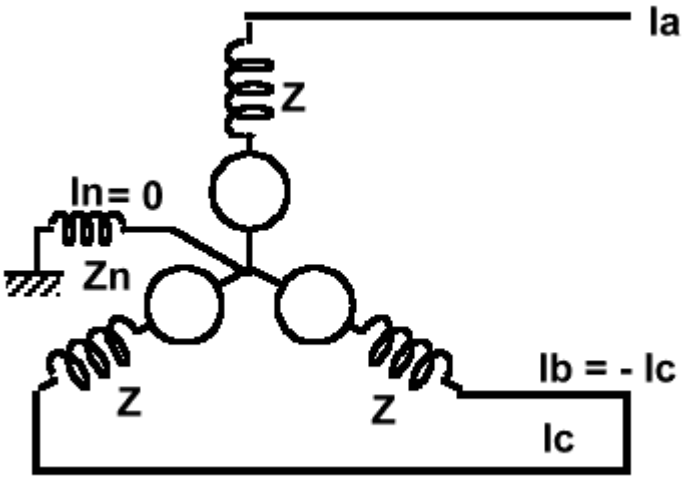
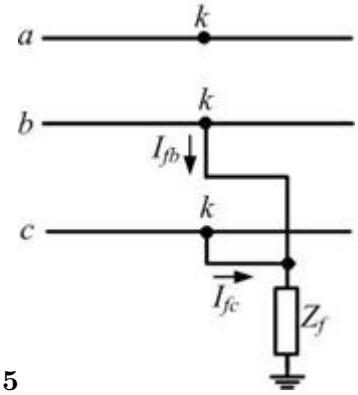



Figure 3:




**5**

Figure 4: Figure 5 :

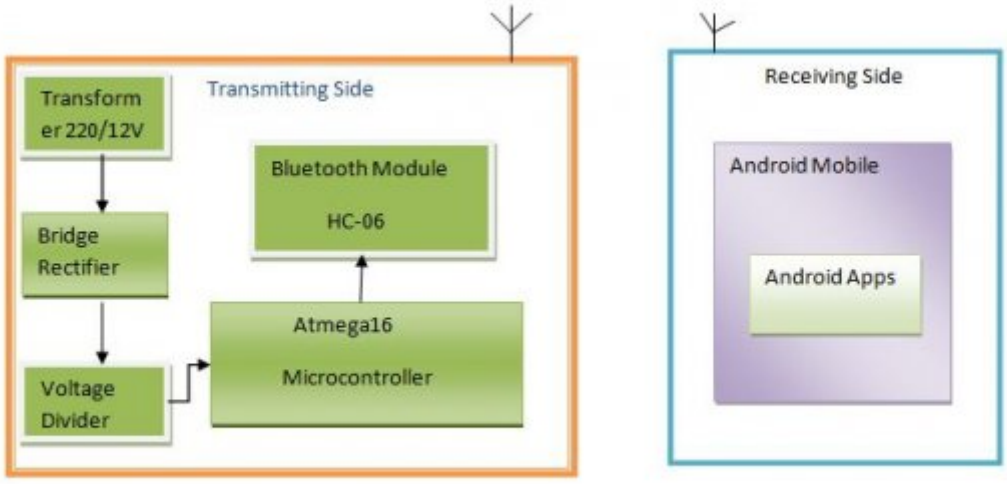



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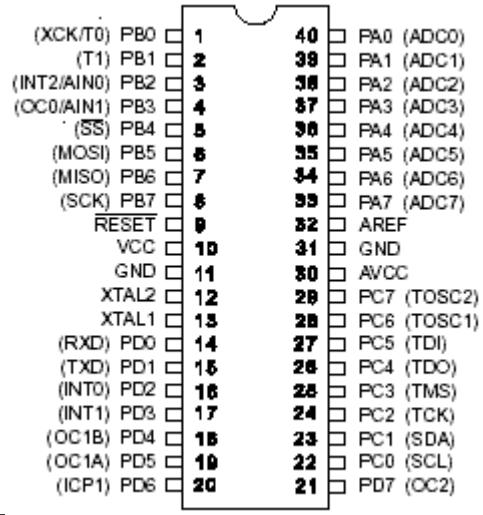
Figure 5: Figure 6 :

