

# IMPROVEMENT POWER SYSTEM STABILITY FAULT ISOLATION AND SUPPLY RESTORATION IN PARALLEL

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## ABSTRACT

Power Line fault detection and location are designed based on the Zig Bee wireless protocol. The hardware is designed to connect to the model with an LCD display. The effectiveness of the prototype model was tested. During the test process, no problems were found with the hardware unit that was in contact with the Zig Bee or for monitoring. The current sensor unit works fine. The perceived line current is transmitted to the monitoring room. The combination of the current sensor and the Zig Bee wireless network enables it to continuously monitor the R.M.S current at high voltage lines. Finally, if we can do more research on the system, it will be able to practice a simple, effective, accurate and fast method for electrical fault detection and location, which can contribute to a new type of electrical system based on smart grids. There are three main parts of the electrical system - power generation, transmission and distribution. In these areas, keeping the transmission and distribution lines intact is one of the challenges and difficult tasks facing the EB sector. Many times, the failure of the transmission line is not observed. The client believes that the power is turned off, and the EP employees will not do anything because they do not know what their failure is. Transmission lines are located in the far corners of cities, towns and villages. In all these cases, it can be difficult to hire someone to track these transmission lines. Sometimes in villages, people demand for themselves to correct the fault with the transmission line rather than calling the transmission line person. This can lead to accidents and safety risks. The project proposes a unique method to monitor transmission lines with the help of wireless technology

**Keywords:** Zig Bee, Transmission Line.

## 1.INTRODUCTION

Quick and efficient isolation methods for detecting faults in high voltage direct current (MV) microcircuits rely on rapid integration between power converters and bus separated contacts to control current and isolate faults without the need for these active components. Speedy communication. Once the power converter recognizes the fault, they enter the current-limiting mode independently, and the separated contact automatically determines whether it should be divided according to the local interpretation of the travel time curve and the change of apparent circuit resistance. This method only allows the converter and contact local measurements to be used when identifying whether to travel to isolate the wrong area. The microcontroller-based distributed sub-power monitoring system can monitor voltage and current. The power generation and transmission sectors are formally monitored by utility companies involved in their operations. This distribution does not appear to have the same level of monitoring as the other two regions. In most cases, if a supply substation fails, it is easy to find the cause of the failure due to poor monitoring and it may take some time for the utility company to restart the power supply. This is often caused by ineffective monitoring of the distribution network. Good.

In this mode, there are different modes in which the zig bee is enabled and the command will be entered shortly. Transmission mode. This is the method by which zig bee send commands received from the system to the receiver. Command mode, where commands are entered into the system. Then send the command to Zig Bee. Before sending the command the data was sent to the Zig Bee. Get into the mode. Zig Bee Receiver This is the method of receiving commands sent from the Zig Bee transmitter. Automation is a necessity. Automation is the application of control systems and information technology to streamline equipment, industrial machinery and processes, thereby reducing manual intervention. Automation plays an increasingly important role in the global economy and daily engagement.

Engineers work to integrate automation tools into math and organizational tools to create complex systems for rapidly expanding applications and human operational parameters.

### **1.1 SCOPE AND OBJECTIVE**

The purpose of the automation system behind this is to reduce the complexity of the system, reduce financial costs and waste of available electricity, save human energy and make human life easier and easier. The goal is to keep track of the device, which can easily change the state of the device and remotely access the device. One of the smart things is that it brings comfort, security and a sense of congressman. Smart also offers energy efficiency (lower operating costs) and is convenient for everyone at any given time. Automation refers to the effective use of home monitoring and intelligent control materials. In home products, information must be intelligently interconnected and provide better functionality.