Figure 6:




**7**

Figure 7: FigureFigure 7 :

**8**

Figure 8: Figure 8 :

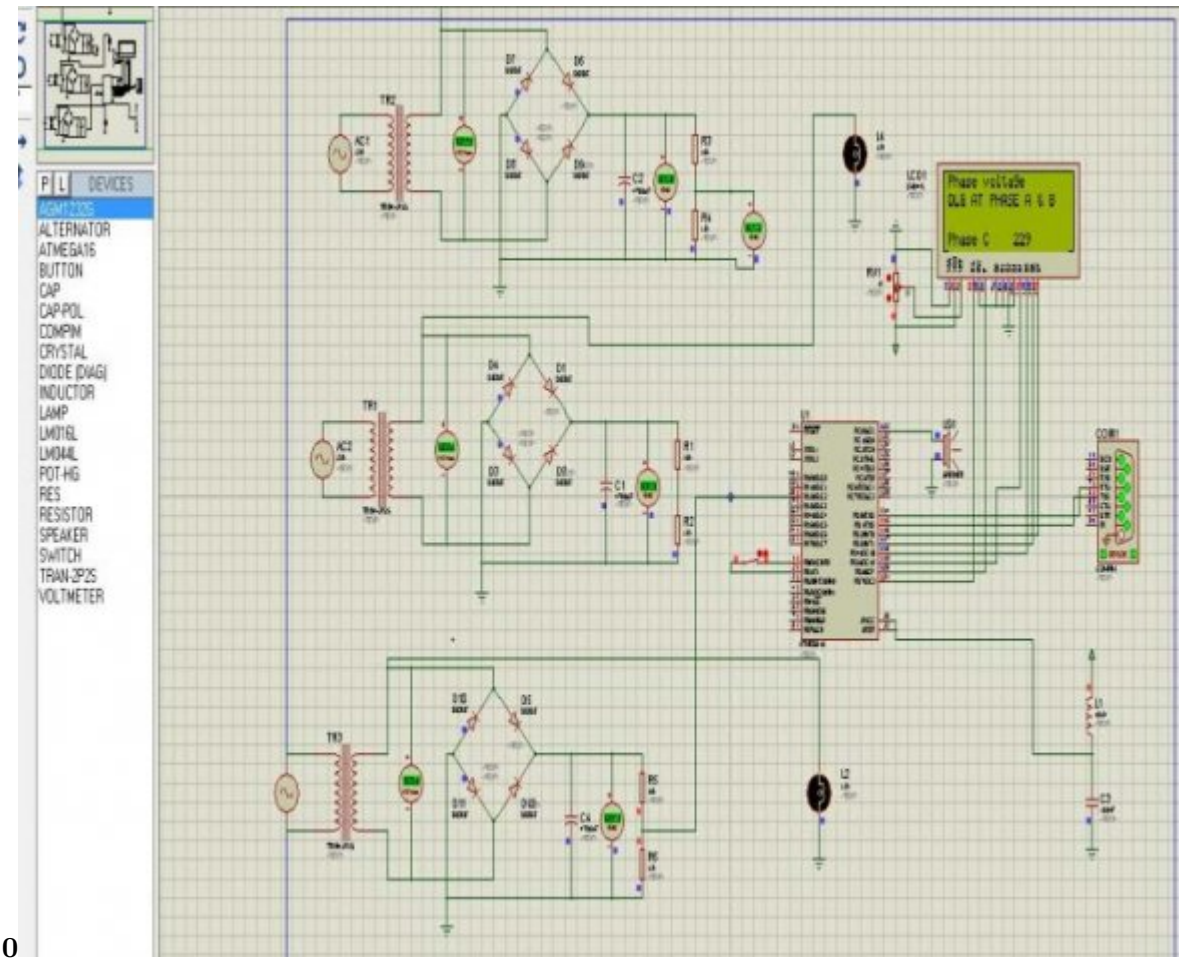



Figure 9: Figure 10 :





Figure 10:

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