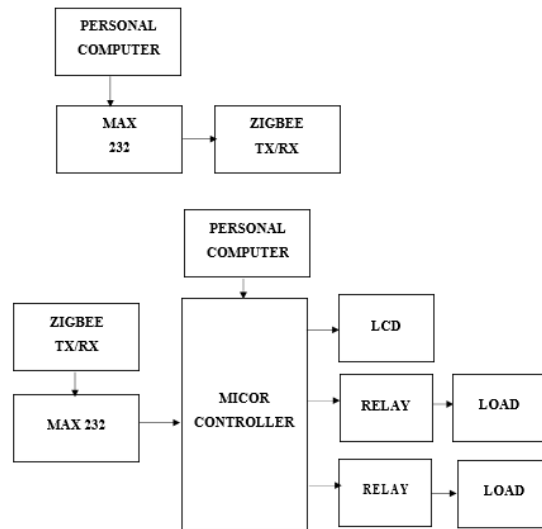
## **II LITERATURE REVIEW**

New solution for power quality management of photovoltaic (PV) power plants using transformer integrated filter. The invention of the photovoltaic power station is that it has a two-stage filter station with integrated filters, a box transformer, and a grid-connected transformer based on induction filtration [1]. Power quality has a bad economic impact on utilities and customers. Harmonics at current and voltage is one of the most common power quality problems and can be solved by applying a hybrid series active power filter (HSAPF). In this manner, a new controller design using a sliding mode controller has been proposed to make HSAPF more robust and stable [2]. Currently, renewable energy-based micro grids require appropriate control functions to meet the requirements for power quality in power distribution systems. The power system traditionally uses the necessary control measures, such as the voltage and frequency of the microcircuit, to maintain the power generation / consumption balance and is essential for sustainable operation [3]. As the penetration rate of wind power plants (WPP) continues to increase, the grid interconnection phase (POI) faces the greatest power quality challenges. Reactive power plays an important role in achieving sustainable and sustainable power system operation. Reaction power required to compensate for voltage fluctuations in WPP's POI varies with short circuit rate (SCR) [4]. In this method, a LVRT control strategy based on positive/negative sequence droop control is proposed for grid- interactive MGs to ride-through voltage sags with not only inductive/resistive, but also complex line impedance. By using the proposed control strategy, MGs can support the grid voltage, make profits, and also ride-through the voltage dip during the whole fault period [5]. In this method proposes a low-cost Wi-Fi based automation system for Smart Home (SH) in order to monitor and control home appliances remotely using Android-based application. An Arduino Mega microcontroller provided with Wi-Fi module is utilized to build the automation system [6]. During the last decade, plenty of devices labeled as "smart" have appeared in the market with the promise of taking the relationship home-user to a new level. Unfortunately, most of these devices are not able to interact with one another and the "smart" solution reduces to the use of a phone app to control a particular device or process [7]. Maintain comfortable living conditions within a home, home monitoring and automation are utilized. The standards of human's comfort in homes can be categorized into several types. Among these categories, the most significant ones are the thermal comfort, which is related to temperature and humidity, followed by the visual comfort, related to colors and light, and hygienic comfort, associated with air quality [8]. The Internet-of-Things (IOT) is a fork of the web service process and new trends in technology have quickly gained attention in the area of home automation. IOT forms an integral part of the home intelligent process, and its security and integrity are controlled by the human / autonomous regional interface [9]. Wireless charging is a technology inspired by the basic principles of Tesla's wireless power transmission. Deliberately transmitting power to electrical devices through the air gap, as the data is transmitted seamlessly through the air [10].

## **III PROPOSED METHOD**

To protect from short-circuit faults, we propose a fault detection system that provides coordination between the current limit setting points of the transformer, main bus contact, and load area contact. Power transmission over an overhead transmission line is a widely used method of transmitting power from one location to another. Failure in this basic service is a major issue. The location of the failure must be determined from it. Even if manual detection is required for fault detection, technical assistance can save time and resources. The electrical system consists mainly of three parts: power generation, transmission and distribution. Currently, the electrical infrastructure is affected by a variety of natural and malicious physical events, which can adversely affect the overall efficiency and stability of the electrical grid. Therefore, it is very important to detect the fault point of the electrical connection to ensure the

healthy functioning of the electrical system. To study the compatibility of wireless sensor networks in power line monitoring and monitoring systems, a prototype model of distribution lines based on current sensors and wireless protocols was designed. This method describes the operation of wireless monitoring, detection and detection of failed nodes. Zig bee modules are used for WSN, and XCTU software is used for its configuration. Zig Bee based automation systems provide remote access to users for monitoring and control purposes. Zig bee wireless devices are very popular for their low power consumption. Zig Bee uses short-range wireless protocols and provides full functionality Execution ability. This makes full automation wireless. Based on the data received from the sensors connected to the device via the Zig Bee module with the controller

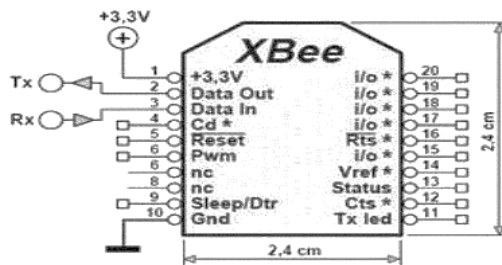


**Figure 1: Proposed Block Diagram**

**3.1 BLOCK DIAGRAM EXPLANTION**

**4.1.1 Zig Bee transmitter and receiver.**

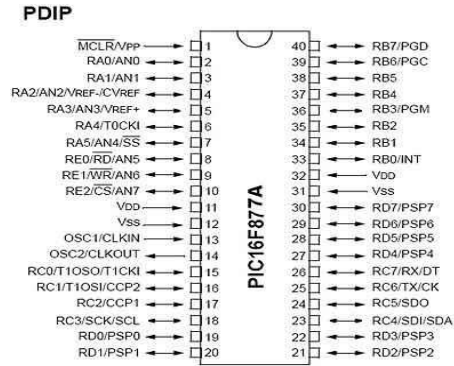
Zig Bee is the "Internet of Things" specification for communication in wireless personal area networks (WPAN). Theoretically, a bee enabled embedded application. Zig Bee is an open, universal, packet-based protocol designed to provide secure, reliable, and easy-to-use architecture for low-power wireless networks. Zig Bee and low-data-weightless network standards eliminate expensive and brittle wiring in industrial control applications. Flow or process control equipment can be used in any case and interact with the rest of the system. This can also be caused by the internet location of sensors, pumps or valves that the network does not care about



**Figure 2: Zig Bee pin configuration**

**4.3.2 MICRO CONTROLLER (PIC16F877A)**

Peripheral Interface Controller (PIC) is a microcontroller developed by Microchip. PIC microcontrollers are fast and easy. When compared to other microcontrollers like the 8051 for easier programming, it is easier to interface with other devices. PIC becomes a successful microcontroller. Design plan. As we know, the microcontroller is an integrated chip.

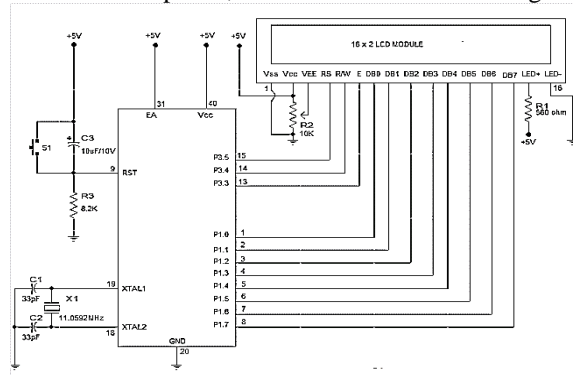


**Figure 3: PIC Pin Diagram**

PIC is a microcontroller which also consists of RAM, ROM, CPU, timers, counter, ADC (analog to digital converters), DAC (digital to analog converter). PIC also supports the protocols like CAN, SPI, UART for interfacing with other peripherals. PIC mainly used modified Harvard architecture and also supports RISC (Reduced Instruction Set Computer) by the above specification RISC and Harvard we can easily that PIC is faster than the 8051 based controller which is made-up of Von-Neuman architecture. The PIC Microcontroller PIC16F877A Is One Of The Most Renowned Microcontrollers In The Industry. This Controller Is Very Convenient To Use, The Coding Or Programming Of This Controller Is Also Easier. One Of The Main Advantages Is That It Can Be Write-Erase As Many Times As Possible Because It Use Flash Memory Technology. It Has A Total Number Of 40 Pins And There Are 33 Pins For Input And Output. An EEPROM Is Also Featured In It Which Makes It Possible To Store Some Of The Information Permanently Like Transmitter Codes And Receiver Frequencies And Some Other Related Data.

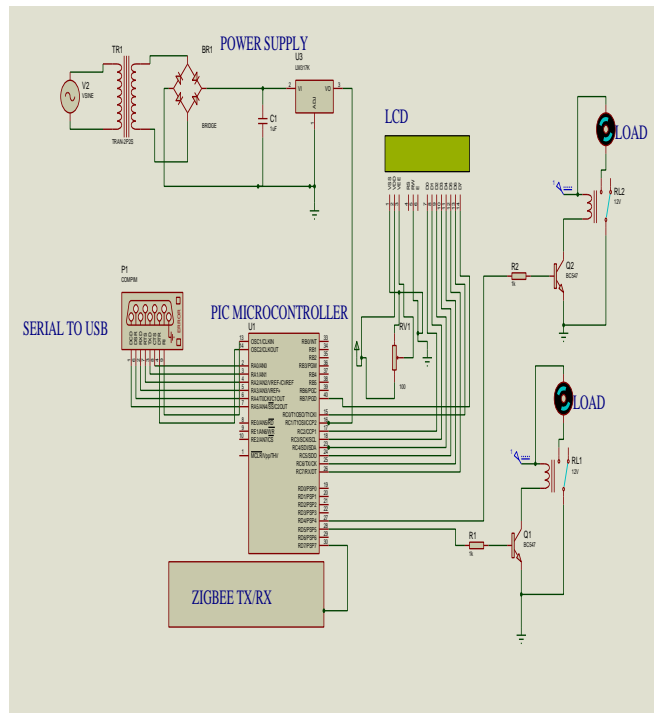
**4.1.2 LCD display**

A liquid crystal display (LCD) is a flat panel display, electronic display or video display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. The LCD display can be used to display any image (such as a general-purpose computer display) or to display or hide a static image such as a preset word, digital, and a 7-segment display on a digital clock. They use the same basic technology, except that any image is made up of a large number of small pixels, while other scenes have larger components.



**Figure 4: Circuit diagram of LCD**

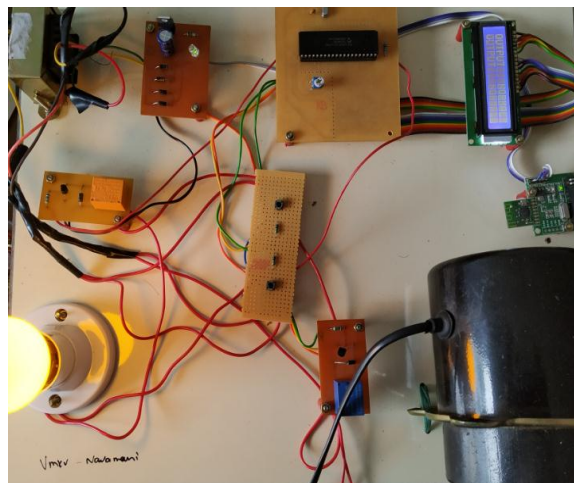
**IV CIRCUIT DIAGRAM**  
**4.1 Hardware Circuit Diagram**



**Figure 5 Circuit Diagram**

- In this method Devices which are to be controlled in which act as controller, sensors for the purpose of sensing the current status of the devices and Zig-Bee module as a wireless communication device.
- The data transfer takes place in serial mode as well as Bidirectional that is this works like a transceiver.
- Based on the data received from the sensors attached on the devices via Zig-Bee Module, the controller will examine the current status of the devices and if some remedy is required then it will send the Controlling signals back to the devices

**4.2 Hardware Circuit Diagram**



**Figure 6 Hardware Model of the prosed system**

- The Zig-bee modules are used in the proposed system that is one at the transmitter section and other at the receiver section.
- The device connected with the controller by UART Max 232. At one end, there are buttons to control the devices and the LCD to display the status of the devices as on/off.
- At the other end, there is a relay card of relays connected with the microcontroller.
- The microcontroller can switch on/off devices with the help of relay card, according to the command given at the transmitter.
- As the user press any key at the transmitter end, a proper data is sent to the Zig-bee of the remote end. The Zig-bee at the transmitter side will communicate to the Zig-bee connected to the other side i.e. at the receiver device end.
- At the device end, the Zig-bee will receive the data and feed it to the microcontroller. The microcontroller will check the data and turn on/off the proper device with help of a relay connected at this end.
- It can also send a feedback message to the transmitter end and the display on the transmitter will be changed according to the status of the devices.

#### 4.3 Hardware Specification

Hardware	Specification	Input Ranges	Output Ranges
Transformer	Step down	230v	110V
Microcontroller	PIC (16F877A)	5V DC	5V DC
Rectifier	Input power	230V AC	12V DC
Relay	Output Power	12 V	12V
LCD	16*2	(5,9,12vdc)	-
Load	Load	230V	4A

#### 4.4 ADVANTAGES

- Two level security system.
- Less time consumption
- The proposed system is secure and does not allow unauthorized user to access the system
- Safety monitoring of the environment.

#### 4.5 APPLICATION

- Lighting Control Leaving the Dark Ages and Stepping Into the Light
- HVAC Regulation: No Longer Burned by Your Heating Bill
- To help Handicapped people
- Where less energy consumption is major factor

#### V CONCLUSION

This method can automatically detect faults, classify the types of errors, and then display the defects on the LCD screen. Detailed information is sent to the authorized person's collection via SMS, and once a message is automatically sent using the IOT, the relay goes to the main unit to repair the power card. Automatic electrical fault detection is a device that detects, identifies, and detects faults in various natural or man-made power lines. This

project focuses mainly on a portion of the transformer power line connected to the customer. These failures directly affect customers, which need to be quickly discovered and corrected. This is done by placing a single unit by setting the voltage, current sensor and some points of the Zig Bee power connector.

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